CERTIFICATE OF NEED & ROUTE PERMIT APPLICATION FOR THE HVDC MODERNIZATION PROJECT

MINNESOTA POWER

E015/TL-22-611

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Prepared by:

merjent

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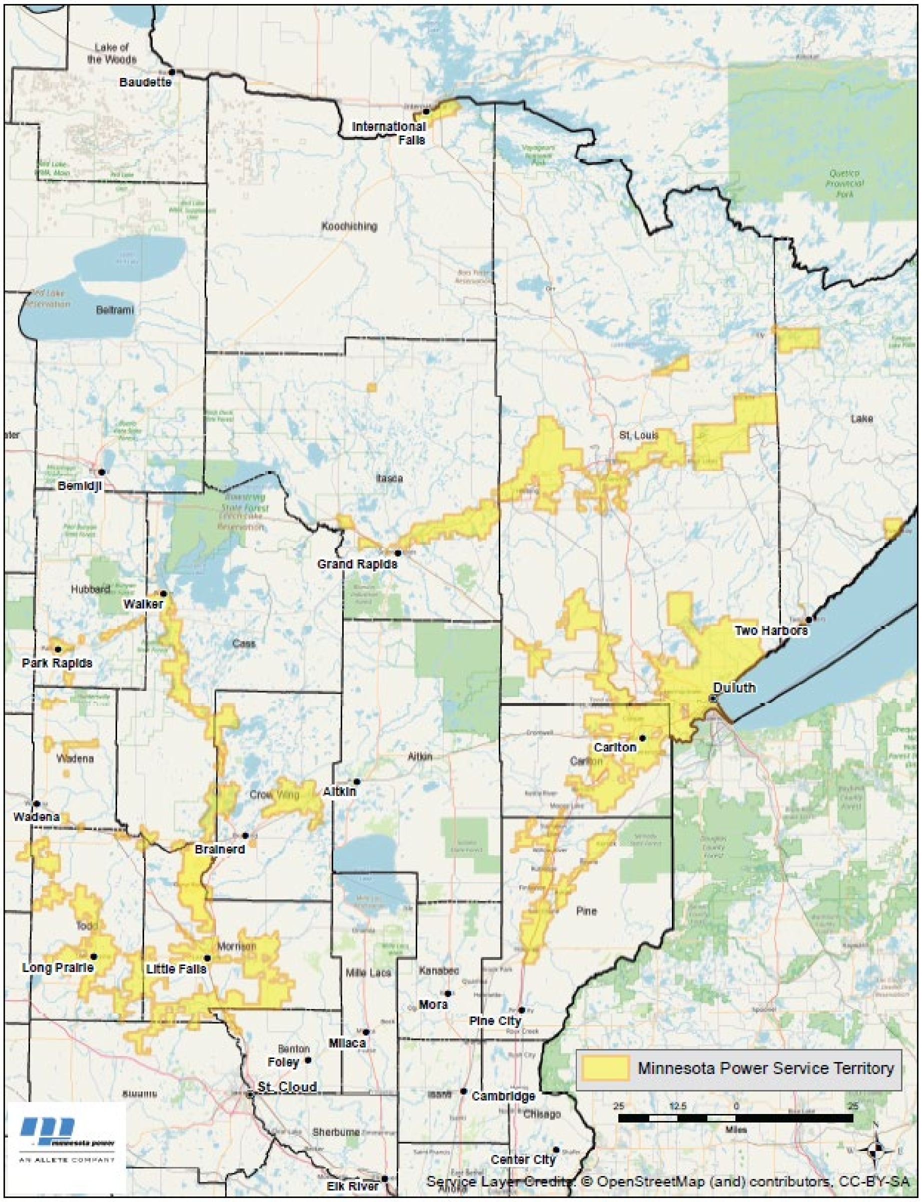
1.0 EXECUTIVE SUMMARY

1.1 INTRODUCTION

Minnesota Power (or the "Applicant") is an investor-owned public utility headquartered in Duluth, Minnesota. Minnesota Power supplies retail electric service to 150,000 retail customers, including some of the nation's largest industrial customer operations, and wholesale electric service to 14 municipalities in a 26,000-square-mile electric service territory located in northeastern Minnesota. Minnesota Power generates and delivers electric energy through a network of transmission and distribution lines and substations throughout northeastern Minnesota. Minnesota Power's transmission network is interconnected with the regional transmission grid to promote reliability and Minnesota Power is a member of the Midcontinent Independent System Operator, Inc. ("MISO") and the Midwest Reliability Organization ("MRO").

Figure 1.1-1 – Minnesota Power Service Territory



Minnesota Power operates a 1,600-megawatt (“MW”) peak demand system with electric power generation in the form of renewable wind, solar, and hydropower generation facilities as well as coal, biomass, and natural gas-fired power plants in Minnesota and additional wind facilities in North Dakota. Minnesota Power also purchases electricity from independent power producers and other public utilities. Minnesota Power was the first utility in the state to deliver 50 percent of its power from renewable resources and a significant portion of that carbon-free energy is currently delivered to Minnesota Power’s service area by the 465-mile-long Square Butte High-Voltage Direct-Current (“HVDC”) 550 MW transmission line (“HVDC Line”).

Minnesota Power submits this application to the Minnesota Public Utilities Commission (“Commission”) for a Certificate of Need and Route Permit to construct modernized HVDC Line terminals and transmission facilities necessary for their operation (the “HVDC Modernization Project” or the “Project”). The original HVDC Line and terminals were placed in service in 1977 prior to Minnesota siting and permitting requirements and were, therefore, exempt from state permitting requirements.

The Project involves modernizing and upgrading both HVDC terminals for the 465-mile-long HVDC Line and interconnecting the upgraded HVDC terminals to the existing alternating-current (“AC”) transmission system. These HVDC terminals are currently located near the Arrowhead Substation in Hermantown, Minnesota and the Center Substation in Center, North Dakota. Voltage and power transfer capabilities on the HVDC Line will remain the same and the Project will ensure bi-directional flow capability through the installation of state-of-the-art equipment. Additional detail on bi-directional flow and dispatch capabilities is covered in Section 3.3.2.4 of this Application. Minnesota Power will own all the facilities proposed and will acquire all land rights needed for the construction and operation of the Project facilities.

To modernize the HVDC terminals and implement the latest technology, new buildings and electrical infrastructure need to be constructed on a new site near the existing HVDC terminals. In Minnesota, to connect the new HVDC terminal to the existing AC system, the Project would require the construction of a new St. Louis County 345 kilovolt (“kV”)/230 kV substation located less than one mile west of the current Arrowhead Substation. The new HVDC terminal would be connected to the new St. Louis County Substation by less than one mile of 345 kV large high-voltage transmission line (“LHVTL”) and the St. Louis County Substation would be connected to the existing Arrowhead Substation by two parallel 230 kV LHVTLs less than one mile in length. Additionally, a short portion of the existing ±250 kV HVDC Line in Minnesota will need to be reconfigured to terminate at the new HVDC terminal.

The HVDC Modernization Project is scheduled to be placed in service between 2028 and 2030 and is a critical component of Minnesota Power’s efforts to leverage existing infrastructure to efficiently maintain the current load, gain additional access to renewable resources for customers, and keep momentum for reaching the state’s goal of 100 percent carbon-free energy by 2040. The Project also innovatively proposes flexible design options to allow for future expansion and additional renewable energy transfer capability, leveraging the unique attributes of HVDC technology—the most efficient way to transfer power over long distances.

1.2 PROJECT NEED AND PURPOSE

The HVDC Modernization Project is needed to modernize aging HVDC assets that are critical to the grid, continue to position the grid for the clean energy transition, and improve the reliability of the transmission system in Minnesota and North Dakota. The existing HVDC terminal has successfully operated for 45 years—15 years beyond its 30-year design life—continuously delivering value for Minnesota Power's customers. In recent years, Minnesota Power has experienced HVDC terminal outages due to failures in the control system, power electronics, transformers, and other components. Based on experience with other electric system components, the failure rate is expected to increase, which is of particular concern for the existing HVDC system because of limited parts availability. The orderly replacement of the HVDC terminal equipment is prudent to ensure continuous efficient delivery (and expansion) of Minnesota Power's renewable, carbon-free energy resources into the future.

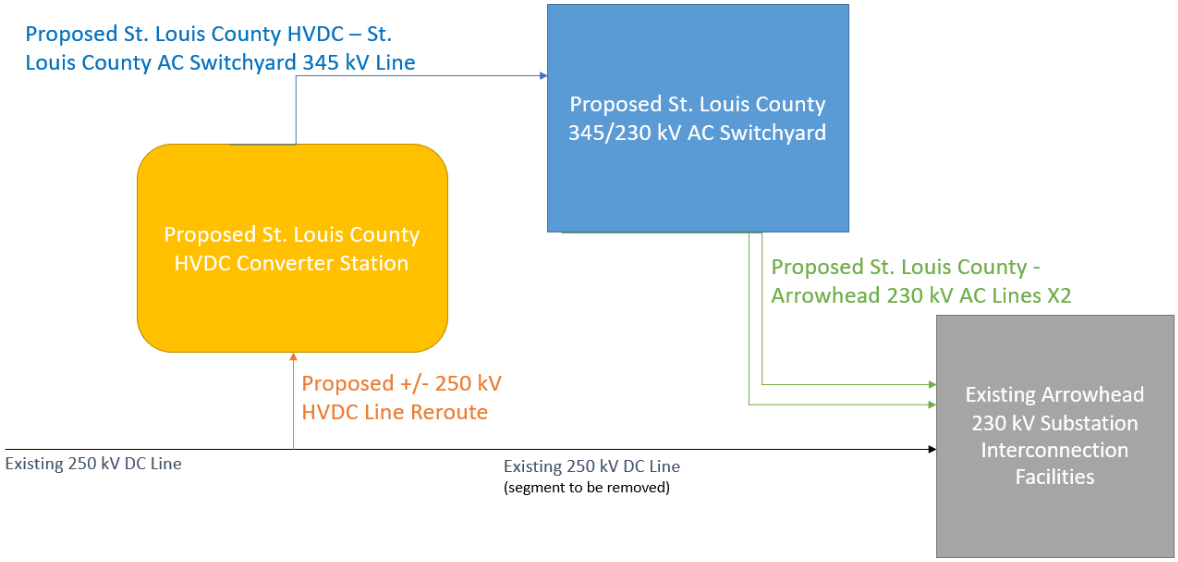
In addition to the replacement of the existing HVDC terminals, the new Voltage Source Converter ("VSC") HVDC technology implemented for the Project will be designed to provide voltage regulation, frequency response, blackstart capability, and bidirectional power transfer capability, all of which will enable Minnesota Power and the region to continue to support its clean energy transition reliably.

1.3 PROPOSED PROJECT FACILITIES

To modernize the HVDC terminals and implement the latest technology, new buildings and electrical infrastructure need to be constructed on a new site near the existing HVDC terminals. In Minnesota, to connect the new HVDC terminal to the existing AC system, the Project would require the construction of a new St. Louis County 345 kV/230 kV substation located less than one mile west of the current Arrowhead Substation. The new HVDC terminal would be connected to the St. Louis County Substation by less than one mile of 345 kV LHVTL and the new St. Louis County Substation would be connected to the existing Arrowhead Substation by two parallel 230 kV LHVTLs less than one mile in length. Additionally, a short portion of the existing ±250 kV HVDC Line in Minnesota will need to be reconfigured to terminate at the new HVDC terminal.

Figure 1.3-1 provides a conceptual drawing of the proposed new facilities relative to the existing ±250 kV HVDC Line and the Arrowhead Substation in Minnesota. This figure is not drawn to scale and does not represent a final site design, layout, or proposed transmission alignment.

Figure 1.3-1 – Proposed Facilities Drawing



In North Dakota, the Project will consist of an expansion of the separately-proposed Nelson Lake 230 kV Substation to add a 345 kV/230 kV transformer and 345 kV line entrance, a new HVDC Converter Station, a new 345 kV line from the Converter Station to the Nelson Lake Substation, and a ±250 kV HVDC Line Extension from the new Converter Station to tie into the existing ±250 kV HVDC Line. The siting of the North Dakota HVDC terminal upgrades will be permitted separately through the North Dakota Public Service Commission.

1.4 PROJECT SCHEDULE AND COST

Once regulatory approvals are in place, Minnesota Power will enter into a firm engineering, procurement, and construction ("EPC") contract with the preferred HVDC supplier to finalize material orders and engineering design for long lead time components. Because of the limited number of manufacturers of the type of equipment used in HVDC terminals and highly constrained global HVDC market conditions, Minnesota Power has already secured a manufacturing slot reservation with a preferred supplier to ensure it can meet the schedule laid out below. Amid rapidly evolving global HVDC market conditions and supply constraints, this procurement strategy ensures schedule certainty for Minnesota Power's customers while stabilizing the budgetary outlook for the Project. These timelines are primarily dictated by the manufacturing process and are out of Minnesota Power's control. However, Minnesota Power anticipates beginning construction of the Minnesota terminal as early as 2024 and starting construction of the North Dakota Terminal in 2025 dependent on having all required regulatory approvals in place. The Project is scheduled to be in service between 2028 to 2030. In aggregate, the HVDC Modernization Project (both Minnesota and North Dakota portions) is anticipated to cost approximately $660 to $940 million, and construction will take three to five years to complete. Federal and State grant cost mitigation continues to be pursued to help support this critical infrastructure.

1.5 POTENTIAL ENVIRONMENTAL IMPACTS

Minnesota Power analyzed the potential environmental impacts from the proposed Project. No significant unavoidable impacts will result from construction of the proposed Project. Additionally, Minnesota Power has acquired or is in the process of acquiring the majority of the land within the Proposed Route, including sites for the new HVDC Converter Station and the St. Louis County 345 kV/230 kV Substation. The land acquired by Minnesota Power contains a limited number of homesteads which will be abandoned after acquisition. Additional information about the potential environmental impacts of the proposed Project and proposed mitigation measures is provided in Chapter 7.0.

The Department of Commerce, Energy Environmental Review and Analysis unit ("DOC EERA") is responsible for environmental review of the Project. The Certificate of Need rules require the preparation of an Environmental Report, whereas the Route Permit rules require preparation of an Environmental Document, which Minnesota Power intends to do under the alternative review process via an Environmental Assessment ("EA"). The DOC EERA may elect to prepare an EA for the Project that analyzes potential environmental impacts and meets all statutory and rule requirements of both the Environmental Report and the EA.

1.6 PUBLIC INPUT AND INVOLVEMENT

Minnesota Power employed various engagement methods to provide information about the proposed Project to the public and local agencies, Tribal government representatives, and elected officials. These engagement methods included open houses, direct mailings, agency meetings, and Project information included on Minnesota Power's website. Additional information regarding the public outreach efforts conducted prior to the filing of this application is provided in Chapter 8.0.

Interested stakeholders and the public 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 Department of Commerce's Project website (http://mn.gov/commerce/energyfacilities). Additionally, a copy of this application will be available at the Duluth Public Library for the public to review.

Within 60 days of the Commission's acceptance of this application as complete, a public information and scoping meeting will be held in the Project area by the Commission and DOC EERA to answer questions about the Project and to solicit public comments and suggestions for matters to examine during its environmental review. In a few months, assuming the Department of Commerce chooses to prepare an EA that includes all requirements of an Environmental Report, a public hearing will be held in the Project area after the EA is complete. At this hearing, members of the public will be given an opportunity to ask questions and submit comments. Minnesota Power will also present further evidence to support its need and route for the Project. Minnesota Power anticipates that the Commission will hold a joint public hearing on both the Certificate of Need and the Route Permit pursuant to Minn. Stat. § 216B.243, subd. 4.

Persons interested in receiving notices and other announcements about the Project's Certificate of Need application can subscribe to the docket by visiting https://mn.gov/puc/ and using the following steps. Select "eDockets", then "eFiling Home/Login" in the left menu and click on the "Subscribe to Dockets" button. Enter an email address and select "Docket Number" from the Type of Subscriptions dropdown box, then select "[22]" from the first Docket number drop down box and enter "[607]" 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 (E015/TL-22-611).

Persons wanting to have their name added to the Project Route Permit proceeding mailing list (MN PUC Docket No. E015/TL-22-611) 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 (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 (MN PUC Docket No. E015/CN-22-607), mail, fax, or email Robin Benson at Minnesota Public Utilities Commission, 121 7th Place E., Suite 350, St. Paul, MN 55101-2147, Fax: 651-297-7073, or robin.benson@state.mn.us. Contact information for the Minnesota state regulatory staff for this Project is listed below:

Minnesota Public Utilities Commission
Mike Kaluzniak
121 7th Place East, Suite 350
St. Paul, MN 55101
651-296-7124
1-800-657-3782
mike.kaluzniak@state.mn.us
https://mn.gov/puc/

Minnesota Department of Commerce EERA
Jenna Ness
85 7th Place East, Suite 280
St. Paul, MN 55101
651-539-1693
1-800-657-3710
jenna.ness@state.mn.us
https://MN.gov/eera/

1.7 CERTIFICATE OF NEED PROCESS

Minnesota Statute § 216B.243, subd. 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 commission…." "Large energy facility" is defined in Minn. Stat. § 216B.2421, subd. 2(2), as "any high-voltage transmission line with a capacity of 200 kilovolts or more and greater than 1,500 feet in length." Minnesota Power anticipates that both the Proposed St. Louis County HVDC – St. Louis County AC Switchyard 345 kV line and the Proposed St. Louis County – Arrowhead 230 kV lines will exceed 1,500 feet in length. Therefore, the proposed new transmission facilities require the issuance of a Certificate of Need from the Commission prior to construction.

The term Large High Voltage Transmission Line, or LHVTL, is defined in Minn. Rule 7849.0010, Subp. 14, as "a conductor of electrical energy as defined by Minnesota Statues, section 216B.2421, subdivision 2, clause (2), and associated facilities necessary for normal operation of the conductor, such as insulators, towers, substations, and terminals." As a result, Minnesota Power's application for a Certificate of Need includes the three LHVTL described in the paragraph above, plus the proposed associated facilities, including the Proposed St. Louis County HVDC Converter Station, the Proposed St. Louis County 345 kV/230 kV Substation, and the Proposed ±250 kV HVDC Line reroute.

The Commission has adopted rules for the consideration of applications for Certificates of Need. Minn. R. 7829.2550 requires a Notice Plan to be submitted for review by the Commission at least three months before filing a Certificate of Need application under Minn. Stat. § 216B.243. On November 30, 2022, Minnesota Power submitted the Notice Plan for Commission approval.

The Commission has adopted rules for the consideration of applications for Certificates of Need, found in Minn. R. Ch. 7849. On November 30, 2022, Minnesota Power filed a Petition for Exemption under Minn. R. 7849.0200, subp. 6, requesting that the Applicant be exempt from certain filing requirements under Chapter 7849. The Commission approved the Petition in an order dated February 1, 2023 ("Exemption Order") which is provided in Appendix E.

This application assumes a joint regulatory review process will be pursued and thus 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 E. A Certificate of Need completeness checklist is provided in Appendix A with cross references indicating where the information required by Minnesota statute and rules can be found in this application.

1.8 STATE ROUTING PROCESS

Minnesota Statute 216E, also known as the Minnesota Power Plant Siting Act, provides the Commission with siting and routing authority for large electric power facilities. Pursuant to this authority, Minn. R. ch. 7850 lays out the process by which the Commission should select sites and routes for large electric power generating plants and high voltage transmission lines. Minn. Rule 7850.1000, subp. 9, defines "high voltage transmission line" or HVTL as "…a conductor of electric energy and associated facilities designed for and capable of operating at a nominal voltage of 100 kV or more either immediately or without significant modification. Associated facilities shall include, but not be limited to, insulators, towers, substations, and terminals."

This application is submitted under the alternative permitting process set forth in Minn. Stat. § 216E.04 and Minn. R. 7850.2800 to 7850.3900. The Project qualifies for review under the alternative permitting process authorized by Minn. Stat. § 216E.04, subd. 2(4) and Minn.

R. 7850.2800, subp. 1(D) because the Project is a high voltage transmission line in excess of 200 kV and fewer than five miles in length.

Minnesota Power notified the Commission on November 30, 2022 that Minnesota Power intended to use the alternative permitting process for the Project. The letter complied with the requirements of Minn. R. 7850.2800, subp. 2, to notify the Commission of its intent at least 10 days prior to submitting an application for a Route Permit. A copy of this letter is attached as Appendix G.

The Commission has adopted rules for the consideration of Route Permit applications in Minn. R. 7850.4000 to 7850.4400. A Route Permit completeness checklist is provided in Appendix B with cross references indicating where the information required by Minnesota Statutes and Administrative Rules can be found in this application.

1.9 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.

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

1.10 PERMITTEE

Minnesota Power is the requested permittee for the Project, who will have ownership at the time of filing this application and after commercial operation. Phone and email addresses for the Project are:

Project Phone Number: 218-355-3515
Project email address: askus@mnpower.com

Minnesota Power's contact for the Project is:

Dan McCourtney
Manager – Strategic Environmental Initiatives
Minnesota Power
30 West Superior Street
Duluth, MN 55802
218.355.3515

1.11 APPLICANT'S REQUEST

Minnesota Power respectfully requests that the Commission approve a Certificate of Need and Route Permit for the proposed Project along the Proposed Route. The Commission has established criteria in Minn. R. 7849.0120 to apply in determining whether a Certificate of Need should be granted for a proposed high voltage transmission line. An applicant for a Certificate of Need must show that the probable result of denying the request would be an adverse effect on the future adequacy and reliability of the system, there is not a more reasonable and prudent alternative, the proposed facility will provide benefits to society compatible with protecting the environment, and the project will comply with all applicable standards and regulations. Minnesota Power has demonstrated in this application that the proposed Project meets all the requirements to obtain a Certificate of Need. The Project will modernize aging assets, improve the reliability of the transmission system and is critical to the reliable delivery of renewable energy to Minnesota Power's customers.

This application demonstrates that issuance of a Route Permit for construction of the proposed Project along the Proposed Route effectively considers and satisfactorily addresses factors as set forth in Minn. Stat. § 216E.03, subd. 7, and Minn. R. 7850.4100. The proposed Project will support the State's goals to conserve resources and to minimize environmental and human settlement impacts and land use conflicts by leveraging existing assets, using land owned by Minnesota Power in close proximity to existing transmission substations and transmission lines, and will ensure the State's electric energy security through the construction and modernization of efficient, cost-effective transmission infrastructure.

2.0 PROPOSED PROJECT

2.1 PROJECT DESCRIPTION

To modernize the terminals of the existing Square Butte HVDC Line and implement the latest VSC HVDC technology, new buildings and electrical infrastructure need to be constructed on a new site near the existing HVDC terminals. In Minnesota, to connect the new HVDC terminal to the existing AC system, the Project would require the construction of a new St. Louis County 345 kV/230 kV substation located less than one mile west of the current Arrowhead Substation (see Map 1). The new HVDC terminal would be connected to the St. Louis County Substation by less than one mile of 345 kV LHVTL and the new St. Louis County Substation would be connected to the existing Arrowhead Substation by two parallel 230 kV LHVTLs less than one mile in length. Additionally, a short portion of the existing ±250 kV HVDC Line in Minnesota will need to be reconfigured to terminate at the new HVDC terminal.

In North Dakota, the Project will consist of an expansion of the separately proposed Nelson Lake 230 kV Substation to add a 345 kV/230 kV transformer and 345 kV line entrance, a new HVDC Converter Station, a new 345 kV line from the Converter Station to the Nelson Lake Substation, and a ±250 kV HVDC Line Extension from the new Converter Station to tie into the existing ±250 kV HVDC Line. The siting of the North Dakota HVDC terminal upgrades will be regulated by the North Dakota Public Service Commission and permitted as part of the Certificate of Corridor Compatibility and Route Permit Application process.

2.1.1 Substation and Terminal Facilities

Substation and terminal facilities are sometimes referred to as 'Associated Facilities' in transmission line Certificate of Need and Route Permit Applications. For the proposed HVDC Modernization Project, the substations and terminals are the primary and most significant facilities proposed, and the short transmission line segments are ancillary facilities for interconnecting the HVDC terminal with the substation facilities. Chapter 3.0 further discusses the rationale for the proposed relocation of the substation and terminal facilities.

For substation and terminal facilities, the Project will require a new HVDC terminal, a new St. Louis County 345 kV/230 kV substation, and upgrades to the existing Arrowhead Substation 230 kV bus. The HVDC terminal will convert the DC electricity into AC and will interconnect to the AC transmission system at 345 kV via a short 345 kV transmission line to the St. Louis County Substation. The area proposed for this infrastructure is identified in Figure 2-1.

2.1.2 Proposed Route

The Project includes the construction of approximately 40 acres of new terminal facilities as well as the construction of LHVTL to connect those facilities to each other and to the existing electrical grid (see Map 1). Minnesota Power plans to have all proposed Project facilities located on land owned by Minnesota Power in St. Louis County, although land acquisition is ongoing at the time of filing this Application. The preliminary layout on Map 1 is conceptual only and all facilities are proposed within the area identified on Map 1 as the Proposed Route. The term "Proposed Route" when used in this application includes all LHVTL and associated facilities, plus all work areas needed to build and operate the proposed modernizations.

2.1.2.1 Route Width

The Power Plant Siting Act, Minn. Stat. ch. 216E, directs the siting of transmission lines in a way that "minimize[s] adverse human and environmental impact while ensuring continuing electric power system reliability and integrity and ensuring that electric energy needs are met and fulfilled in an orderly and timely fashion." Further, it authorizes the Commission to meet its routing responsibility by designating a "route" for a new transmission line when it issues a Route Permit. A "route" may have "a variable width of up to 1.25 miles," within which the right-of-way for a HVTL can be located. Minnesota Power's Proposed Route is approximately 0.5 mile wide from north to south and 0.7 mile long from east to west.

The transmission line right-of-way is the specific area within a route that is required for the construction, maintenance, and operation of a HVTL. For the proposed HVDC Modernization Project, the substations and terminals are the primary and most significant facilities proposed, and the short transmission line segments are ancillary facilities for interconnecting the HVDC terminal with the substation facilities. Chapter 3.0 further discusses the rationale for the proposed relocation of the substation and terminal facilities.

Minnesota Power is requesting a route width that is wide enough to provide flexibility to design facilities to minimize system impacts and outages, to optimize future expandability work with landowners, to address engineering concerns after a Route Permit has been issued, to avoid sensitive natural resources, and to manage construction constraints as practical. In addition, unlike traditional transmission line projects, Minnesota Power plans to purchase and own in fee simple all the land required for Project construction and operation, in which case no "right-of-way" as such would be required. However, at the time this application was filed with the Commission, landowner negotiations were still ongoing for some required Project parcels.

2.1.2.2 Transmission Line Right-of-Way

To the extent possible, the Project will not use traditional transmission line easements for rights-of-way and will, instead, construct the Project on land owned by Minnesota Power. Because landowner negotiations are ongoing for several required Project parcels, Minnesota Power reserves the possibility of exercising eminent domain pursuant to an approved Certificate of Need as required to complete the proposed Project. Map 2 shows the Project parcels and names of each owner whose property is within the proposed route in purchase negotiation or those for which acquisition is complete as of the date this application was filed. If Minnesota Power is unable to acquire all Project lands in fee simple ownership, the company will acquire traditional utility rights-of-way for any remaining land required to build and operate the Project.

For the purpose of traditional operation and maintenance of the transmission lines, Minnesota Power will maintain typical "right-of-way" widths for the transmission lines within the Proposed Route. In this case, typical right-of-way widths are those established by both industry standards and Minnesota Power's standard practices for maintaining transmission line rights-of-way. The proposed transmission lines will be designed such that vegetation clearing will use the typical right-of-way widths per voltage class as indicated in Table 2.1.2-1. Additional maintained width beyond these values may be required as needed based on design requirements. Reduction in these right-of-way width values will only be considered on a case-by-case basis as necessary.

Table 2.1.2-1 – Structure Design Summary

Line Type	Structure Type	Structure Material	Right-of-Way Width (feet)	Structure Height (feet)	Foundation	Foundation Diameter (feet)	Span Between Structures (feet)
230 kV	Tubular Steel Pole	Weathering Steel	130	60-180	Concrete Pier	4-12	200-1000
345 kV	Tubular Steel Pole	Weathering Steel	150	60-180	Concrete Pier	4-12	200-1000
±250 kV HVDC	Tubular Steel Pole	Weathering Steel	120	60-180	Concrete Pier	4-12	200-1000

Note: The values in the table above are typical values expected for the majority structures based on similar facilities. Actual values may vary.

2.1.2.3 Transmission Structure and Conductor Design

The proposed transmission structures for the Project are anticipated to be tubular steel pole structures; however, steel lattice or wood pole structures could be used as necessary. Structure heights and span lengths are a function of span properties, topography, structure type and configuration, wire, voltage, tension, route, and other factors. The height and span lengths provided here are general values expected for the majority of structures based on similar facilities. Actual span lengths and structure heights may vary outside typical values as necessary. Tubular steel pole structures are anticipated to be supported on concrete drilled pier foundations; however, other foundation types including but not limited to helical piles and direct embedment may also be used as appropriate.

The new ±250 kV HVDC, 230 kV, and 345 kV steel pole structures will be approximately 60 to 180 feet tall with spans of approximately 200 to 1,000 feet. Structures may be configured as double circuit or double circuit-capable as appropriate to facilitate future development consistent with planning efforts at the terminals and substations. The proposed transmission line will be designed to meet or surpass relevant state codes including the National Electric Safety Code ("NESC").

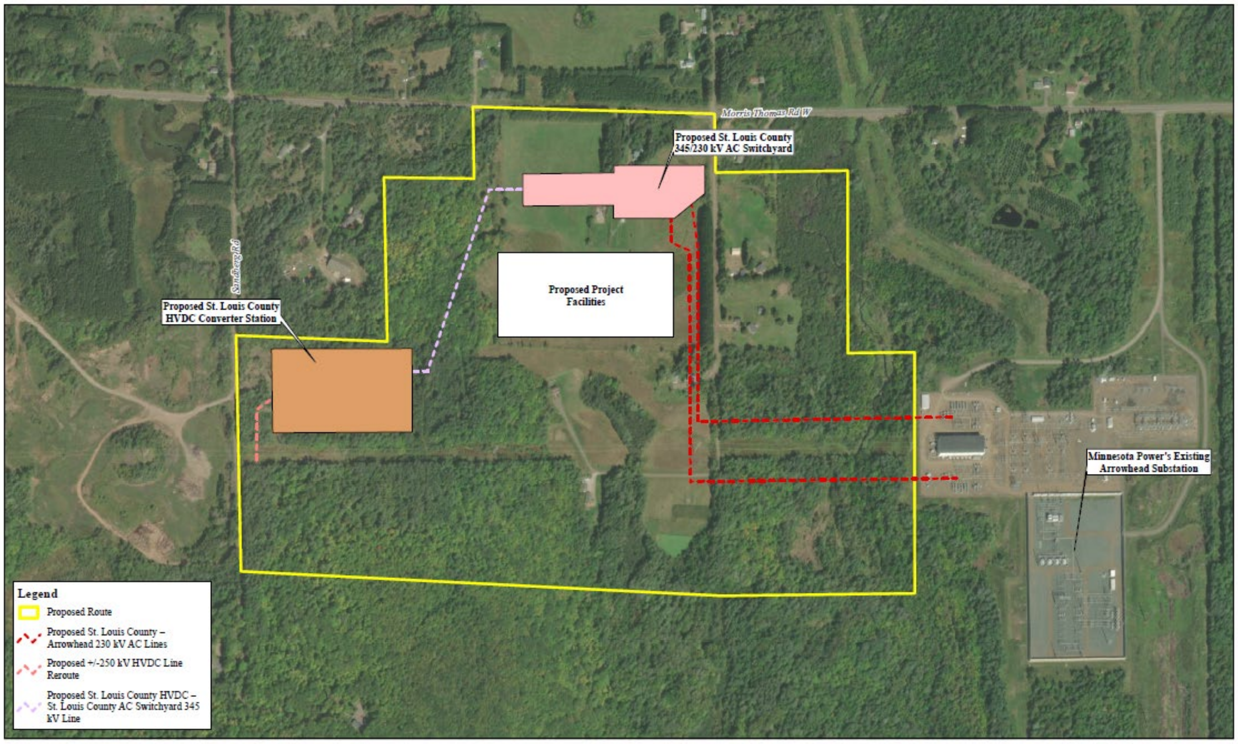
The specific conductors for the 230 kV and 345 kV transmission lines have yet to be determined but will consist of aluminum conductor steel reinforced ("ACSR") or possibly aluminum conductor steel supported ("ACSS") wire and are likely to use bundled configurations (e.g., two sub-conductors per phase). The conductors will be selected according to the near-term and long-term capacity needs of the proposed transmission lines while also considering electrical performance characteristics, such as electric and magnetic fields, audible noise, radio interference, and lifecycle operating and maintenance costs. The conductor for the short segment of new ±250 kV HVDC line is anticipated to be 2839 ACSR to match the existing HVDC line conductor. This is an atypically large conductor that is necessary to facilitate the full capacity of the HVDC line. Typical transmission line construction utilizes one or two Overhead Ground Wires ("OHGW") based on structure configuration, shielding requirements, fault current rating requirements, and communication requirements. It is also not uncommon for Optical Ground Wire ("OPGW") to be installed in some or all of the OHGW positions.

2.1.2.4 Design Options to Accommodate Future Expansion

Given the long-term significance of the HVDC Line for Minnesota Power and the region, design options to accommodate future expansion are a major consideration for the Project. The new VSC HVDC Converter Stations will be designed with a flexible, scalable approach that will enable their future expansion to accommodate bulk regional transfers of renewable energy. Minnesota Power is working with the HVDC supplier to procure the most current capacity and technology for the new VSC Converter Stations, as well as additional expandability features to enable staged development of additional HVDC capacity to meet future regional needs.

The new St Louis County 345 kV/230 kV Substation will be designed with room for several future 345 kV line additions to accommodate regional transmission development in conjunction with increasing capacity and utilization of the HVDC line. The new substation will also include space to accommodate a second 345 kV/230 kV transformer to facilitate expanded delivery of power to the local transmission system in northeastern Minnesota. New 345 kV and 230 kV transmission lines constructed for the Project will be designed with sufficient capacity to accommodate reasonably foreseeable long-term needs, and Minnesota Power will consider making new transmission structures double-circuit capable where appropriate.

Figure 2-1 – HVDC Modernization Project Route



2.2 PROJECT COST AND SERVICE CHARACTERISTICS

2.2.1 Project Costs

The estimated cost to construct both the Minnesota and North Dakota terminal upgrades for the Project is approximately $660-940 million.[1] Costs are presented in 2022 dollars, with an upper and lower range provided to illustrate contingencies in cost estimating assumptions. The cost estimates below are based on preliminary engineering considerations, which includes all HVDC Converter Station costs (including engineering, materials, construction, permitting, and design costs) new transmission line costs (including engineering, materials, associated construction, permitting and design costs), substation construction costs (including engineering, materials, construction, permitting, and design costs), allowance for funds used during construction ("AFUDC") through Certificate of Need approval, and land and right-of-way costs. The main components are discussed briefly below.

Table 2.2.1-1 – Estimated Construction Costs

Project Component	Lower-Range (2022$) ($Millions)	Mid-Range (2022$) ($Millions)	Upper-Range (2022$) ($Millions)
HVDC Converter Stations	$590	$705	$815
Minnesota Interconnection Facilities	$40	$55	$70
North Dakota Interconnection Facilities	$30	$40	$55
TOTAL	**$660**	**$800**	**$940**

The cost of HVDC Converter Stations is based on the budgetary estimate provided by the HVDC supplier along with Minnesota Power's estimates for supporting internal and professional services and AFUDC. Due to the specialized nature of the technology, HVDC Converter Stations are typically delivered as turnkey projects by the original equipment manufacturer ("OEM"). Due to the scale and complexity of the Project, there are only two OEMs in the world capable of supplying the HVDC Converter Stations that can meet the size and cybersecurity requirements of the proposed design. Minnesota Power engaged in discussions with both OEMs over the course of approximately 12 months before issuing a competitive request for proposals ("RFP") to obtain a guaranteed manufacturing slot and an exclusivity agreement for further development of the Project. The OEM with the most favorable schedule proposal and lowest budgetary pricing was selected at the beginning of 2023, cementing a guaranteed latest in-service date in April 2030 and stabilizing the budgetary outlook for the Project through collaboration and ongoing engagement with the preferred OEM.

In this case, the OEM's estimate includes all engineering, procurement, construction, and installation for the Converter Stations themselves, up to the point of interconnection with the AC transmission system. Minnesota Power is responsible for bringing the existing HVDC line to the Converter Station and constructing a new 345 kV transmission line from the point of interconnection in the HVDC Converter Station to the new AC substations being constructed for the Project. The costs received from the OEM are budgetary and subject to change based on typical market forces, like inflation and commodities pricing, until such time as Minnesota Power

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[1] Minnesota Power's initial mid-range project cost estimate from early 2022 was approximately $700 million which was based on preliminary discussions with HVDC suppliers. Since early 2022, there has been a worldwide surge in HVDC system orders directly competing with Minnesota Power for limited manufacturing slots. Competitive market conditions combined with high inflation on basic components through the end of 2022 have impacted the cost range, as evidenced by the most recent budgetary estimates provided by HVDC suppliers in late 2022 and reflected in this Application.

is able to enter into a firm EPC contract with the OEM. Minnesota Power does not anticipate executing a firm contract until after the Commission grants the Certificate of Need for the Project. The HVDC Converter Station cost also includes Minnesota Power's internal and professional services and AFUDC associated with the HVDC Converter Stations. Internal and professional services include Minnesota Power's engineering, permitting, project management, and other resources contributing to the Project, as well as external consultants supporting system impact and design studies, engineering, permitting and environmental review, legal support, land, and right-of-way. The costs associated with Minnesota Power's HVDC Owner's Engineer, HVDC technical experts who will provide detailed technical review of all HVDC OEM work through project commissioning, are also included. The cost of AFUDC was calculated based on the anticipated cash flow for the Project. Accrual of AFUDC will cease once the Commission grants a Certificate of Need for the Project, because the Project will then become eligible for current cost recovery under the Transmission Rider. Based on this, AFUDC accrual is assumed to stop by the end of 2024, well in advance of the most significant financial commitments for the Project.

The cost of Minnesota Interconnection Facilities is generally based on the 2022 MISO Transmission Expansion Planning Cost Estimating Guide. Minnesota Interconnection Facilities include the short extension of the HVDC line to the Converter Station, as well as all 345 kV and 230 kV facilities from the HVDC Converter Station to the Arrowhead Substation. This includes the new St. Louis County 345/230 kV Substation, rebuilding existing 230 kV bus sections at Arrowhead, and constructing new 345 kV and 230 kV lines for the Project. Land acquisition costs in Minnesota for the Project are also included.

The cost of North Dakota Interconnection Facilities is generally based on the MISO MTEP22 cost estimating guide. North Dakota Interconnection Facilities include the two-mile extension of the HVDC line to the new Converter Station, as well as all 345 kV and 230 kV facilities from the HVDC Converter Station to the separately planned Nelson Lake 230 kV Substation. This includes the addition of a 345 kV/230 kV transformer at Nelson Lake Substation, as well as constructing a short new 345 kV line segment from the HVDC Converter Station to Nelson Lake Substation. Land acquisition costs in North Dakota for the Project are also included.

2.2.2 Operations and Maintenance Costs

Operations and Maintenance ("O&M") Costs for the Project consist of three components: the new transmission lines, new AC substations, and new HVDC Converter Stations. Of the three components, the O&M costs for the HVDC Converter Stations are expected to be the most significant.

Once constructed, O&M costs associated with the new transmission lines will be minimal for several years since vegetation maintenance on the route corridor will occur prior to construction. Minnesota Power's average vegetation management costs for all of its transmission lines (100 kV and above) on its system was approximately $660 per line mile in 2020. In addition to vegetation management, Minnesota Power also performs other general maintenance on its transmission facilities such as repairing aged or worn equipment or facilities. Minnesota Power's average maintenance costs, excluding vegetation management, for its transmission lines (100 kV and above) was approximately $520 per mile in 2020. The specific O&M costs for an individual transmission line varies based on the location of the line, the number of trees located along the right-of-way, the age and condition of the line, the voltage of the line, and other factors.

Over the life of the AC substation facilities, inspections will be performed regularly to maintain equipment and make necessary repairs. Transformers, circuit breakers, batteries, protective relays and other equipment need to be serviced periodically in accordance with the manufacturer's recommendation. The site itself must also be kept free of vegetation, and drainage maintained. Minnesota Power's substation maintenance costs typically range from $50k to $100K, annually.

The HVDC Converter Station has more heating, ventilation, and air conditioning; programmable; and solid-state equipment than a standard AC substation and an effective O&M program includes inspection and maintenance of not only transformers, circuit breakers, batteries, and protective relays, but also includes converter valves, protection and control systems, valve cooling systems, and building services. Bi-directional capabilities of the HVDC Converter Station are not anticipated to have an appreciable impact on O&M cost, this capability is inherent to all modern HVDC Systems. The HVDC Converter Station is expected to be staffed during normal business hours and will also be supported by dedicated engineering staff to support normal operations. During scheduled outages, additional staff will be needed to support operations. Costs related to O&M will be less during the warranty period (i.e., the first three to five years of operation depending on final EPC contract terms) due to the limited scope of outages and parts will be replaced under warranty. After the warranty period, outages become more time intensive and additional maintenance is needed based on the age of equipment. Regular maintenance, regardless of age, includes periodic inspections (e.g., daily, weekly, monthly), equipment testing, cybersecurity, compliance support, and vegetation management. The annual HVDC O&M costs are anticipated to be approximately $1 million annually.

2.2.3 Effect on Rates

Minnesota Power recognizes the value and importance of ensuring affordable rates for all customer classes while also delivering reliable service and executing state energy policy goals and mandates. While approval of the Project will impact the rates that Minnesota Power charges its customers as described in this section, the Company has taken steps to prepare to minimize that impact, as discussed in Section 2.2.5 below.

Table 2.2.3-1 summarizes the estimated Minnesota jurisdictional revenue requirements and rate impacts by customer class for an in-service date of May 1, 2030. Although Minnesota Power is working to secure an earlier in-service date, conducting the rate impact analysis requires a distinct in-service date to be chosen. Since the guaranteed latest in-service date provided by the OEM is currently in April 2030, May 1, 2030 is the date used to calculate the Project's effect on rates. The estimated impacts are provided using a Mid-Range and Upper-Range capital costs before any Federal or State grant funding is applied. The total revenue requirements were estimated using the approved rate of return in the Company's recently completed rate case (Docket No. E015/GR-21-335). The revenue requirements incorporate property tax values based on the range in cost and reflect current assumptions for Minnesota and North Dakota property tax treatment.

For the average residential customer, the rate impact for the first 12 months following Project in-service would range from approximately $8.32 to $9.80 per month. When compared to the estimated average current 2023 residential rate reflecting the outcomes of the recently completed rate case, this would represent an increase of approximately 7.89 to 9.29 percent. For Large Power customers, the estimated rate impact for the first 12 months following in-service would range from approximately 1.112¢ to 1.311¢ per kilowatt-hour ("kWh") of energy. If compared to the estimated average current 2023 Large Power rate reflecting the outcomes of the recently completed rate case, this would represent an increase of approximately 11.88 to 14.01 percent. By 2030, however, the above percent rate increases are expected to be lower because base rates will continue to increase due to changes in other system costs that will be incorporated into base rates through future rate cases and other mechanisms.

Table 2.2.3-1 – Estimated Retail Customer Impacts

For the twelve months ending	4/30/31 Mid-Range	4/30/31 Upper-Range
MN Jurisdictional Revenue Requirements	$86,423,884	$101,860,375
Rate Class Impacts [a]		
Residential		
Average Current Rate (¢/kWh)	14.894	14.894
Increase (¢/kWh)	1.175	1.384
Increase (%)	7.89%	9.29%
Average Impact ($/month)	$8.32	$9.80
General Service		
Average Current Rate (¢/kWh)	14.943	14.943
Increase (¢/kWh)	1.175	1.384
Increase (%)	7.86%	9.26%
Average Impact ($/month)	$32.76	$38.61
Large Light & Power		
Average Current Rate (¢/kWh)	11.960	11.960
Increase (¢/kWh)	1.175	1.384
Increase (%)	9.82%	11.58%
Average Impact ($/month)	$2,883.04	$3,397.99
Large Power		
Average Current Rate (¢/kWh)	9.361	9.361
Increase (demand+energycombined) (¢/kWh)	1.112	1.311
Increase (%)	11.88%	14.01%
Average Impact ($/month)	$534,935	$630,482
Lighting		
Average Rate (¢/kWh)	31.964	31.964
Increase (¢/kWh)	1.175	1.384
Increase (%)	3.67%	4.33%
Average Impact ($/month)	$1.93	$2.27

[a] *Average current rate based on 2022 Final General Rates based on the 2023 Commission decision (Docket No. E015/GR-21-335) without riders adjusted to include current rider rates. Current rider rates include the Transmission Cost Recovery Rider rates, Renewable Resources Rider rates, Solar Renewable rates, Conservation Program Adjustment rates, and the 2022 Fuel and Purchased Energy Adjustment with True-Up. The increase (¢/kWh) shown above is the increase from the new project.*

2.2.4 Costs of Outages

As discussed in further detail in Section 3.2, the HVDC terminal equipment has been reliable for most of its long history; however, the forced (unplanned) outage hours due to converter equipment failure have been increasing with the age of the asset. Scheduled (planned) outages due to the need to repair converter equipment before it fails have also increased over the last five years, though the impact on rates is less because scheduled outages can be planned around peak demand and peak wind production times in some cases. Furthermore, the Company is anticipating significant volatility in energy market prices when the HVDC line experiences forced outages. During periods of outages Minnesota Power utilizes the AC system, resulting in higher congestion cost between generation and load and increases the risk of wind curtailment. The cost of replacement energy for wind curtailment is expected to increase in future years as more dispatchable coal and natural gas units are retired. These are real and negative impacts to Minnesota Power customers from increasing levels of HVDC system outages.

Recently, Minnesota Power has seen significant increases in energy prices and hourly price volatility, especially related to the cost of delivering remotely located wind resources to load. Furthermore, Minnesota Power expects energy price volatility and congestion cost risks to increase over time due to the transition from baseload to intermittent resources, which drives a need for additional transmission infrastructure. Market price volatility poses an increased risk in terms of costs to customers when the HVDC line is not available. The HVDC line effectively makes Minnesota Power's North Dakota wind assets look like they are located in northeast Minnesota, reducing congestion cost to deliver wind to load. This has significant value for customers that is passed along through the Fuel Adjustment Clause ("FAC"). When the HVDC line is in outage, Minnesota Power loses that capability and pays the higher congestion cost to deliver North Dakota wind to customers. Furthermore, when the HVDC line is not available, Minnesota Power's wind resources must be delivered across the non-MISO North Dakota AC transmission network, adding to the regional congestion issues and are subject to curtailment.

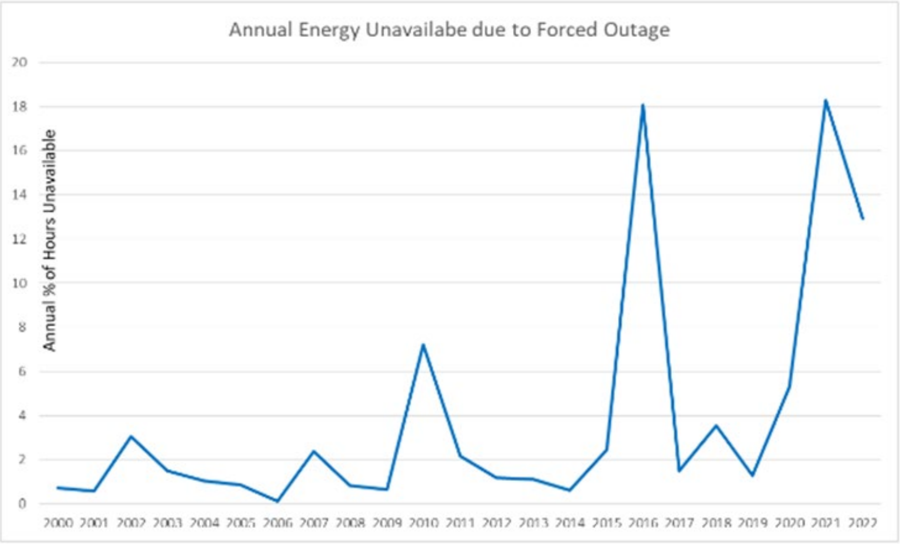
If the HVDC system is unavailable, there is also a higher risk of curtailment of its North Dakota wind energy, along with the congestion cost risk discussed above. Specifically:

1. If the Minnesota Power Bison Wind Facility in Center, ND is curtailed, then Minnesota Power would incur replacement energy costs for the Company's 500 MW generated by its Bison units.
2. If the Oliver County I and II Wind Facilities in Center, ND are curtailed, the language of the PPA controls as to payments in the event replacement power is necessary. Minnesota Power's PPA amendment was granted approved by the Commission via Docket No. E015/M-18-600.

Typically, replacement energy will be from higher carbon intensive resources inmarket or from Minnesota Power's own power supply. The curtailments associated with HVDC outages could lead to the Company not meeting the state 100 percent carbon free goal by 2040. Reaching the state's 100% carbon free goal will require optimization of the existing renewable portfolio customers have already invested in. Maintaining and upgrading existing transmission assets, for example modernizing the HVDC line, is an important part of the broader plan to achieve decarbonization in Minnesota. The risk of higher replacement energy prices is expected in future years as more baseload coal units retire; however, reliable wind energy transferred along the HVDC line will help mitigate these congestion challenges as grid congestion patterns continue to evolve.

Minnesota Power anticipates the risk of forced outages on the HVDC line to increase given the age and condition of the existing infrastructure. Figure 2.2.4-1 displays the annual energy unavailability when the HVDC system is not available due to forced (unplanned) outages from all causes, including transmission and converter equipment outages. In 2022, 9.86 percent of annual energy unavailable due to forced outages occurred because of converter equipment failures. This was the second highest recorded forced unavailability due to converter equipment since 2000 and represented approximately 76 percent of total forced outages in 2022. HVDC unavailability due to converter station forced outages is shown in Figure 3.2.2-1 and discussed later in the application. Although total forced outages were lower in 2022 than 2021, Figure 3.2.2-1 shows that forced outages due to converter equipment failures was notably higher in 2022 and has been increasing steadily over the last five years.

Figure 2.2.4-1 – Annual Energy Unavailable due to Forced Outage



Note: Unavailability defined as capacity not available due to outage. Percent unavailable is based on full year of full production: 550MW x 8760 hours/year = 4,818,000 (4,831,200 in leap years).

The Company's current risk assessment, which is updated annually based on current market prices, is anticipating volatility in energy market prices for replacement energy when the HVDC line experiences forced outages and North Dakota wind is curtailed. During periods of outages when Minnesota Power utilizes the North Dakota AC system, unprecedented congestion between generation and load in the MISO region exacerbates the cost impact to customers. The risk of higher replacement energy prices is expected in future years as more baseload coal units retire; however, reliable wind energy transferred along the HVDC Line will help mitigate these congestion challenges as grid congestion patterns continue to evolve.

2.2.5 Efforts to Lessen Rate Impacts

As stated earlier, Minnesota Power recognizes the importance of providing reliable and increasingly clean electric service at affordable rates for customers, and as such is exploring several options that could reduce the rate impact of the Project for its customers.

1. **Earlier in-service date:** Because of the limited number of manufacturers of the type of equipment used in HVDC terminals and highly-constrained global HVDC market conditions, Minnesota Power has already secured a manufacturing slot reservation with a preferred supplier to obtain a guaranteed in-service date for the Project. In the midst of rapidly evolving global HVDC market conditions and supply constraints, this procurement strategy ensures schedule certainty for Minnesota Power's customers while stabilizing the budgetary outlook for the Project. Unfortunately, the earliest in-service date that could be guaranteed by any manufacturer capable of delivering the Project is April 2030. This is roughly three years later than the originally desired in-service date. As discussed in Section 3.8, with several years of delay it is possible that the HVDC Line may experience an extended outage. Because of this, the Company is working with the supplier to secure an earlier in-service date. Those efforts include regular collaboration, early initiation of design activities, and ongoing discussions to secure an earlier manufacturing slot and in-service date guarantee. It is also possible that other projects with manufacturing reservations in the supplier's

queue may experience delays, in which case the supplier may offer Minnesota Power an earlier manufacturing slot. Minnesota Power's early engagement with the supplier is intended to place the Project in a position to take advantage of such an opportunity, should it come to fruition, provided all regulatory approvals are in place. An earlier in-service date may result in a slightly different capital cost and rate impact, but the overall rate impact customers pay over time will be lower if the in-service date is sooner.

2. **MISO recognition of system support in North Dakota that is added with VSC technology:** The VSC technology brings additional benefits to the MISO system that should be recognized as MISO considers long-term reliability needs. Minnesota Power has initiated discussions with MISO regarding potential wholesale Tariff changes to investigate ways to create a method to compensate Minnesota Power for these broader system benefits. MP is monitoring MISO's efforts to identify sufficient resource attributes, a key MISO priority being taken up by the Resource Adequacy Subcommittee in 2023 (RASC-2022-1), to determine if and/or how VSC HVDC can fit into resource adequacy to provide additional system support and benefits to the broader regional grid.

3. **Federal Incentives for Shovel-Ready Project:** Minnesota Power has explored available opportunities for Federal Funding options through the Infrastructure Investment and Jobs Act ("IIJA") and submitted an application for the Deployment of Technologies to Enhance Grid Flexibility (Section 40107-Smart Grid Grants) program in March 2023. Minnesota Power submitted a Concept Paper for this program in December 2022 and received a recommendation to apply for this funding from the Department of Energy ("DOE"). If awarded, Minnesota Power could apply up to $50 million—the maximum award amount—to the project costs associated with expansion capability of the facility. A number of stakeholders submitted letters in support of Minnesota Power's Federal Funding application, including International Union of Operating Engineers Local 49, the Laborers' International Union of North America, the Duluth Area Chamber of Commerce, the Greater North Dakota Chamber, St. Louis County, the Area Partnership for Economic Expansion, the Center for Energy and Environment, the Minnesota Center for Environmental Advocacy, Fresh Energy, and the Minnesota Tribal Contractors Council. Additionally, more Federal Funding Opportunity Announcements are expected over the coming years and Minnesota Power anticipates pursuing them when practical for the Project. If any are identified before the Project is placed in service and construction is completed, Minnesota Power will provide an update to the Commission in this docket as a compliance filing. Minnesota Power also provided an update on efforts taken to maximize benefits from both the IIJA and Inflation Reduction Act ("IRA") in a filing submitted on January 30, 2023 in the Commission's Joint Investigation into the Impacts of the Federal IRA in Docket No. E,G999/CI-22-624.

4. **State funding:** The Company has sought funding from both the states of Minnesota and North Dakota to support the Project and further reduce its rate impact through state matching programs related to IIJA funding as well as state competitive and budgetary processes. Minnesota Power has secured $15 million in funding for the Project from the state of Minnesota,[2] which is available until June

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[2] See line 293.15 in HF No. 2310, Conference Committee Report - 93rd Legislature.

30, 2034, and will continue to pursue state funding as opportunities become available. Should any of the state funding be awarded before the Project is placed in service and construction is completed, Minnesota Power will provide an update to the Commission in this docket as a compliance filing.

5. **Procurement processes**: Minnesota Power uses a competitive bidding process for all capital projects and other purchases over $10,000, ensuring projects are delivered at the best value for customers. Minnesota Power procurement professionals manually track savings achieved through these competitive bidding processes, and the total cost savings for all projects averages approximately $14 million per year. These proven procurement processes will be used on this Project to capture savings for customers wherever possible.

   Minnesota Power conducted a thorough and competitive vendor selection process for the Project's Converter Station equipment that included a formal Request for Proposal for indicative pricing and in-service dates for a single project/configuration the two vendors that are able to supply an HVDC project of this scale and complexity. This approach differed from the typical approach to bid a fully developed project due to the state of the market supply chain for HVDC converters. In addition to the converter stations, the Minnesota and North Dakota interconnection facilities, including AC substations and transmission line facilities, will also follow the procurement process for materials and construction in line with standard project delivery practices. Project Schedule

The anticipated permitting and construction schedule for the Project is provided in Table 2.3-1. It is anticipated that construction of the Project will begin in Q4 2024. This schedule is based on information known as of the date of the filing of this Application and may be subject to change.

Table 2.3-1 – Anticipated Project Schedule

Activity	Anticipated Date
Land Acquisition Begins	Apr 2022
Secure Manufacturing Slot Reservation with Preferred Supplier	Jan 2023
Kick off technical coordination and engagement with Preferred Supplier	Mar 2023
Certificate of Need and Route Permit Application Filed	May 2023
Begin Front End Studies & Engineering Design (FEED) with Preferred Supplier	Jan 2024
Certificate of Need and Route Permit Issued	July 2024
Other Federal, State, and Local Permits Issued	July – November 2024
Order Long Lead Time Equipment for AC Substations	November 2024
Clearing Begins	January 2025
Construction of AC Interconnection Facilities Begins	May 2025
Receive Firm Proposal for HVDC converters from Preferred Supplier	Dec 2025 – Aug 2026[a]
Execute Firm EPC Contract and Give Final Notice to Proceed with HVDC Manufacturing & Delivery	Feb 2026 – Oct 2026[a]
Construction of HVDC Converter Stations Begins	Feb 2027 – Oct 2027[a]
Project In-Service	Dec 2028 – Apr 2030[a]

[a] *Date range represents potential outcomes based on supplier availability to expedite manufacturing slot reservation.*

3.0 PROJECT PURPOSE AND NEED

3.1 SUMMARY OF NEED

The HVDC Modernization Project is needed to modernize aging HVDC assets, continue to position the transmission grid for clean energy transition, and improve the reliability of the transmission system. The existing HVDC terminal has operated for 45 years—15 years beyond its 30-year design life. In recent years Minnesota Power has experienced HVDC terminal outages due to failures in the control system, power electronics, transformers, and other components. Based on experience with other electric system components, the failure rate is expected to increase, which is of particular concern for the existing HVDC system because of limited parts availability. The orderly replacement of the HVDC terminal equipment is prudent to ensure continuous efficient delivery and l expansion of Minnesota Power's renewable, carbon-free energy resources into the future.

In addition to the replacement of the existing HVDC terminals, the new HVDC technology implemented for the Project will be designed to provide key reliability attributes including voltage regulation, frequency response, blackstart capability, and bidirectional power transfer capability. These modernizations to the HVDC technology will enable Minnesota Power and the region to continue to support its clean energy transition.

3.2 AGE AND CONDITION OF HVDC CONVERTER STATIONS

The fundamental need driver for the HVDC Modernization Project is the age and condition of the existing HVDC Converter Stations located on either end of the transmission line. These Converter Stations are responsible for making the conversion between the AC transmission system and the HVDC Line. They consist of power electronics, transformers, control and protection systems, and other supporting equipment necessary to complete the conversion between AC and DC. The HVDC Converter Stations are the gateway between the HVDC Line and the grid, and it cannot operate without functional and reliable converter stations. To aid in understanding the need to replace these Converter Stations, this section will provide a brief history of the Square Butte HVDC system, an overview of the main age and condition issues with the existing Converter Stations, a discussion of the consequences of outages on the Square Butte HVDC system for Minnesota Power's customers, and a description of how the proposed HVDC Modernization Project will address these concerns.

3.2.1 History of the Square Butte HVDC System

In early 2010, Minnesota Power finalized its purchase of a 465-mile-long, ±250 kV HVDC Line with Converter Stations located in Hermantown, Minnesota and Center, North Dakota. After a contested case proceeding (MPUC Docket No. E-015/PA-09-526), the Commission approved the Company's purchase of the HVDC Line from the Square Butte Cooperative, finding the proposed transactions associated with the acquisition to be reasonable, prudent, and in the public interest.[3]

The Square Butte HVDC Line and its Converter Stations at the Center and Arrowhead substations were released for commercial operation in May 1977, and such construction was prior to the existence of statewide permitting requirements for HVTLs in both Minnesota and North Dakota. The original purpose of the HVDC Line was to bring electricity from the coal-fired Milton R. Young

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[3] *See In re Minnesota Power's Petition to Purchase the Square Butte Coop.'s Transmission Assets and for Restructuring Power Purchase Agreements from Milton R. Young Unit 2 Generating Station*, Docket No. E015/PA-09-526, Order Granting Petition with Conditions (Dec. 21, 2009).

2 ("Young 2") generating station in Center, North Dakota, directly to Minnesota Power's customers and use the Minnesota transmission system to flow energy to Minnkota Electric Cooperative's customers in western Minnesota. Minnesota Power's purchase of the HVDC Line in 2010 cleared the way for the line to be repurposed to facilitate the delivery of wind power generated in North Dakota directly to Minnesota Power's service territory. Minnesota Power subsequently developed a portfolio of approximately 600 MW of North Dakota wind that now relies on the HVDC Line for reliable and efficient transmission deliverability.

The Center and Arrowhead HVDC Converter Stations were originally designed by General Electric. The original Converter Station technology, which was the best available at the time, is line commutated converter ("LCC") technology. The Square Butte HVDC line was the first long-distance project in North America to implement 12-pulse thyristor[4] valve converter technology. Under normal conditions, the system operates as a ±250 kV bipole, meaning there is a positive pole that operates at +250 kV and there is a negative pole that operates at -250 kV, with a total voltage between the poles of 500 kV. Each pole has its own HVDC converter within the Converter Stations at each end of the line. In the event of an outage in one of the converters, the HVDC system can operate with a single 250 kV pole in metallic return using the wire of the outaged pole as a ground wire for an extended duration. If the wire of the outaged pole is also unavailable, the original HVDC system also includes ground electrodes on either end that allow for short-term operation as a single 250 kV pole in ground return.

The original LCC converters were designed for a 30-year operating lifetime, which is typical for the type of power electronics and substation apparatus in the converters. As of 2023 the Converter Stations have been operating reliably for over 45 years. The main components of the HVDC Converter Stations include power electronics (thyristor valves) and their associated cooling system, converter transformers, smoothing reactors, harmonic filters, and reactive resources to complete the conversion between AC and DC. General Electric, the original vendor, exited the HVDC business for a time in the 1980s before restarting its HVDC line of business in the 1990s. However, due to the end of the original General Electric HVDC Line of business, much of the documentation and knowledge base from the original designers of the Square Butte HVDC system has been lost. In recent years, it has been increasingly difficult to procure spare parts for the Converter Stations as the technology is becoming obsolete and the individuals involved in the original design are no longer available for support. Minnesota Power has researched reverse engineering solutions to this technology issue, but has had limited success and thus spare and replacement parts for the Converter Stations remain limited. Minnesota Power has also sought out and procured spare components from similar HVDC systems as they have been upgraded and replaced in order to maximize the lifespan of the existing HVDC system. At this time, however, the spare parts inventory is becoming depleted with no straightforward solution to continue replenishing it.

3.2.2 Age and Condition Concerns

Modernizing the HVDC Converter Stations by replacing the original equipment with modern, state-of-the-art equipment will greatly reduce the likelihood of an extended outage due to component failures in the HVDC Converter Stations. The equipment has been reliable for most of its history, but as shown in Figure 3.2.2-1, forced outages due to HVDC Converter Station component failures have increased since approximately 2009 and appear to be accelerating over the last five years. In the worst historical case shown in Figure 3.2.2-1, the annual availability of the HVDC

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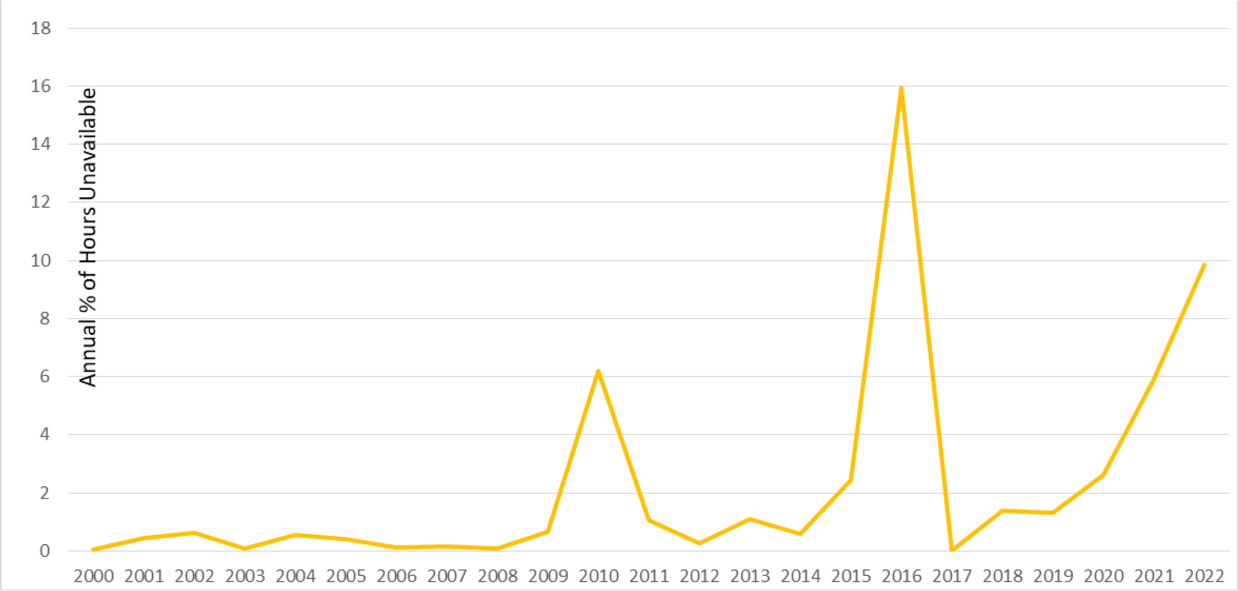
[4] A thyristor is a power electronics component that performs high-speed switching operations to convert between alternating current and direct current waveforms.

system was reduced by 16 percent (equivalent to about 1,400 hours) due to a failure in one of the HVDC Converter Stations.

Figure 3.2.2-1 – HVDC Unavailability due to Converter Station Forced Outages



In recent years, the most common outages in the HVDC Converter Stations have been the result of failures in the thyristors, converter transformers, control and protection system components, and filters, among other things. Based on experience with other system components and the trend shown in Figure 3.2.2-1, the failure rate is expected to continue to increase in both frequency and duration. Specifically, as addressed below, the top three equipment categories of concern for the HVDC system at this time are the 1) control and protection system, 2) pulse transformers, and 3) converter transformers.

3.2.2.1 Control and Protection System

Each of the two poles of the current HVDC system has its own control and protection system, with components located at each HVDC terminal. Control and protection systems depend on computer technology that reaches obsolescence much more rapidly than the rest of the components in the HVDC Converter Station. As such, control system upgrades typically take place every 10 to 20 years. The most recent control system upgrade for the Square Butte HVDC system was completed in 2004 by ABB and had to be retrofitted to work with the original General Electric equipment. The current HVDC control and protection system is microprocessor-based and is built on an older Microsoft Windows platform from the early 2000s that is no longer supported or commercially available. Due to the embedded nature of the proprietary programming within the outdated Windows operating system, it is not possible to simply replace failed control equipment with new computers that run current versions of Windows. Rather, the Square Butte HVDC system is due for a complete overhaul and replacement of the control and protection system.

However, based on the failure rates in the control system components, it would be more accurate to say that the control system upgrade is reaching the point of being overdue. To date, Minnesota Power has experienced one complete server failure and increasing failures of input/output ("I/O") cards caused by bad inputs. The server is a critical component that is used to operate the control and protection system and ensure all other components can communicate accurately. Minnesota Power replaced the failed server with a spare that was provided by ABB and kept on-site since the original control system upgrade in 2004. Currently, it is possible to procure a limited number of replacement I/O cards from ABB, but many other components, like industrial processing boards for the workstations and servers, are obsolete. Further, given the limited number of replacement I/O cards available, those will also soon become obsolete. The processing boards are not unique to the control system, but they have not been manufactured in many years, which forces Minnesota Power's engineers to have to look to secondary markets—such as Sillworks and Splus Technologies—for replacement. Because new processing boards are difficult to acquire, Minnesota Power has had to rely on refurbished boards. This dependence on secondary markets and refurbished parts creates a potential cyber security risk because the secondary vendor may not be associated with an OEM.

Minnesota Power can continue to operate and maintain the control and protection system in this manner for as long as it can continue to procure spare parts. However, once these critical spares are no longer available, Minnesota Power will be unable to operate the HVDC system at full capacity. At that point, HVDC system operations would be reduced to one pole, using the control system components from the failed pole for spare parts as long as the servers remain intact. Under these operating constraints, the capacity of the HVDC system would be indefinitely limited to 275 MW, or half of its current total capacity. However, two servers are needed for the entire system to run, so if either server fails and cannot be replaced or refurbished, then the entire HVDC system would be unavailable until a complete control and protection system upgrade could be implemented. The lead time on a full control and protection system upgrade is estimated to be at least two years, and the cost for such an upgrade is estimated to be within the range of $50 to $100 million. Any control and protection system upgrade implemented without also replacing the HVDC converters would not be usable when the converters are replaced with a more modern system and would, thus, become a stranded investment if done separately from a project like the HVDC Modernization Project proposed by Minnesota Power.

3.2.2.2 Pulse Transformers

As noted earlier, the thyristor valves are the power electronics component of the HVDC converters responsible for making the conversion between AC and DC. To perform this conversion, individual groups of thyristors are switched rapidly on and off by a gate-drive system in order to transform the electrical current waveform from an AC sine wave to a DC signal at the sending end and then from a DC signal back to an AC sine wave at the receiving end. One converter consists of many thyristor valves connected together to produce a conversion between AC and DC at the desired voltage and current levels. The individual subcomponents in the thyristor valves are called power modules. Within each power module are the thyristors and all the subcomponents required to drive them. One of those required subcomponents, the pulse transformer, is becoming an increasing concern for the Square Butte HVDC system.

The design specifications for the pulse transformers in the power modules, which are original to the 1970s design of the HVDC system, have been destroyed or lost due to General Electric's initial exit of the HVDC business. Minnesota Power has spent many hours working with past General Electric employees, other owners of similar-vintage General Electric HVDC systems, and unassociated pulse transformer manufacturers to find a suitable replacement for failed pulse transformers for the Square Butte HVDC system.

Pulse transformers fail for various reasons, but the biggest contributors are a failed gate drive (the component that tells the pulse transformer to fire, directing a thyristor to operate) or a disturbance on the HVDC transmission line that is close enough to the converter to cause a transient electrical signal to travel into the valves. There is some redundancy built into the converters to withstand individual component failures, but if there were enough accumulated pulse transformer failures, Minnesota Power would no longer be able to operate the HVDC system at full capacity. At that point, similar to the control system failures discussed above, HVDC system operations would be reduced to one pole, using the power module components from the failed pole for spares. Under these operating constraints, the capacity of the HVDC system would be indefinitely limited to 275 MW, or half of its current total capacity, until a full refurbishment or replacement of the HVDC converters could be completed. The lead time on a full like-for-like replacement of the thyristor valves is estimated to be at least five years. In light of the current state of the HVDC market, it is possible that vendor interest and availability for this type of project would be very limited, further increasing the lead time and cost. Any like-for-like replacement of the thyristor valves would also commit Minnesota Power to the existing LCC technology for the foreseeable future, forgoing all the added benefits from the HVDC Modernization Project as proposed by Minnesota Power.

3.2.2.3 Converter Transformers

Converter transformers are the interface between the HVDC Converter Station and the AC transmission system. They are specialized power transformers that change the voltage from the HVDC system output voltage to the AC system interconnection voltage and are built to withstand the unique stresses involved in the process of converting between AC and DC. One particularly important aspect of the design of these converter transformers is that they require load tap changers ("LTC") to make minor adjustments to the turns ratio to maintain voltage within acceptable limits on either side of the transformer. Each pole of the HVDC system has 6 converter transformers (two for each of the three phases on the AC side), which means there are 12 converter transformers energized at each Converter Station and 24 transformers in total between the two Converter Stations. The transformers are located next to the building containing the HVDC converters (the valve hall), with bushings that protrude through the building walls to connect the converter valves to the transformers.

In the past seven years, three converter transformers on the Square Butte HVDC system have failed due to problems caused by LTCs. Large power transformers are typically reliable for 40+ years, as these have been, but the LTCs are mechanical devices with many physical contacts and moving parts, and that have relays in the control circuit that experience wear and tear. After years of mechanical operations, vibrations, and other stresses, some of the LTC components are wearing out. Like many of the other components of the HVDC system, several of the parts in these transformers have become obsolete. As a result, Minnesota Power has been searching secondary markets for refurbished parts and has been in contact with several non-OEM companies who are able to remanufacture certain parts.

When a converter transformer fails there is also a risk that it is a catastrophic failure causing collateral damage. The most recent converter transformer failure, which involved a catastrophic failure in a bushing, resulted in a fire. Fortunately, the fire was contained and not spread to the valve hall, limiting the damage. If the fire had reached the valve hall, the outage would have lasted significantly longer as building repairs and potentially converter valve repairs would have been required. Minnesota Power has a spare unit available for emergency replacement in the event of a failure of any of the 24 transformers currently in use. Replacing a failed converter transformer with an onsite emergency spare unit typically takes about two weeks to complete. This is because the replacement requires physically removing the failed transformer, moving the spare into position, completing all power wiring and control connections, and commissioning the new unit for operation. If there is collateral damage to other Converter Station infrastructure or components, outage restoration can take significantly longer due to required repairs. If a subsequent transformer failure were to occur after the emergency spare had already been allocated, Minnesota Power would no longer be able to operate the HVDC system at full capacity. At that point, similar to the control system and pulse transformer failures discussed above, HVDC system operations would be reduced to one pole, de-energizing the pole with the failed converter transformer(s). Under these operating constraints, the capacity of the HVDC system would be indefinitely limited to 275 MW, or half of its current total capacity, until one of the failed transformers could be repaired and reinstalled, or a new replacement could be manufactured and delivered. The lead time for repair or replacement of a failed converter transformer is two to three years. As transformers fail, Minnesota Power will likely need to purchase replacements in order to retain a spare in case of emergency, which come at a considerable cost—over $2 million per unit. These transformers would also be specifically designed for the existing Square Butte HVDC system, meaning they would not be usable when the converters are replaced with a more modern system and would thus become a stranded investment if done separately from the full-scale HVDC Modernization Project proposed by Minnesota Power.

3.2.2.4 Summary

The HVDC Modernization Project is needed to address the significant age and condition concerns with the existing HVDC Converter Stations, including increasing concerns with the control and protection system, power modules, and converter transformers. In the short term, Minnesota Power has the ability to deal with minor problems (such as occasional single thyristor failures). But more extensive outages, such as failures of critical control and protection system components, the cascading failure of an entire valve (consisting of 12 power modules), or multiple converter transformer failures, could require weeks or months-long outages. Depending on the nature of the failure, Minnesota Power would be able to continue operating the HVDC system in one pole operation with a reduced capacity of 275 MW, or half of its current total capacity, until a full refurbishment or replacement of the failed component(s) could be completed in two to five years. In the extreme, a failure impacting both poles of the Converter Station would render the HVDC system entirely inoperable. This would result in a long-term (multi-year) outage of the Square Butte HVDC line until a refurbishment or replacement of the failed components or a full-scale HVDC Modernization Project could be permitted, engineered, procured, and constructed. Under current HVDC market conditions this would take a minimum of five years.

The HVDC Modernization Project will address these concerns by implementing a replacement of the existing Square Butte HVDC Converter Stations on both ends of the line (Hermantown, Minnesota and Center, North Dakota). Because the replacement will take place primarily on an adjacent site, the existing converters can continue to be maintained and operated as long as possible until the HVDC Modernization Project is implemented. Following completion of the Project, the new Square Butte HVDC Converter Stations will use modern voltage source converter HVDC technology, as discussed in more detail in Section 3.3, and the HVDC system will be positioned for another four (or more) decades of reliable operations.

3.3 NEED FOR VOLTAGE SOURCE CONVERTER TECHNOLOGY

There are two different types of HVDC converter technology available in the market today: LCCs and VSCs. The HVDC Modernization Project involves upgrading the HVDC converter technology used for the Square Butte HVDC system from LCC to VSC technology.

In addition to addressing the fundamental age and condition issues discussed in Section 3.2, upgrading to VSC technology addresses several other significant needs related to reliability and grid support, renewable integration, and long-term flexibility. Selecting VSC technology for the upgrade of the Square Butte HVDC Converter Station is also consistent with global HVDC market trends as the worldwide electric utility industry continues to re-position itself for a clean energy future. This section provides a brief overview of the two different HVDC technologies, followed by a discussion of why it is necessary for the Project to upgrade Minnesota Power's HVDC Converter Stations from LCC to VSC technology.

3.3.1 HVDC Technology Options

LCC HVDC technology, which was used for the original Square Butte HVDC Converter Stations, has been available for several decades. LCC HVDC converters utilize thyristor valves to drive the conversion between AC and DC, and they rely on the AC system voltage for commutating current from the outgoing valves to the incoming valves. LCC converters have a long track record of reliable and effective performance and can be an efficient option for high-power transfer applications. However, LCC converters come with inherent limitations due to the underlying technology and its reliance on the AC system voltage and performance. These limitations include significant filtering requirements due to high harmonic content generated by the AC-DC conversion process, significant steady state and dynamic reactive power requirements, susceptibility to commutation failures caused by faults on the AC transmission system, and poor performance in weak AC systems leading to minimum system strength (short circuit level) requirements for LCC HVDC systems.

In response to these limitations and advances in VSC technology, the implementation of new LCC HVDC converters has rapidly diminished in the last two decades. Today, VSC has become the dominant technology choice for new HVDC systems worldwide. VSC HVDC converters utilize integrated gate bipolar transistors ("IGBTs") to drive the AC-DC conversion process, coupling the IGBTs with DC capacitors to produce an internal voltage source. As a result of these inherent technical advantages, VSC HVDC converters generally produce little to no harmonic content, provide for their own steady state and dynamic reactive power requirements, are able to ride through AC system faults without failing, and provide robust operation in weak or strong AC systems with no minimum short circuit requirements. All of these features serve to make VSC HVDC technology the most robust and future-proof HVDC technology available today.

Disadvantages of VSC HVDC technology compared to LCC technology include higher Converter Station operating losses (primarily due to the need for more power electronics components compared to LCC), slower fault recovery for faults on the HVDC line, more significant spatial requirements leading to larger buildings, and generally higher costs. With respect to the advantages and disadvantages of VSC converters, and particularly considering the higher cost of VSC, it is important to develop a holistic comparison of the two technology options. To achieve similar performance attributes as VSC HVDC converters, LCC HVDC converters require additional supporting system upgrades, the cost of which tends to result in a more equal cost comparison between the two technologies, particularly in the rapidly changing operational environment created by the clean energy transition. Even then, the inherent advantages of VSC technology make it nearly impossible to develop a comprehensive alternative utilizing LCC converters. Further discussion of LCC HVDC technology as an alternative for the HVDC Modernization Project is provided in Section 4.9. As stated above, VSC HVDC technology is the most robust and future-proof HVDC technology available today, and its value-added attributes provide confidence and long-term value that are not achievable with LCC HVDC technology.

Table 3.3.1-1 – LCC and VSC Technology Comparison Attributes

Attributes	LCC	VSC
Future-Proof Technology	No	Yes
Reactive Power Requirements	Significant	Self-Provided
Dynamic Voltage Support	Not Included	Included
AC System Harmonic Impact	Significant	Minimal
Blackstart Capability	No	Yes
Risk of HVDC Failures Due to AC System Events	Susceptible	Immune
Minimum AC System Short Circuit Level Requirement	Required	None
Long-Term Outlook for Development & Support	Fewer Projects	More Projects
Outdoor Equipment	Most	Least
Building Size	Moderate	Large
Converter Power Losses[5]	Moderate/Lower	Moderate/Higher
Bi-Directional Capability and Dispatch Frequency	Limited Flexibility	Highly Flexible
HVDC Fault Recovery Performance	Fastest	Slowest
Reliability & Availability	Similar	Similar
Expandability Options	Yes	Yes

3.3.2 Reliability and Grid Support

VSC HVDC converters offer inherent grid-supporting attributes not found in LCC HVDC converters. In many ways, the grid-supporting attributes of VSC HVDC converters provide comparable performance to traditional central station baseload generators. The role of coal-fueled baseload generators in the regional energy mix continues to decline as traditional central station resources are displaced by intermittent renewable resources. Minnesota Power has previously discussed the impact of transitioning away from local baseload generation on its own transmission system, specifically citing concerns about system strength and voltage support, local power delivery, and regional power delivery.[6] The implementation of VSC HVDC technology for the Square Butte HVDC system is a foundational component for ensuring the continued reliability of the transmission system as Minnesota Power navigates the clean energy transition. This section provides a more detailed analysis of the technology enhancements offered by VSC HVDC and discussion of how these enhancements will contribute to the reliability of the transmission system.

3.3.2.1 Reactive Power and Voltage Support

VSC HVDC converters provide for their own steady state and dynamic reactive power requirements. This inherent attribute of VSC technology eliminates the need for additional reactive support from mechanically switched capacitors, synchronous condensers, or static synchronous compensators ("STATCOM") external to the HVDC system itself. In addition to providing for the needs of the HVDC system itself, VSC converters are capable of producing or absorbing reactive power with very fast response times to support the surrounding AC system in both steady state and transient timeframes. Real and reactive power operations in a VSC HVDC system are independent of one another, meaning that this reactive power support is available to support the AC system regardless of the real power transfer level of the HVDC line at any given

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[5] While converter station losses are a differentiator between LCC and VSC technology, it is also important to note that converter station losses in both cases are only a fraction of overall HVDC system losses. As noted in Section 3.7, the losses in the converters are much smaller than the losses in the transmission line itself when the HVDC system is operating at peak.

[6] See Appendix P.

time. This feature of the new VSC HVDC converters will contribute to maintaining predictable steady-state transmission voltages and robust transient voltage performance for Minnesota Power and the region.

3.3.2.2 Resiliency Against Adverse AC System Conditions

Unlike LCC HVDC converters, VSC HVDC converters do not rely on the AC system voltage for commutating current from the outgoing valves to the incoming valves. Instead, they use electronic signals to commutate current in the valves. This feature of VSC technology renders it very resilient, and practically immune, to faults on the surrounding AC transmission system. Whereas an LCC HVDC system may stop transferring power briefly due to low transient voltages caused by nearby AC system fault events, VSC HVDC converters can normally operate through AC system faults. When an LCC HVDC system experiences a commutation failure, all of the power formerly being transferred on to HVDC line is dumped onto the underlying AC system, aggravating the post-fault system response. VSC converters prevent this problem by continuing to transfer real power over the HVDC line. When this inherent resiliency is combined with the dynamic reactive support discussed in Section 3.3.2.1, which acts like a STATCOM to support the surrounding system during and after nearby fault events, VSC converters can contribute to significant improvements in transient performance.

VSC converters are also capable of operation at very low short circuit levels and can even be designed to operate in “grid-forming” mode to restart and support an islanded system. This feature makes VSC converters uniquely suitable for transmission systems with a high penetration of inverter-based resources and little to no synchronous generation. To achieve similar performance, LCC converters often require synchronous condensers to ensure a minimum short circuit level of at least 2.5 times the HVDC power rating. If the surrounding system is not sufficiently strong, LCC HVDC systems may experience control interaction issues with surrounding inverter-based resources or high transient over-voltages due to significant amounts of fixed reactive support (filters and capacitor banks). The resiliency of VSC converters to weak system conditions ensures their long-term viability regardless of how the surrounding system develops, effectively future-proofing the HVDC system. With the added value of being able to support blackstart and islanded (grid-forming) operation,[7] VSC HVDC converters provide additional flexible options for recovering from adverse AC system conditions.

3.3.2.3 Low Impact on AC Transmission System

The current design standard for VSC HVDC converters, known as multi-level modular converter, consists of multiple sub-modules connected in series. This converter design produces an AC waveform with a large number of steps, resulting in very little harmonic content. Harmonic content occurs when the AC waveform varies from a standard 60 Hz sine wave due to the inclusion of higher-frequency content. LCC HVDC converters produce a waveform with a significant amount of harmonic content, which must then be filtered out on the AC side by fixed-sized capacitive filter banks. Because VSC converters do not produce significant harmonics, there is less potential harmonic impact on the AC system. Without a need for large capacitive filter banks, VSC HVDC systems are significantly less likely to contribute to low-order resonances, high transient over-voltages, and circuit breaker transient recovery voltage issues.

The symmetric monopole configuration that is proposed for the Project will also contribute to reduced AC system impacts. In this configuration, the HVDC system has a high-impedance

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[7] Black start capability is an added feature that requires additional equipment and control functions which must be specified and incorporated into the technical design of the VSC HVDC converter.

ground point on the DC system. Due to this grounding configuration, faults on the DC system do not draw fault current from the AC system. Instead, DC system faults appear to the AC system as an interruption of real and reactive power flow only, rather than drawing a significant amount of fault current and negatively impacting AC system voltage.

3.3.2.4 Flexible Bi-Directional Dispatch Capability

Bi-directional dispatch capability refers to the ability to transfer power in both directions. In the case of the Square Butte HVDC system, that creates the ability to transfer power from West to East and East to West. The present Square Butte HVDC system operates exclusively in West to East dispatch, moving from central North Dakota to northeastern Minnesota. When it was originally commissioned, the Square Butte HVDC system would have had the capability to operate bidirectionally. However, several decades of exclusively West to East operation have polarized the HVDC terminal equipment, rendering it impossible to reverse the direction of power flow. The existing system is also capable of changing the power transfer level only once per hour and requires a minimum dispatch of 50 MW per pole at all times when the HVDC line is in use.

The new VSC converters will have bidirectional dispatch capability and greater flexibility for changing the dispatch of power flow on the HVDC Line. VSC HVDC converters can operate continuously from zero to maximum power transfer in each direction without changing voltage polarity. This allows power transfer on the HVDC Line to be ramped up and down, and even reversed if necessary, very rapidly to respond to system events or market signals. The capability to dispatch on a more frequent basis will also align HVDC operations with current MISO market operations, which can update dispatch every five minutes. Thus, the VSC converters provided enhanced operational flexibility for both supporting transmission reliability and optimizing HVDC dispatch for market economics.

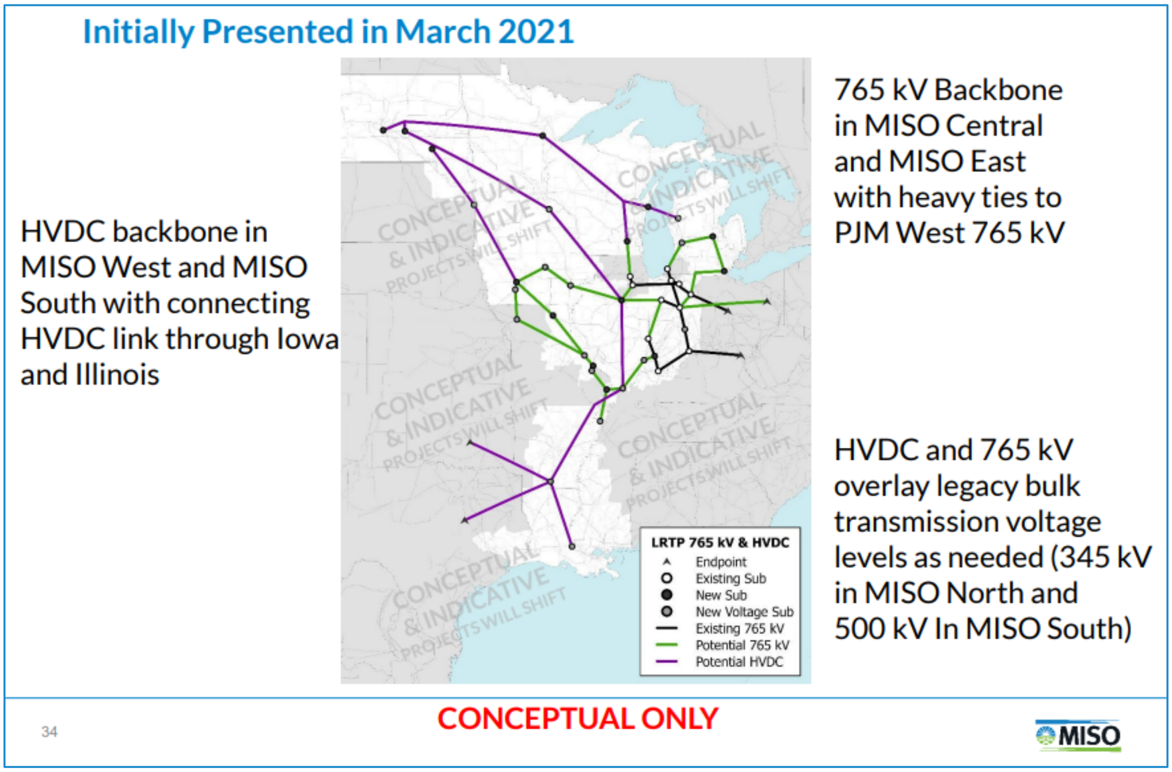
3.3.3 Future-Focused Technology

The many attributes listed above position VSC HVDC converters to support Minnesota Power as it navigates the continued evolution of the power system and make positive contributions to grid reliability as the clean energy transition continues. With their inherent technological advantages, VSC HVDC converters are better suited to operations in weaker and less predictable system conditions associated with higher penetrations of renewable energy. In addition, the VSC HVDC converters implemented with the HVDC Modernization Project will provide flexibility and scalability to support both the near-term and long-term needs of the electric grid. Previous sections have already provided a thorough discussion of how the VSC HVDC converters will support the near-term needs of Minnesota Power's system. This section provides an overview of how the VSC HVDC converters will best support the long-term needs of Minnesota Power's transmission system and the regional grid.

Utilities, RTOs, Federal agencies, and states are in various stages of developing plans to meet their goals for a carbon-free future, with Minnesota leading the way in the upper Midwest region in many respects. The pace of the transformation is increasing, and the grid needs to be adapted to meet the needs of the future renewable-heavy power system. Across the world, VSC HVDC systems are being examined to support reliable integration of large amounts of renewable energy. This is also true in the Upper Midwest, where the regional transmission operator, MISO, has taken on an ambitious multi-year effort to identify and advance the regional electric grid of the future. This effort is called the Long Range Transmission Plan ("LRTP"), and similar to many other long-term transmission roadmaps being developed to support the clean energy transition, high-capacity regional HVDC systems play a significant role in the MISO LRTP roadmap as shown in

Figure 3.3.3-1.[8] Notably, the MISO roadmap specifically highlights several high-capacity HVDC connections, including the Square Butte HVDC corridor, as key components of the roadmap.

Figure 3.3.3-1 – 765 kV and HVDC Components of LRTP Indicative Long-term Road Map



Initially Presented in March 2021

HVDC backbone in MISO West and MISO South with connecting HVDC link through Iowa and Illinois

765 kV Backbone in MISO Central and MISO East with heavy ties to PJM West 765 kV

HVDC and 765 kV overlay legacy bulk transmission voltage levels as needed (345 kV in MISO North and 500 kV In MISO South)

CONCEPTUAL ONLY

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This is consistent with the previous findings from MISO's Renewable Energy Integration Impact Assessment ("RIIA"). RIIA was a technically rigorous analysis of system needs resulting from increasing renewable (wind and solar) penetration levels in the MISO footprint up to 50 percent. The focus of the assessment was to understand the complexities of large-scale renewable integration, identify potential issues and inflection points (where complexity increases significantly), and examine potential mitigation solutions.[9] One of the major findings of RIIA was that power delivery from weak areas of the grid, defined by large amounts of inverter-based resources and low short circuit levels, would require a holistic approach to solution development to solve a myriad of reliability issues. According to MISO, "For the purposes of the RIIA analysis, the only workable solution found was addition of Voltage Source Converter (VSC) HVDC transmission lines."[10] It is, therefore, clear from the RIIA report and the present MISO LRTP analysis that the implementation of VSC HVDC technology is fundamental for transforming the power grid and integrating the vast amounts of renewable resources necessary to meet clean energy goals.

High-volume renewable energy transfer by large HVDC transmission projects will be required for the nation to make considerable progress towards clean energy objectives. While the urgent need to replace the existing Square Butte HVDC Converter Station due to aging infrastructure \requires Minnesota Power to proceed with the HVDC Modernization Project now, the

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[8] Figure reference: March 8, 2023 Planning Advisory Committee presentation.

[9] RIIA Report, Page 2

[10] RIIA Report, Page 118

implementation of VSC technology in a flexible, scalable, and expandable configuration best positions the Square Butte HVDC corridor for the future development in support of the regional grid.

3.3.4 HVDC Market Drivers

Over the most recent two decades, VSC HVDC has evolved from a niche technology to the preferred HVDC converter technology for the majority of projects worldwide. Through ongoing discussions with the top worldwide HVDC suppliers, it has become clear that some of the suppliers are moving toward specializing in VSC HVDC projects in order to maximize their opportunity in the market. Given these conditions in the market, the likelihood of getting multiple responses to a competitive request for proposals for a LCC retrofit project for the Square Butte HVDC system is minimal. Further complicating the situation is that LCC and VSC projects fight for similar engineering, project delivery, and manufacturing resources within each of the suppliers. Thus, it is not altogether certain that the timeline for delivery of a LCC retrofit project would be any more favorable than what is currently available for VSC projects. Further, as mentioned above, the system support components necessary to augment LCC systems creates a near level comparison with respect to costs of the two systems. Finally, with a dwindling number of new LCC projects and a rapidly growing number of new VSC projects, there are concerns about long-term support for LCC projects.

The HVDC Modernization Project is intended to establish new Converter Stations that will last another four decades for Minnesota Power's customers. While it is clear that the knowledge and expertise, spare parts, and technical support will be available for VSC converters over that time period, the status of long-term support for LCC Converter Stations appears less certain. Based on Minnesota Power's assessment of the current market conditions and long-term support outlook, VSC HVDC converters are the most effective and reasonable way to deliver the HVDC Modernization Project in the near-term while meeting Minnesota Power's goal of establishing facilities that will be viable for the next several decades.

3.4 NEED TO RELOCATE THE HVDC TERMINALS

The implementation of new VSC HVDC converters for the HVDC Modernization Project requires that the Converter Stations be relocated and constructed on adjacent sites. The Company determined that the most suitable parcels for relocation of the Converter Station are west of the existing Arrowhead Substation due to its proximity to the existing Arrowhead Substation and HVDC terminal, as well as its proximity to the existing HVDC line. This site is preferred to minimize the number and length of new transmission lines required to connect the new HVDC Converter Station to the existing HVDC line and AC transmission system, while also maximizing the use of existing utility infrastructure at the Arrowhead Substation.

This section provides a brief overview of the underlying need drivers for relocation of the HVDC terminals, including the difference in spatial requirements for VSC technology compared to LCC technology, outage constraints, and future expansion considerations.

3.4.1 Spatial Requirements of VSC Technology

For the purpose of understanding the need to relocate the Converter Stations as Minnesota Power transitions the Square Butte HVDC system from LCC technology to VSC technology, it is necessary to understand the fundamental difference in the type of power electronics utilized for each technology option.

As discussed previously, the power electronics that do the work of converting between AC and DC current signals in a LCC HVDC system are called thyristors. On the other hand, VSC HVDC systems use IGBTs to perform high-speed switching to make the conversion. The IGBTs in a VSC HVDC system are coupled with DC capacitor banks to create an internal voltage source (hence the name, "voltage source converter") that inherently provides for its own reactive power and voltage support. Due to the fundamental difference in the power electronic components, VSC HVDC systems generally require a much larger building than similarly rated LCC HVDC systems. For the HVDC Modernization Project, this means that the new VSC HVDC equipment is much too large to be retrofitted into Minnesota Power's existing HVDC Converter Station buildings, which were designed for a substantively different (LCC HVDC) application. Therefore, new buildings must be constructed for the new VSC converters.

The larger footprint of the buildings required for VSC converters is generally offset by significantly less required outdoor equipment compared to LCC converters. This is because LCC HVDC systems require significant amounts of reactive power to maintain voltage within minimum limits and large filter banks to smooth out harmonic components inherent to the LCC HVDC conversion process. To meet these requirements, LCC HVDC systems typically come with a large number of outdoor capacitor and filter banks, and sometimes also include synchronous condensers. VSC HVDC systems inherently provide reactive power and voltage support and produce a waveform with very little harmonic content, generally eliminating the need for AC filters. In the end, the comprehensive footprint including all indoor and outdoor equipment tends to be similar for comparably rated LCC and VSC converters.

3.4.2 Outage Constraints

In addition to the requirement for new buildings, constructability and outage constraints are another major reason to construct the new Converter Stations on an adjacent site. The consequences of extended outages discussed above are similar whether the outages are "forced" by failures or whether those outages are planned due to construction. Relocating the Converter Stations enables the existing HVDC Converter Stations to continue operating to the greatest extent practicable during the construction of the HVDC Modernization Project, further minimizing costs to customers.

The new HVDC Converter Stations and most of the new AC interconnection facilities may be constructed adjacent to the existing HVDC Line and substation infrastructure. Single pole outages will be required to upgrade the capacity of 230 kV substation bus and equipment in the Arrowhead Substation at the points of interconnection for the two new 230 kV lines. An outage will also be required to cut into the existing HVDC line and reconnect it to the newly constructed extension to the new VSC Converter Station. These outages are significantly shorter in duration compared to the multi-year outages that would be required to retrofit new converters into the existing buildings.

3.4.3 Future Expansion

The Square Butte HVDC system has a significant role to play in the ongoing clean energy transition and decarbonization of our region's energy resources, as discussed in Section 3.3. As such, the HVDC Modernization Project is designed to accommodate future expansion of the HVDC system and the interconnected AC transmission system, to support the future regional transmission development that is necessary to successfully navigate the clean energy transition. Relocating the Converter Stations to adjacent sites where there is considerably more space and flexibility to accommodate future expansion is necessary to ensure that the HVDC system is positioned to provide maximum value over its lifespan.

3.5 IMPACT OF DENIAL

The Commission has established criteria in Minn. R. 7849.0120 to apply in determining whether a Certificate of Need should be granted for a proposed high voltage transmission line. An applicant for a Certificate of Need must show that the probable result of denying the request would have an adverse effect on the future adequacy and reliability of the system, there is not a more reasonable and prudent alternative, the proposed facility will provide benefits to society compatible with protecting the environment, and the project will comply with all applicable standards and regulations. Minnesota Power has demonstrated in this application that the proposed Project meets all the requirements to obtain a Certificate of Need. The Project will modernize aging assets that are critical to the reliable delivery of renewable energy to Minnesota Power's customers, improve the reliability of the transmission system and thoughtfully position for continued clean energy system transformation.

Should the Commission deny Minnesota Power's Certificate of Need Application for the Project, failure rates of the existing HVDC Converter Station equipment are anticipated to increase, resulting in outages that impact the reliable and efficient delivery of Minnesota Power's North Dakota wind energy and result in direct cost impacts to Minnesota Power's customers and reliability impacts to the regional transmission system. As these outages increase in frequency and duration, the cost and reliability impacts will continue to grow. With no viable plan to modernize the existing HVDC converters, Minnesota Power would immediately need to determine if it was prudent to invest in relatively short-term fixes to keep the HVDC Line operating on a limited basis or to move on from the HVDC Line entirely and begin to develop alternative AC transmission solutions.

As discussed in Section 4.8.2, the alternative transmission solutions required to facilitate continued delivery of Minnesota Power's zero fuel cost North Dakota wind energy, mitigate system impacts caused by the retirement of the HVDC Line, and replace the grid support provided by the VSC HVDC converters would come at a substantially higher cost and with greater human and environmental impacts than the HVDC Modernization Project. Given that the alternative AC transmission solutions include multiple regional-scale 345 kV transmission lines, there would likely be prolonged exposure to outages of the HVDC Line during the 10 or more years it would take to develop these projects. At some point during that time, it may become impossible to continue operating the HVDC Line at its full capacity, leading to extended outages and associated impacts to Minnesota Power's customers and regional reliability.

Were Minnesota Power to choose to invest in relatively short-term fixes to keep the HVDC Line operating on a limited basis, these fixes would result in significant risk of stranded investment as the regional transmission system develops. Targeted replacements of the existing control system, converter transformers, and thyristor valves could serve to keep the existing LCC HVDC system running for several more decades at its existing capacity. These replacements would not bring the additional grid-supporting attributes associated with VSC technology, and therefore additional investments in STATCOMs, synchronous condensers, or other solutions may become necessary as the clean energy transition continues to challenge the historical operating conditions of the grid. As MISO continues to advance proactive long-range transmission planning solutions to position the grid for the future of clean energy, VSC HVDC solutions will inevitably begin to play a major role in the regional grid. At that point, Minnesota Power's short-term investments in keeping its existing LCC HVDC system may have to be replaced before the end of their useful asset life by a VSC HVDC upgrade similar to the Project in order to continue reliable operation of the Square Butte HVDC corridor and provide the best value for Minnesota Power's customers and the region.

As discussed above, the impact of denial of the Application will be cost impacts to Minnesota Power's customers in the near-term from increased exposure to HVDC outages, substantial additional long-term cost for alternative projects to address reliability issues created by retirement of the HVDC Line, and lost opportunity to efficiently provide long-term bulk power transfer and grid support solutions for Minnesota Power and the region.

3.6 PROJECT AREA LOAD DATA

As discussed in previous sections, a significant portion of the electricity consumed by Minnesota Power's retail and municipal customers is delivered to its service area by the Square Butte HVDC Line. Minnesota Power has either constructed or entered into purchase agreements for 600 MW of wind energy in North Dakota, all of which depends on the HVDC Line for reliable and efficient delivery to Minnesota Power's customers. When the HVDC Line is unavailable due to forced outages, there are potentially significant cost impacts to Minnesota Power's customers. As discussed in the Company's Exemption Requests, which were approved by the Commission on February 1, 2023, the Project is not proposed to address growing peak demand or system capacity issues. Instead, the Project is designed to upgrade and modernize the existing infrastructure of the HVDC terminals to assure the reliable and efficient delivery of renewable energy to Minnesota Power's customers, and enhance the reliable operations of the transmission system, for the coming decades. Since the need for the Project is associated with the ability to serve all of Minnesota Power's customers with reliable and affordable energy, the most relevant project-area load data is documented in Minnesota Power's most recent AFR, which was filed on June 24, 2022 in Docket No. E999/PR-22-11.

3.7 ESTIMATED SYSTEM LOSSES

Losses are a measure of the energy flow across the system that is converted into heat due to impedance within the elements of the transmission system. It is necessary for utilities to provide enough generation to serve their respective system demands (plus reserves), taking into account the loss of energy before it can be usefully consumed. When system losses are reduced or minimized, electrical energy is delivered to end users more efficiently, helping to defer the need to add more generation resources to a utility's portfolio. Therefore, system loss reduction results in monetary savings in the form of less fuel required to meet the system demand plus potentially delayed capital investment in generation plant construction.

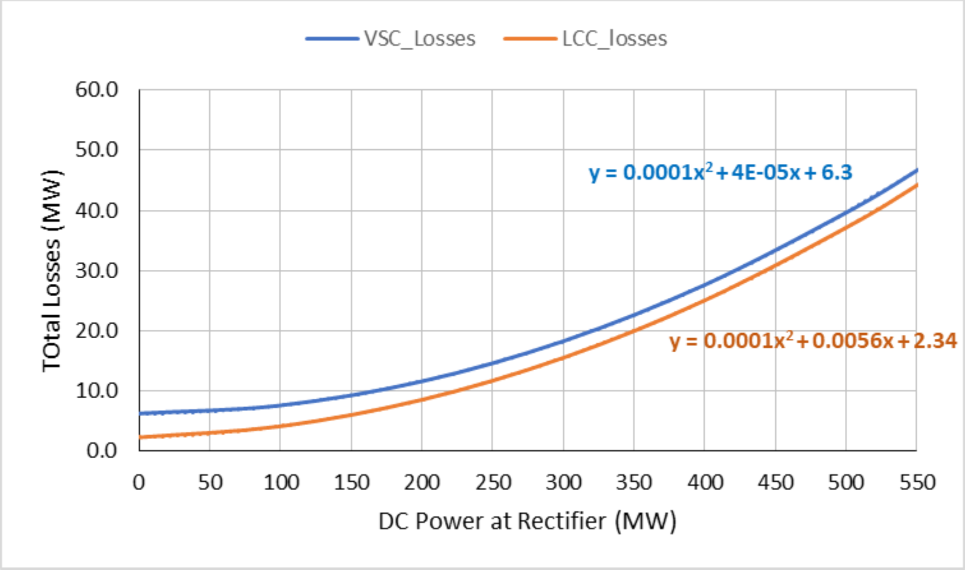
Each new transmission line that is added to the electric system affects the losses of the system. In determining the amount of loss associated with a particular transmission project, it is typically not reasonable to consider only the project's transmission facilities and calculate losses directly from operation of those new transmission facilities. However, due to the unique nature of HVDC transmission and the specific circumstances of the HVDC Modernization Project, it is feasible to provide expected losses for the HVDC system under projected maximum loading and under projected average loading in the length of the line and at its terminals. This is because HVDC is a controllable, point-to-point transmission technology for which direct losses can be measured and reasonably quantified. One of the primary drivers for implementing HVDC transmission is that it is the most efficient option for long-distance bulk power transfer, in part due to reduced losses. For the HVDC Modernization Project in particular, the existing Converter Stations are being directly replaced with new Converter Stations and AC interconnection facilities, which makes a direct comparison of pre- and post-Project losses in the HVDC facilities a simple and reasonable way to assess system loss impacts.

In previous proceedings, Minnesota Power has used power flow software PSS/E to calculate the losses in the transmission system before and after implementation of a project. Unfortunately, power flow programs like PSS/E are not equipped to provide holistic analysis of losses in HVDC systems, including both the transmission line and Converter Stations. While HVDC transmission line losses are fairly straightforward to calculate, the losses in the Converter Stations on either end are generally too complex for the power flow program to accurately model. Since the HVDC Modernization Project only involves replacing the Converter Stations on either end of the existing HVDC line, the losses in the transmission line component will be unaffected. Therefore, the primary comparison of pre- and post-Project losses is a comparison of the original LCC HVDC Converter Stations to the new VSC HVDC Converter Stations.

In the course of evaluating technology options for the HVDC Modernization Project, Minnesota Power's Owner's Engineer ("OE") developed a calculation methodology to approximate Converter Station losses in order to compare LCC and VSC options. The methodology takes into account fixed loss components, including transformer no load losses and basic station service losses that are present any time the Converter Station is energized, as well as current-dependent losses, including power wiring, component, and heating losses that increase as the power flow through the Converter Station increases.

Based on the OE's methodology, VSC converter losses are expected to be about 0.35 percent higher than LCC converter losses (1.0 percent versus 0.65 percent). The higher losses are well-documented as one of the drawbacks of VSC technology compared to LCC technology and are primarily due to the greater number of power electronics components and the larger buildings required for VSC Converter Stations. Fortunately, the impact on total HVDC system losses is relatively minimal because the transmission line losses continue to dominate the total losses. Figure 3.7-1 below shows a comparison of total HVDC system losses with VSC converters compared to LCC converters across the full range of dispatch from 0 MW to 550 MW. The underlying formula from the OE's methodology is also shown on the plot to illustrate how the losses have been calculated.

Figure 3.7-1 – HVDC System Losses with VSC Converters vs. LCC Converters



At 550 MW, total losses for the LCC HVDC system are 44.2 MW (8.0 percent) while total losses for the VSC HVDC system are 46.7 MW (8.5 percent). At maximum power transfer on the HVDC line, losses are expected to be approximately 2.5 MW higher with the new VSC HVDC converters compared to the original LCC HVDC converters.

Because the power flow on the HVDC line changes from day to day and hour to hour, and losses are related to the square of the current flowing through the HVDC line, the losses will change over time, increasing as HVDC line flow increases and decreasing as HVDC line flow decreases. Since losses change over time, there is no precise method to calculate average annual loss reductions. One common method is to use the loss savings at peak demand to estimate the average annual loss savings based on the following formulas:[11]

$$\textit{Loss Factor} = (0.3 \times \textit{Load Factor}) + (0.7 \times \textit{Load Factor}^2)$$

$$\textit{Annual Loss Savings (MWh)} = (\textit{Loss Factor} \times \textit{Peak Loss Savings}) \times 8760 \textit{ hours per year}$$

Assuming an average load factor for the HVDC line of 70 percent based on historical operating data and using the calculated difference in losses (2.5 MW) at peak demand (550 MW), the Project will increase average HVDC line losses by an estimated 11,990 MWh annually. This relatively modest increase in losses is offset by the significant value of the additions VSC technology brings to support the grid, as discussed in previous sections.

3.8 IMPACT OF DELAY

If the Commission delays issuing a Certificate of Need and Route Permit for the HVDC Modernization Project, Minnesota Power's customers will have increased exposure to HVDC outage impacts, and the ability to meet even the 2030 in-service date for the Project may become compromised.

Further delay of the HVDC Modernization Project could lead to significant and extended outages, as discussed in Chapter 3.0. These outages come with potentially significant costs to Minnesota Power's customers due to their impact on the reliable and efficient delivery of Minnesota Power's North Dakota wind energy facilities, as discussed in Section 2.2.4. Given the age and condition of existing HVDC Converter Stations, three general outage scenarios exist, all with of which have significant impacts on Minnesota Power's customers:

1. **Continued Short-Duration Outages:** Component failure rates continue to grow over time, resulting in increasing short-duration outages similar to what have been occurring in recent years (see Figure 3.2.2-1). In some years, extended-duration outages may occur due to more challenging failures. Eventually a failure occurs that cannot be repaired, advancing to one of the extended outage situations discussed below.

2. **Extended Outage of a Single Pole:** Many of the scenarios discussed in Section 3.2.2 would result in failures in the control system, thyristor valves, or converter transformers that render it impossible to continue operating the HVDC system at its full capacity. At that point, HVDC system operations would be reduced to one pole, de-energizing the pole with the failed equipment. Equipment from the failed pole would then be utilized to fix any failures in the operating pole in order to keep

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[11] Gönen, Turan. Electric Power Distribution System Engineering. McGraw Hill, 1986. 55, 58-59.

it running as long as possible. Under these operating constraints, the capacity of the HVDC system would be indefinitely limited to 275 MW, or half of its current total capacity.

3. **Extended Outage of Both Poles:** There are equipment failure scenarios whereby repair would not be feasible and, as a result, it would be impossible to continue operating either pole of the HVDC system. In that case, the entire 550-MW capacity would be unavailable until the Project could be completed or until Minnesota Power could procure, engineer, and construct a project to repair the existing HVDC Converter Stations. Current estimates indicate that a six-month outage could cost between $25 to $40 million. For delays longer than six months, replacement energy costs could be $100 million/year or more, and there would be major delays in Minnesota Power's carbon and renewable energy progress. Minnesota Power's wind deliveries, totaling about 2,000,000 MWh/year, are vital to meeting Minnesota Power and State of Minnesota carbon reduction and clean electricity goals.

While the most likely scenario is continued short-duration outages with the ability to repair and restore the HVDC system to full capacity, further delays to the Project in-service date will increase the risk of realizing one of the extended outage scenarios described above.

In addition to the operational and customer impacts, a delayed Commission decision may impact Minnesota Power's ability to expedite the Project in-service date. As discussed in Section 2.2.1, Minnesota Power is presently working with a preferred HVDC supplier to evaluate options for improving upon the best-available guaranteed in-service date of April 2030. The HVDC supplier could present Minnesota Power with this opportunity at any time. If there is uncertainty surrounding the status or timing of the Certificate of Need, it would not be possible for Minnesota Power to make a commitment to achieve the earlier in-service date. If the Commission delays issuing a decision long enough, even the ability to procure the project by 2030 may come into question, as Minnesota Power needs to make significant commitments to obtain long lead time items for AC substations and HVDC system design with the preferred supplier in late 2024 and 2025 toward meeting the 2030 in-service date. Given the highly competitive state of the global HVDC market, a slight delay on the front end of the Project could result in a multi-year delay to the in-service date on the back end.

In light of the substantial risks and costs of delayed action on this Application, it is critically important that the Commission does not delay issuing a Certificate of Need and Route Permit for the HVDC Modernization Project.

3.9 EFFECT OF PROMOTIONAL PRACTICES

Minnesota Power has not conducted any promotional activities or events that have triggered the need for the Project. Rather, the Project is driven by the need to replace an aging HVDC system with current technology to enable and augment the renewable energy transition in Minnesota.

3.10 EFFECT OF INDUCING FUTURE DEVELOPMENT

The HVDC Modernization Project is not intended to induce future development, but it may support future economic development that otherwise would not be possible if the aging HVDC system is not brought to current technology and operational standards. Additionally, the replacement of this aging infrastructure through the HVDC Modernization Project will ensure that zero fuel cost renewable generation from North Dakota can continue to be efficiently transmitted to Minnesota along the existing HVDC Line, ensuring Minnesota Power remains well positioned to meet Minnesota's clean energy goals.

3.11 SOCIALLY BENEFICIAL USES OF FACILITY OUTPUT

As discussed above in Chapter 3.0, the purpose of the HVDC Modernization Project is to replace aging infrastructure and, thus, improve the HVDC Line reliability and availability for socially beneficial use.

4.0 ALTERNATIVES TO THE PROJECT

4.1 ANALYSIS OF ALTERNATIVES

In any Certificate of Need proceeding for a proposed transmission line project, an applicant is required to consider various alternatives to the proposed project. Minn. Stat. § 216B.243, subd. 3(6) provides that in assessing need, the Commission shall 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 has also provided in its rules that an applicant for a Certificate of Need must discuss alternatives in the application and environmental report. Minn. R. 7849.0260 states:

Each application for a proposed large high voltage transmission line 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 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 sub items (1) to (7).

Minn. R. 7849.0340 also requires an applicant to consider the option of not building the proposed facility.

This section discusses the various alternatives to the Project that Minnesota Power considered, including: 1) generation alternatives; 2) various transmission solutions, including upgrading other existing facilities, different voltage levels, and different endpoints; and 3) a no-build alternative.

As discussed below, none of these alternatives is more reasonable and prudent than the HVDC Modernization Project.

4.2 GENERATION AND NON-WIRE ALTERNATIVES

The Project involves replacing the Converter Stations on either end of the existing HVDC Line with relatively limited development of new transmission facilities for the purpose of reconnecting the new Converter Stations to the existing AC transmission system. Because the Project is enabling the continued delivery of existing high-capacity renewable wind energy resources from North Dakota by utilizing existing transmission infrastructure, it has similar attributes to both a generation solution and a non-wire solution. There is no alternative generation or non-wire solution that can replace the function of the HVDC Converter Stations in facilitating the bulk long-distance transfer of renewable energy across the grid.

4.3 ALTERNATIVE VOLTAGES

4.3.1 Alternative HVDC Transmission Voltages

The Project involves replacing the Converter Stations on either end of Minnesota Power's existing ±250 kV HVDC transmission line. The 465-mile transmission line itself will continue to be operated using its existing structures, which are designed specifically to operate at ±250 kV DC. To continue using the existing transmission line, the new Converter Stations must be designed for the same operating voltage as the line. To change the HVDC transmission voltage at this time would require rebuilding the entire 465-mile line on new structures designed for a higher operating voltage—a significant increase in scope and cost that is not necessary at this time to support the near-term capacity needs on the HVDC system. Therefore, alternative HVDC transmission voltages are not a necessary improvement or a cost-effective alternative for the Project.

4.3.2 Alternative AC Transmission Voltages

The Project involves interconnecting the new Converter Stations at 345 kV and then stepping down the voltage from 345 kV to 230 kV to interconnect to the existing transmission system at the Arrowhead Substation. Minnesota Power considered interconnecting the new HVDC converters directly to the 230 kV system. This would involve designing the HVDC converter transformers with a 230 kV winding on the AC system side rather than a 345 kV winding, and then building new 230 kV bus and transmission to connect to Arrowhead. While this alternative would have a lower cost in the near term, the long-term cost would likely be significantly higher than developing an initial interconnection at 345 kV.

As the regional transmission system continues to develop to support the clean energy transition, the near-term focus has been on developing a strong 345 kV backbone network. This is clearly demonstrated by Tranche 1 of the MISO Long Range Transmission Plan, which was approved by the MISO Board of Directors on July 25, 2022 and consists of 18 individual 345 kV projects totaling over $10 billion. As discussed in Section 3.2, Minnesota Power believes the Square Butte HVDC corridor has long-term significance for the regional transmission system, enabling efficient and flexible long-distance transfer of high-value and zero fuel cost renewable energy resources in North Dakota to customers throughout MISO. As the use and significance of this existing HVDC system evolves over the life of the proposed VSC Converter Stations, it will become increasingly important for the HVDC system to be directly interconnected to the regional 345 kV network, rather than the underlying local 230 kV network. However, to move the point of interconnection from the 230 kV system to the 345 kV system at a later date would require an expensive replacement of the converter transformers to change the winding voltage on the AC-system side. Since the converter transformers are approximately 20 percent of the overall cost of the HVDC Converter Station itself, there would be a significant sunk cost at the time the transition from 230 kV to 345 kV is made. Therefore, alternative AC transmission voltages are not a cost-effective long-term alternative for the Project.

4.4 UPGRADE OF EXISTING FACILITIES

The Project involves upgrading existing facilities as discussed throughout Chapter 3.0.

4.5 ALTERNATIVE ENDPOINTS

The Project's endpoints are determined by the endpoints of the existing 465-mile HVDC transmission line. While the implementation of VSC HVDC technology requires that the new Converter Stations be developed on new sites nearby to the existing Converter Stations, as discussed in Section 3.3, the new sites have been carefully selected to minimize the amount of new transmission line construction required to interconnect the Converter Stations to the existing HVDC transmission line and the AC transmission system. Moving the endpoints farther away from the existing HVDC transmission line endpoints would significantly impact the scope and scale of the Project. Therefore, there are no feasible alternative endpoints for the Project outside of the immediate vicinity of the existing HVDC Converter Stations and no route alternatives were considered outside of what is proposed.

4.6 DOUBLE CIRCUITING

The Project includes AC interconnection facilities required to connect the new VSC HVDC Converter Stations to the existing AC transmission system. These proposed AC transmission lines are very small in scope and scale, with none of them exceeding half a mile in length. The Company will consider implementing double circuit-capable structures for these short new AC interconnection facilities where appropriate given the potential future use of the facilities. Use of double-circuit or double-circuit capable structures within the proposed route will be determined during detailed design based on engineering and site constraints, constructability review, and future considerations for the facilities.

4.7 ALTERNATIVE NUMBER, SIZE, AND TYPE OF CONDUCTOR

The Project includes AC interconnection facilities required to connect the new VSC HVDC Converter Stations to the existing AC transmission system. The specific conductors for the proposed AC transmission lines have yet to be determined but will consist of ACSR or possibly ACSS wire and are likely to utilize bundled configurations (e.g., two sub-conductors per phase). The conductors will be selected according to the near-term and long-term capacity needs of the proposed transmission lines while also considering electrical performance characteristics, such as electric and magnetic fields, audible noise, and radio interference, as well as the lifecycle operating and maintenance costs. The conductor for the short segment of new ±250 kV HVDC line is anticipated to be 2839 ACSR to match the existing HVDC Line conductor. This is an atypically large conductor that is necessary to facilitate the full capacity of the HVDC Line, and there are limited or no feasible alternatives at this time.

4.8 ALTERNATING CURRENT (AC) TRANSMISSION ALTERNATIVES

Since the Project involves improvements to an existing HVDC Line, the Company considered AC transmission alternatives, including directly converting the HVDC transmission line to AC or developing a broader AC network solution to enable the HVDC Line to be retired.

4.8.1 Converting the HVDC Line to AC

The Company considered converting the existing HVDC Line to AC to avoid having to replace the Converter Stations on each end. The existing Square Butte HVDC line is a direct 465-mile connection from Center, North Dakota, to Hermantown, Minnesota. Along the entire length of the line, there are no interconnections to the underlying system. The existing transmission line structures are designed to operate at ±250 kV DC and consist of two energized conductor positions, one for each pole of the HVDC line, and a shield wire. A typical AC transmission line consists of three energized conductor positions (for three-phase power transfer) and one or more shield wires. Transmission line insulation and phase-to-ground clearances are also driven by the designed operating voltage of the line.

Considering these facts, it would not be possible to convert the existing HVDC Line to operate at an alternative AC voltage. Rather, the entire 465-mile line would need to be rebuilt to specifications for the selected AC transmission voltage, and new substation interconnections would need to be developed on either end. Depending on the selected AC transmission voltage (345 kV, 500 kV, or 765 kV) large power transformers would be required at each end to step down the voltage for interconnection to the underlying 230 kV system. Additional mid-line interconnections to the underlying system would also be required to reduce line lengths and facilitate the interconnection of new reactive support. This reactive support would be necessary because AC transmission lines consume significant amounts of reactive power proportionally to their transfer capacity and line length. In this case, an exceptionally long high-capacity AC transmission line would be required to replace the HVDC Line, driving the need for substantial amounts of reactive power compensation. Changing the line from HVDC to AC would also raise significant constructability concerns due to the need to remove the existing line before replacing it with the new AC transmission lines. To avoid constructability concerns, the new line could be built next to the existing HVDC Line corridor, but this would create additional human and environmental impacts that are well beyond the limited impacts of the Project.

In summary, direct replacement of the HVDC transmission line with an AC transmission line to avoid replacement of the Converter Stations would result in significant increases to cost and human and environmental impacts. The entire 465-mile transmission line would need to be rebuilt, expanded substation interconnections would need to be developed on both ends of the line, and new mid-line substations would need to be established to connect reactive resources and interconnect to the underlying AC transmission system. Considering these factors, direct replacement with AC transmission is not a reasonable alternative to the Project.

4.8.2 HVDC Line Retirement with AC Network Upgrades

The Company considered running the existing HVDC Converter Stations to failure, retiring the HVDC Line, and developing a package of AC transmission network upgrades to mitigate the impacts of HVDC Line retirement and facilitate delivery of Minnesota Power's existing and planned North Dakota wind generation. If Minnesota Power were to run the HVDC Converter Stations to failure, effectively retiring the HVDC Line after it becomes inoperable, a package of AC transmission network upgrades would need to be developed and implemented to mitigate the system impacts of retiring the HVDC Line (the “AC Alternative”). The AC Alternative would need to restore direct transmission outlet capacity for Minnesota Power’s North Dakota wind generation, mitigate deficiencies in regional transfer capability to allow the generation to move out of North Dakota, and address local reliability impacts for Minnesota Power’s customers in Northeastern Minnesota who depend on the support provided by the Arrowhead HVDC terminal.

The process of developing the AC Alternative would involve identifying the system impacts from retirement of the HVDC Line through steady state and stability analysis of regional power system models, coordinating with MISO and neighboring impacted utilities through the annual MTEP reliability process to determine appropriate AC system mitigation solutions, and permitting, engineering, and constructing the network upgrades included in the AC Alternative as expeditiously as possible while keeping the HVDC Converter Stations operational for as long as possible.

Minnesota Power performed a power flow screening analysis to develop a better understanding of the potential scope and scale of impacts and AC network upgrades associated with a retirement of the HVDC Line. Impacts were evaluated with and without the MISO LRTP Tranche 1 projects to identify the extent to which LRTP transmission may help mitigate the impacts of a HVDC Line retirement. Results indicate that the $10 billion LRTP Tranche 1 portfolio of transmission projects does mitigate some of the constraints, but is not sufficient to address all, or even most, of the constraints associated with HVDC Line retirement. In addition to LRTP Tranche 1, Minnesota Power estimates that the AC Alternative would include:

- **340** miles of new 345 kV and 230 kV transmission lines in North Dakota and Minnesota

- **220** miles of upgraded 345 kV transmission lines in North Dakota, South Dakota, and Iowa

- **204** miles of upgraded 230 kV and 115 kV transmission lines in North Dakota and Minnesota

- **3,000** megavolt amperes of additional transformer capacity in North Dakota and Minnesota

- **600** megavolt amperes reactive (“MVAR”) of new STATCOMs in North Dakota and Minnesota to equal the dynamic reactive support provided by the HVDC Modernization Project

- **300** MVAR of new capacitor banks along the North Dakota / Minnesota border

The total estimated direct cost for the AC Alternative is nearly $1.4 billion, a 70 percent increase over the estimated mid-range cost of the HVDC Modernization Project. Because the need for these network upgrades would be triggered by retirement of the HVDC Line, the entirety of this cost would most likely be assigned to Minnesota Power. Besides being more costly, the AC Alternative comes with other drawbacks that cannot be reconciled when compared with the HVDC Solution. Other key differences between the Project and the AC Alternative include:

1. **Controllability:** The HVDC line moves Minnesota Power’s wind generation directly from Center, North Dakota, to Minnesota Power’s customers in Northeastern Minnesota. Minnesota Power controls the HVDC Line flow,

facilitating the transfer of wind energy directly to its customers while bypassing a broad and often congested area of the regional AC transmission network. With an AC Alternative, Minnesota Power's wind generation is injected into the regional AC transmission network in North Dakota, and Minnesota Power withdraws an equivalent amount of energy from the AC transmission network in Northeastern Minnesota. There is no direct control over the system flow to support the needs of the grids (other than by redispatching generation resources). This contributes to further congestion on the MISO network and drives a need for significant transmission expansion, unlike the Project, which provides controllability of the HVDC Line, eliminating these impacts in their entirety without degrading the reliability of the regional transmission system.

2. **Congestion Risk:** With power transmitted on the HVDC Line, there is no risk of market congestion costs; the HVDC Line provides the perfect bridge for Minnesota Power's wind generation because its 465-mile direct connection between wind-rich Central North Dakota and Northeastern Minnesota bypasses constrained areas of the regional AC transmission network. With an AC Alternative, Minnesota Power bears the market risk if significant cost differences (i.e., congestion) develop between the North Dakota wind generation and Minnesota Power's load due to transmission constraints on the AC network. The AC Alternative creates a significant risk of exposure to increased delivery costs for Minnesota Power's North Dakota wind generation as it is subject to network constraints and congestion that are sometimes unpredictable, especially as major shifts in generation resources are projected for the future.

3. **Human and Environmental Impacts:** The Project makes efficient use of the existing 465-mile HVDC transmission line. It requires no additional transmission corridor development outside the immediate area of the Converter Stations, resulting in very limited human and environmental impacts. Comparatively, the AC Alternative would require an estimated 340 miles of new 345 kV lines to be routed and permitted, in addition to other network upgrades, establishing substantial new transmission corridors with significant human and environmental impacts. In addition to the human and environmental impacts, there is a significantly higher risk profile for permitting, engineering, procurement, and construction of the AC Alternative projects, potentially leading to even higher costs and longer implementation timelines.

In summary, running the existing HVDC Converter Stations to failure, retiring the HVDC Line, and developing a package of AC transmission network upgrades to mitigate the impacts of HVDC Line retirement would be almost double the cost of the Project and come with additional drawbacks including significant increases in human and environmental impacts due to the need for many miles of new AC transmission lines to be built to mitigate regional reliability impacts. Considering these factors, the AC Alternative is not a reasonable alternative to the Project.

4.9 HVDC TECHNOLOGY ALTERNATIVES

The Project involves upgrading the HVDC converter technology used for the Square Butte HVDC system from LCC to VSC technology. The need for VSC HVDC technology is discussed in Section 3.3. This section will discuss the Company's consideration of LCC HVDC technology as an alternative to the Project.

LCC HVDC technology, which was used for the original Square Butte HVDC Converter Stations, has been available for several decades. LCC HVDC converters utilize thyristor valves to drive the conversion between AC and DC, and they rely on the AC system voltage for commutating current from the outgoing valves to the incoming valves. LCC converters have a long track record of reliable and effective performance and can be an efficient option for high-power transfer applications. However, LCC converters come with inherent limitations due to the underlying technology and its reliance on the AC system voltage and performance. These limitations include significant filtering requirements due to high harmonic content generated by the AC-DC conversion process, significant steady state and dynamic reactive power requirements, susceptibility to commutation failures caused by faults on the AC transmission system, and poor performance in weak AC systems leading to minimum system strength (short circuit level) requirements for LCC HVDC systems. In response to these limitations and advances in VSC technology, the implementation of new LCC HVDC converters has rapidly diminished in the last two decades.

Advantages of LCC HVDC technology compared to VSC technology include lower Converter Station operating losses (primarily due to fewer power electronics components and smaller buildings compared to VSC), faster recovery for faults on the HVDC line, smaller buildings, and generally lower direct installed cost. With respect to the advantages and disadvantages of LCC converters compared to VSC converters, and particularly considering the higher installed cost of VSC, it is important to develop a holistic comparison of the two technology options.

For LCC HVDC converters to achieve similar performance attributes as VSC HVDC converters, they require additional supporting system upgrades, the cost of which tends to result in a more equal cost comparison between the two technologies, particularly in the rapidly changing operational environment created by the clean energy transition. Even then, the inherent advantages of VSC technology make it nearly impossible to develop a comprehensive alternative utilizing LCC converters. The key comparison attributes of LCC and VSC technology are summarized and compared in Table 4.9-1 below.

Table 4.9-1 – LCC and VSC Technology Comparison Attributes

Attributes	LCC	VSC
Future-Proof Technology	No	Yes
Reactive Power Requirements	Significant	Self-Provided
Dynamic Voltage Support	Not Included	Included
AC System Harmonic Impact	Significant	Minimal
Black Start Capability	No	Yes
Risk of HVDC Failures Due to AC System Events	Susceptible	Immune
Minimum AC System Short Circuit Level Requirement	Required	None
Long-Term Outlook for Development & Support	Fewer Projects	More Projects
Outdoor Equipment	Most	Least
Building Size	Moderate	Large
Converter Power Losses	Moderate/Lower	Moderate/Higher
Bi-Directional Capability and Dispatch Frequency	Limited Flexibility	Highly Flexible
HVDC Fault Recovery Performance	Fastest	Slowest
Reliability & Availability	Similar	Similar
Expandability Options	Yes	Yes

To close the performance gap for an LCC alternative compared to a VSC alternative, the main supporting upgrades that would be necessary are large STATCOMs and/or synchronous condensers at each Converter Station. VSC HVDC converters would be designed to produce or absorb reactive power up to 0.95 power factor (equal to approximately one-third of the real power rating) to provide steady state voltage regulation and dynamic reactive support to the surrounding transmission system. An equivalent LCC HVDC solution would need to have at least ±300 MVAR of installed dynamic reactive power support from STATCOMs or synchronous condensers. Large amounts of fixed reactive support from harmonic filters required to be online any time the HVDC Line is energized may also increase reactive power absorption needs to prevent high voltages at low HVDC transfer levels and for transient events. If it is expected that the LCC converters will be operating in a system with a low short circuit level due to a lack of synchronous generation or because they will be used for blackstart restoration, the preference may be for synchronous condensers, which provide fault current as well as dynamic reactive support. Otherwise, large STATCOMs are a more optimal solution for flexible, fast-responding steady state and dynamic reactive support. Utilizing the MISO Transmission Cost Estimate Guide for MTEP22, each ±300 MVAR STATCOM or synchronous condenser would cost approximately $45 million to $60 million. Since these devices would be required on both ends of the HVDC Line, the total cost adder would be $90 million to $120 million in addition to the Converter Station cost. Even with the added support from STATCOMs or synchronous condensers, the LCC HVDC converter would continue to be more susceptible to AC system fault events and poor performance during adverse AC system conditions. As inverter-based renewable energy resources continue to displace traditional synchronous resources, changing system conditions may require that LCC converters be re-assessed and potentially re-tuned to changing requirements for short circuit levels or harmonic performance.

The long-term outlook for continued technical and maintenance support from the HVDC OEM may also become challenging as the worldwide HVDC market continues to lean heavily toward VSC technology. The challenges facing the current Square Butte HVDC system related to obsolescence and limited spare parts availability are much more likely to impact LCC Converter Stations over the next several decades than they are to impact VSC Converter Stations. In fact, some of the OEMs surveyed by the Company indicated that they were evaluating moving away from LCC technology entirely to maximize their ability to meet worldwide demand for VSC HVDC systems. As the Company was developing its competitive RFP for the Project in 2022, it became evident that none of the OEMs engaged in discussion with the Company had interest in supplying a LCC HVDC project at this time and that some would not even consider bidding on an LCC project.

In summary, the Company determined that LCC HVDC technology would be an inferior long-term technical solution compared to VSC HVDC technology, that overall costs for the LCC Converter Stations combined with supporting upgrades necessary to approximate the performance attributes of VSC technology would not be substantially less than the cost of implementing VSC Converter Stations, and that the present and long-term market outlook for LCC converters places them at a significant procurement and long-term support disadvantage compared to VSC converters. As the power system continues to evolve around the clean energy transition, the value-added technical attributes of VSC technology will make it the most flexible and future-proof option for HVDC development, a consensus position that is clearly being demonstrated in the global utility industry by recent rapid growth in demand for VSC HVDC projects. Therefore, LCC HVDC technology is not a prudent alternative to the Project.

4.10 UNDERGROUND ALTERNATIVE

The Company plans to have all proposed Project facilities located on land owned by the Company in St. Louis County, although land acquisition is ongoing at the time of filing this Application.

The Project includes AC interconnection facilities required to connect the new VSC HVDC Converter Stations to the existing AC transmission system. These proposed AC transmission lines are approximately a half a mile in length. The cost of constructing underground AC transmission is significantly greater than the cost of constructing overhead AC transmission, and underground transmission comes with considerable drawbacks for operations and maintenance.

While HVDC transmission lines are comparatively better suited for underground construction due to fundamental differences in their electrical characteristics, underground HVDC construction would still be substantially higher cost than overhead and come with similar operations and maintenance concerns. The HVDC line segment proposed for the Project is even shorter than the AC transmission line segments.

Beyond initial costs, another important consideration of undergrounding lines is consistency with existing lines and standards. Minnesota Power does not have any buried lines at voltages of 115 kV and above. The addition of underground transmission is outside of Minnesota Power's 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, resulting in diminished maintenance and emergency restoration responsiveness and effectiveness.

Given the short line lengths, the fact that the Project's new transmission lines will be located on land owned by the Company, and the additional costs and other drawbacks of underground transmission, there is no reason to consider underground transmission for any of the AC or HVDC transmission line segments of the Project.

4.11 NO-BUILD ALTERNATIVE / CONSEQUENCE OF DELAY

The Company considered the impacts of either not building the Project or delaying its in-service date. Major impacts from cancelling or delaying the Project involve increased failure rates and potential catastrophic failures of the existing HVDC Converter Stations, unacceptable increased risk and cost for Minnesota Power's existing and planned renewable generation facilities, negative impacts to Minnesota Power's progress in meeting its renewable and carbon reduction goals, and significant costs for AC network upgrades to mitigate reliability impacts.

4.11.1 No-Build Alternative

It is important to recognize that there is not a true "No-Build" alternative to the Project. If the Project does not move forward, failure rates of the existing HVDC Converter Station equipment will continue to increase, causing outages that impact the reliable and efficient delivery of Minnesota Power's North Dakota wind energy and result in direct cost impacts to Minnesota Power's customers and reliability impacts to the regional transmission system. As these outages increase in frequency and duration, the cost and reliability impacts will continue to grow. With no viable plan to modernize the existing HVDC converters, Minnesota Power would immediately need to determine if it was prudent to invest in relatively short-term fixes to keep the HVDC Line operating on a limited basis or to move on from the HVDC Line entirely and begin to develop alternative AC transmission solutions.

As discussed in Section 4.8.2, the alternative transmission solutions required to facilitate continued delivery of Minnesota Power's zero fuel cost North Dakota wind energy, mitigate system impacts caused by the retirement of the HVDC Line, and replace the grid support provided by the VSC HVDC converters would come at a substantially higher cost and greater human and environmental impacts than the HVDC Modernization Project. Given that the alternative AC transmission solutions include multiple regional-scale 345 kV transmission lines, there would likely be prolonged exposure to outages of the HVDC Line during the 10 or more years it would take to develop these projects. At some point during that time, it may become impossible to continue operating the HVDC Line at its full capacity, leading to extended outages and associated impacts to Minnesota Power's customers and regional reliability.

Were Minnesota Power to choose to invest in relatively short-term fixes to keep the HVDC Line operating on a limited basis, these fixes would result in significant risk of stranded investment as the regional transmission system develops. Targeted replacements of the existing control system, converter transformers, and thyristor valves could serve to keep the existing LCC HVDC system running for several more decades at its existing capacity. These replacements would not bring the additional grid-supporting attributes associated with VSC technology, and therefore additional investments in STATCOMs, synchronous condensers, or other solutions may become necessary as the clean energy transition continues to challenge the historical operating conditions of the grid. As MISO continues to advance proactive long-range transmission planning solutions to position the grid for the future of clean energy, VSC HVDC solutions will inevitably begin to play a major role in the regional grid. At that point, Minnesota Power's short-term investments in keeping its existing LCC HVDC system may have to be replaced before the end of their useful asset life by a VSC HVDC upgrade similar to the Project to continue reliable operation of the Square Butte HVDC corridor and provide the best value for Minnesota Power's customers and the region. As stated above, there is no true "no-build" alternative given the responsibility Minnesota Power bears to its customers and for the reliability of the transmission system. If the Project does not move forward, there will be cost impacts to Minnesota Power's customers in the near term from increased exposure to HVDC outages, substantial additional long-term cost for alternative projects to address reliability issues created by retirement of the HVDC Line, and lost opportunity to efficiently provide long-term bulk power transfer and grid support solutions for Minnesota Power and the region.

4.11.2 Consequence of Delay

If the Project is delayed, Minnesota Power's customers will have increased exposure to HVDC outage impacts, and the ability to meet even the 2028 to 2030 in-service date for the Project may become compromised. Further delay of the Project could lead to significant and extended outages, as discussed in Chapter 3.0. These outages come with potentially significant costs to Minnesota Power's customers due to their impact on the reliable and efficient delivery of Minnesota Power's North Dakota wind energy facilities, as discussed in Section 2.2.4. Given the age and condition of existing HVDC Converter Stations, three general outage scenarios exist, all with of which have significant impacts on Minnesota Power's customers:

1. **Continued Short-Duration Outages:** Component failure rates continue to grow over time, resulting in increases in short-duration outages similar to what have been occurring in recent years (see Figure 3.2.2-1). In addition, given the age of the existing assets, it's likely that extended-duration outages may occur due to more significant equipment failures. Eventually a failure will occur that cannot be repaired, resulting in one of the extended outage situations discussed below.

2. **Extended Outage of a Single Pole:** Many of the scenarios discussed in Section 3.2 would result in failures in the control system, thyristor valves, or converter transformers that render it impossible to continue operating the HVDC system at its full capacity. At that point, HVDC system operations would be reduced to one

pole, de-energizing the pole with the failed equipment. Equipment from the failed pole would then be utilized to fix any failures in the operating pole in order to keep it running as long as possible. Under these operating constraints, the capacity of the HVDC system would be indefinitely limited to 275 MW, or half of its current total capacity.

3. **Extended Outage of Both Poles:** There are equipment failure scenarios whereby repair would not be feasible and, as a result, it would be impossible to continue operating either pole of the HVDC system. In that case, the entire 550-MW capacity of the HVDC system would be unavailable until the Project could be completed or until Minnesota Power could procure, engineer, and construct a project to repair the existing HVDC Converter Stations. Current estimates indicate that a six-month outage could cost between $25-40 million. For delays longer than six months, replacement energy costs could be $100 million/year or more, and there would be major delays in Minnesota Power's carbon and renewable energy progress. Minnesota Power's wind deliveries, totaling about 2,000,000 MWh/year, are vital to meeting Company and State of Minnesota carbon reduction and clean electricity goals.

While the most likely scenario is continued short-duration outages with the ability to repair and restore the HVDC system to full capacity, further delays to the Project in-service date will increase the risk of realizing one of the extended outage scenarios described above, along with the attendant costs and reliability impacts.

The Company has carefully assessed the present condition of the Square Butte HVDC Converter Stations, the future operating risks (e.g., continued aging of the assets, availability of spare parts), and the implications of future outages and concluded that the orderly replacement of the Converter Station equipment is the only prudent utility plan. This will minimize catastrophic outage risk and help assure efficient delivery of the Company's renewable, carbon-free energy resources. The risks that would be borne by Minnesota Power's customers and the potential impacts to regional reliability if the Project is cancelled or delayed further are unacceptable.

5.0 ROUTE SELECTION PROCESS

5.1 SUMMARY OF ROUTE SELECTION PROCESS AND GUIDING FACTORS

5.1.1 Route Development Process Summary

Minnesota Power used a comprehensive siting and vetting process to identify route options for the Project. Based on the applicable Minnesota Statutes and Rules, potential state, federal, and local permits or approvals necessary for the Project, and the purpose and need for the Project, Minnesota Power identified a Proposed Route for consideration by the Commission. The route development process leading to the identification of the Proposed Route is discussed in detail in Section 5.2.2.

The term "Proposed Route" includes, consistent with the definitions of "route" and "HVTL" in Minnesota rules, the Project's proposed HVTLs and associated facilities, including the new segment of ±250 kV HVDC transmission line, the two new parallel segments of 230 kV LHVTL, the new segment of 345 kV LHVTL, the new St. Louis County 345 kV/230 kV Substation, and the new HVDC Converter Station.

5.1.2 Routing Factors

The factors for route development are set forth in Minn. Stat. § 216E.03, subd. 7 and Minn. R. 7850.4100 and these factors directed Minnesota Power's route development process.

Minn. Stat. § 216E.03, subd. 7(a) provides that the Commission's route permit determinations "must be guided by the state's goals to conserve resources, minimize environmental impacts, minimize human settlement and other land use conflicts, and ensure the state's electric energy security through efficient, cost-effective power supply and electric transmission infrastructure." Subdivision 7(e) of the same section requires the Commission to "make specific filings that it has considered locating a route for a high-voltage transmission line on an existing high-voltage transmission route and the use of parallel existing highway right-of-way and, to the extent those are not used for the route, the Commission must state the reasons."

In addition to the statutory factors noted above, Minn. Stat. § 216E.03, subd. 7(b) and Minn. R. 7850.4100 provide factors that the Commission will consider in determining whether to issue a route permit for a high voltage transmission line. These routing factors from Minn. R. 7850.4100 are:

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

B. effects on public health and safety;

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

D. effects on archaeological and historic resources;

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

F. effects on rare and unique natural resources;

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

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

I. use of existing large electric power generating plant sites;

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

K. electrical system reliability;

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

M. adverse human and natural environmental effects which cannot be avoided; and

N. irreversible and irretrievable commitments of resources.

In 2023, the Minnesota Legislature amended Minn. Stat. § 216E.03, subd. 7(b) to also include the following considerations when designating routes:

- Evaluation of the benefits of the proposed facility with respect to (i) the protection and enhancement of environmental quality, and (ii) the reliability of state and regional energy supplies;
- Evaluation of the proposed facility's impact on socioeconomic factors; and
- Evaluation of the proposed facility's employment and economic impacts in the vicinity of the facility site and throughout Minnesota, including the quantity and quality of construction and permanent jobs and their compensation levels. The commission must consider a facility's local employment and economic impacts and may reject or place conditions on a site or route permit based on the local employment and economic impacts.

Minnesota Power used these statutory and rule routing criteria, routing experience, engineering considerations, and stakeholder feedback to develop the Proposed Route for the Project. To minimize impacts to humans and the environment, Minnesota Power first identified routing opportunities and constraints.

Opportunities are resources or conditions that create a potential for transmission line development. They include pre-existing linear infrastructure or other features (e.g., roads, transmission lines, and public land survey divisions of land) along which Project development would be particularly compatible. Opportunities also facilitate Project development by reducing impacts on constraints. Furthermore, Minn. R. 7850.4100 requires the Commission to consider when issuing a route permit the use or paralleling of existing rights-of-way (e.g., transportation corridors, pipelines, and electrical transmission lines), survey lines, natural division lines, and agricultural field boundaries, where practicable.

Constraints are resources or conditions that could limit or prevent transmission line development. Avoiding those resources or conditions is a goal, but not necessarily a requirement, of the routing process. Constraints might include areas restricted by regulations, or areas where impacts to resources would be difficult to mitigate. Constraints can include, for example: existing land uses such as homes, religious facilities, and schools; federal, state, and locally designated environmental protection areas; sensitive habitats or areas; cultural resources such as national landmarks and archaeological sites; and public infrastructure such as airports and aeronautical and commercial telecom structures. It is important for the routing process to account for the fact that Project development may affect constraints differently.

In addition, technical considerations will affect the routing process. These include specific engineering requirements, standards, system objectives, and opportunities for efficiency associated with construction of the Project. For example, the nature of the proposed Project—the modernization of existing facilities—necessitates that the route be located adjacent or as close to those existing facilities as practical. Other engineering objectives may include line entrance into the substations; minimizing the overall line length; good access for construction, inspections and maintenance; and minimizing the need for "special" structures. These technical guidelines are specific to the Project and inform the technical limitations related to Project design, land requirements, and reliability concerns.

The Proposed Route was identified because it takes advantage of Routing Opportunities, such as co-location with existing transmission lines and the existing infrastructure in need of modernization, existing access routes for construction and maintenance, land available for purchase by Minnesota Power, and the minimization of impacts to resources (routing factors) identified in Minnesota Rule 7850.4100. Additionally, the identification, avoidance, and minimization of impacts to Routing Constraints is discussed in detail in Chapter 7.0 of this application.

5.2 ROUTE DEVELOPMENT PROCESS

5.2.1 Project Study Area

Minnesota Power identified a Project Study Area that would help guide the corridor development process. The purpose of identifying a Study Area for the Project was to establish boundaries and limits for the information-gathering process (e.g., identifying environmental and land use resources, routing constraints, and routing opportunities) and the subsequent development of a proposed route for the Project. The Project Study Area was initially developed based on proximity to existing infrastructure and the proposed substation and Converter Station sizes. Further consideration was given to major physiographic features, jurisdictional boundaries, sensitive land uses and ownerships, existing utility corridors, and the availability of land for permanent ownership by Minnesota Power. In subsequent evaluations, the Study Area was reviewed and revised to best suit routing requirements and Project needs. The Project Study Area is shown on Map 1.

5.2.2 Project Route

Minnesota Power developed the Proposed Route by reviewing data, meeting with stakeholders, and performing broad environmental and engineering analyses on the Project Study Area.

In general, the Project Route was developed by considering the following:

- Existing Minnesota Power facilities to be modernized as a result of this Project;
- Existing rights-of-way (transmission lines, roads);
- Availability of sufficient areas of land for purchase by Minnesota Power;
- Avoidance of densely populated areas;
- Avoidance of major environmental / natural features;
- Maximizing transmission system efficiency and reliability; and
- Minimizing the distance between Project facilities and existing facilities to be modernized, and between individual Project components.

The Proposed Route is generally 0.5 mile wide, 0.7 mile long, parallel to the existing HVDC Line, and immediately west of Minnesota Power's Arrowhead Substation. The Proposed Route is shown in Map 1. The width of the Proposed Route provides flexibility in the routing process to take advantage of practical routing opportunities and to promote the avoidance of routing constraints.

5.2.3 Public Participation and Stakeholder Involvement in the Process

The Project Study Area was presented to the public at two open houses in November 2022 and in January 2023. In addition, individual Tribal, local, state, and federal agencies were introduced to the Project during the fall and winter of 2022-2023. These meetings provided information about the Project to key stakeholders and allowed them to provide comments that would be used in the next steps of the routing process. See Chapter 8.0 for a summary of public and agency comments.

5.3 ROUTE REFINEMENT AND ANALYSIS

Based on feedback from stakeholders and the public, as well as Technical Guidelines, Routing Constraints, and Routing Opportunities, Minnesota Power identified a single Proposed Route as identified in Map 1. The Proposed Route maximizes the need for Project proximity to existing Minnesota Power facilities near the Arrowhead Substation in need of modernization. The Proposed Route will include land owned in fee by Minnesota Power to the extent possible, while avoiding Routing Constraints to the extent practicable.

6.0 RIGHT-OF-WAY ACQUISITION, CONSTRUCTION, RESTORATION, MAINTENANCE, AND OPERATION

6.1 PROJECT SCHEDULE AND SEQUENCING, INCLUDING PROPERTY ACQUISITION AND WIDTH OF RIGHT-OF-WAY REQUIRED

6.1.1 Substations

The new HVDC Converter Station and the new St. Louis County Substation are proposed to be located on property owned by Minnesota Power, pending the completion of ongoing landowner negotiations. The modifications necessary at the existing Arrowhead Substation are not anticipated to require a physical expansion of the fenced substation.

6.1.2 Transmission Line Right-of-Way Width and Acquisition

As previously discussed, Minnesota Power plans to purchase and own in fee simple all the land required for Project construction and operation, in which case no “right-of-way” as such would be required. However, at the time of filing this application with the Commission, landowner negotiations were still ongoing for some required Project parcels. Map 2 shows the Project parcels that are proposed to be purchased and those for which acquisition is complete as of the filing date of this application.

Whether transmission lines are located on land owned in fee by Minnesota Power or within easements acquired for Project operation, right-of-way widths will still be established in design and indicated on drawings for purposes of placement of proposed lines relative to each other and to guide ongoing maintenance and adjacent use. Generally, lines will utilize the minimum right-of-way widths per voltage class as indicated in Table 2.1.2-1. For the three lines, this will include all three voltage classes in the Table, varying from 120 to 150 feet. Additional right-of-way width beyond these values may be required as needed based on design requirements. Reduction in these right-of-way width values will only be considered on a case-by-case basis as necessary.

6.1.3 Communication Infrastructure Modifications

Modifications to communications infrastructure in the Proposed Route will be completed as part of the Project to facilitate utility communications between Project facilities. Communications infrastructure additions are anticipated to occur in the following areas:

- Include OPGW on new 345 kV line HVDC Converter Station to St Louis County Substation
- Include OPGW on both new 230 kV lines from St Louis County Substation to Arrowhead Substation

6.2 CONSTRUCTION, MITIGATION AND RESTORATION PRACTICES, INCLUDING WORKFORCE REQUIRED

6.2.1 Substation

Details regarding the modifications necessary at the existing Arrowhead and new St. Louis County substations and HVDC Terminal are provided in Section 2.1.1.

Substation construction will be performed in compliance with the applicable NESC, Occupational Safety and Health Act, and state and local regulations. Minnesota licensed professional engineers will complete designs as required by Minnesota Statutes and Rules. Contractors will be committed to safe working practices. The local conditions of the substation sites will be considered in the final design of the substations. All designs will comply with all applicable safety codes and Minnesota Power standards.

The substation modifications will be designed to allow future maintenance to be done with the minimum impact on substation operation and the necessary clearance from energized equipment to ensure safety.

Industry-specific best management practices (“BMPs”) and standard construction and mitigation practices developed from experience with past projects will be used. BMPs will be determined based on the specific construction design, prohibitions, maintenance guidelines, inspection procedures, and other activities involved in constructing the substations. In some cases, activities will be modified to incorporate a BMP for construction that will assist with minimizing impacts on sensitive environments. In some cases, certain BMPs may be specifically required by permit conditions such as the Route Permit and NPDES Construction Stormwater Permit.

When construction activities are completed, Minnesota Power will restore the remainder of the construction sites in accordance with the restoration procedures described in Section 6.3.

6.2.2 Transmission Line

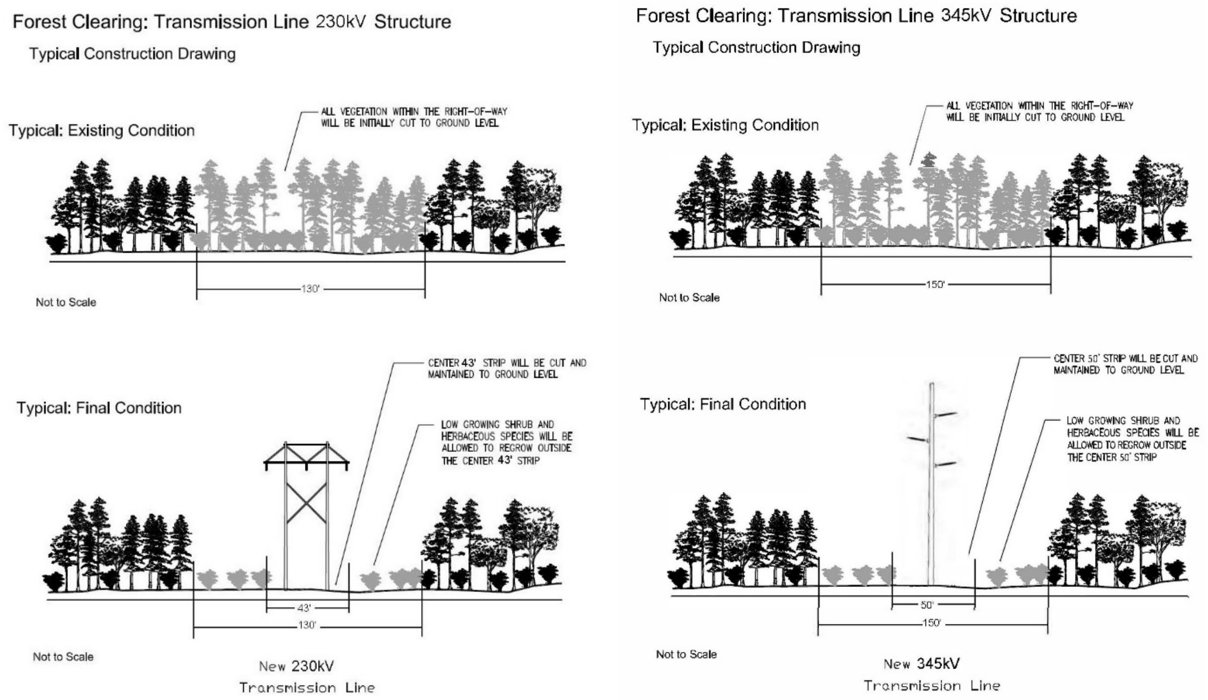
Affected and immediately adjacent landowners will be notified of Project schedule and construction activities, prior to the start of the construction phase of the Project. The first phase of construction activities will involve survey staking of the transmission line alignment and/or pole locations, followed by removal of trees and other vegetation from the full width of the construction right-of-way. Tree species that endanger safe and reliable operation of the transmission facilities will be removed. Low-growing brush will be cleared initially; however, it will generally be allowed to reestablish at the outer limits of the right-of-way area for the ±250 kV HVDC transmission line, the 230 kV LHVTL, and the 345 kV LHVTL.

The NESC states that vegetation that may damage ungrounded supply conductors should be pruned or removed. Trees beyond the right-of-way area that are in danger of falling into the energized transmission line, called “danger trees”, will be removed or trimmed to eliminate the hazard as shown in Figure 6.2.2-1. Danger trees generally are those that are dead, weak, or leaning towards energized conductors.

All material resulting from the clearing operations will be either chipped on site and spread on the right-of-way or removed and disposed as specified in Minnesota Power’s project construction plans.

The final survey staking of pole locations may occur after the vegetation has been removed, prior to structure installation.

Figure 6.2.2-1 – Standard Vegetation Management Practices



Forest Clearing: Transmission Line 230kV Structure

Typical Construction Drawing

Forest Clearing: Transmission Line 345kV Structure

Typical Construction Drawing

Structure installation and stringing of conductor wire is the second phase of construction. Underground utilities are identified through the required One Call process to minimize conflicts with the existing utilities along the routes.

Transmission line structures are typically designed for installation at existing grades. Because of this, minimal grading and leveling will be needed at structure sites unless it is necessary to provide a reasonably level area for construction access and activities. In situations where there is concern with safe access for construction operations and equipment installation, minor grading of the immediate area may be necessary.

Minnesota Power will employ standard construction practices that were developed from experience with past projects in addition to industry-specific BMPs. BMPs address right-of-way clearance, erecting transmission line structures, and stringing transmission lines. BMPs for the Project will be based on the specific construction design, prohibitions, maintenance guidelines, inspection procedures, and other activities involved in constructing the line. Construction schedules are sometimes modified to incorporate a BMP that will minimize impacts on sensitive environments. For example, for construction in or near wetlands, BMPs such as matting, or winter construction may be used. Section 7.5.2 describes potential water resources and wetland crossings anticipated for the Project. In areas where construction occurs close to waterways, BMPs help prevent soil erosion and ensure that equipment fueling and maintenance occur at locations away from waterways.

Steel pole structures are expected to be foundation supported with the drilled concrete pier foundations being the predominant foundation type. Concrete pier foundations have not yet been designed but could be expected to vary from 4 to 12 feet. Other foundation types such as, but not limited to, direct embedded and helical piers could also be used as necessary.

Minnesota Power will begin to install the conductors by establishing stringing setup areas after structures have been erected. These stringing setup areas will be located at the end of the new transmission line and occupy approximately 100-foot by 500-foot areas. Access to each structure is needed to secure the conductor wire to the insulators and to install shield wire clamps once final sag is established for stringing operations. To ensure conductors will not be damaged or contact existing energized conductors or other cables, temporary guard structures are installed, as needed, over existing distribution or communication lines, roads, or other obstructions after any necessary notifications are made or permits obtained.

6.2.3 Workforce Required

Approximately 150 to 175 workers will be required for construction of the HVDC Modernization Project in Minnesota, depending on the construction sequencing and time of the year. This workforce includes vegetation maintenance crews, transmission line and substation construction workers, safety supervisors, environmental support, and other on- and offsite support staff. Minnesota Power will work with local governments in the Project area to meet any specific local employment obligations. Minnesota Power has a strong relationship with the Building Trades and is committed to working with organized labor on this project. Evidence of this strong relationship is demonstrated by the letters of support submitted for the DOE Smart Grid grant application for this project from the Laborers' International Union of North America, International Union of Operating Engineers, and the North Central States Regional Council of Carpenters. The Minnesota Tribal Contractors Council also submitted a letter of support for the DOE grant application.

6.3 RESTORATION PROCEDURES

6.3.1 Substation

The HVDC Converter Stations and St. Louis County Substation will require ground disturbance during construction (see Map 1). Minnesota Power will restore the remainder of the site upon completion of the HVDC Converter Station and St. Louis County Substation construction activities. Restoration activities post-construction will include removing and disposing of debris; removing all temporary facilities, including staging and laydown areas; installing appropriate erosion control measures; reseeding disturbed areas with a seed mixture certified as free of noxious or invasive weeds; and restoring the areas to their original condition to the extent possible. Where soil compaction has occurred, construction crews or the restoration contractor will use techniques to reduce the compaction.

6.3.2 Transmission Lines

Limited ground disturbances at the structure sites may occur during construction. Areas for staging or temporary storage of materials and equipment will be determined based on property acquisition. A previously disturbed or developed area that includes sufficient space to lay down material and preassemble certain structural components or hardware and store construction equipment is preferred. Property immediately adjacent to the right-of-way or parts of the right-of-way may be used for structure laydown and framing prior to installation. Stringing setup areas used to store conductors and equipment are necessary for stringing operations. Disturbed areas will be restored to their original condition to the extent practicable.

Restoration activities post-construction will include removing and disposing of debris; removing all temporary facilities, including staging and laydown areas; installing appropriate erosion control measures; reseeding disturbed areas with a seed mixture certified as free of noxious or invasive weeds; and restoring the areas to their original condition to the extent possible. Where soil compaction has occurred, construction crews or the restoration contractor will use techniques to reduce the compaction.

6.4 OPERATIONS AND MAINTENANCE PRACTICES

6.4.1 HVDC Converter Station and St. Louis County Substation

To keep the HVDC Converter Station and St. Louis County Substation functioning in accordance with accepted operating parameters and NESC requirements, routine maintenance is required. Periodic servicing coinciding with manufacturer recommendations is needed for HVDC converters and auxiliary equipment, transformers, circuit breakers, batteries, protective relays, and other equipment. Substation locations and outdoor equipment areas at the HVDC Converter Station also need vegetation control and drainage maintenance.

Costs associated with O&M of the transmission lines and substations are provided in Section 2.2.2. Final costs will be dependent on final location, vegetation management requirements, natural disaster and storm damages, structure types, age of facilities, and other variables.

6.4.2 Transmission Line

The Project’s new transmission lines will be designed and maintained in accordance with the NESC and North American Electric Reliability Corporation (“NERC”) requirements. Overall, transmission lines are highly reliable and unplanned outages are infrequent. High voltage transmission lines are seldom retired and have estimated service lives that are very long. Maintenance and asset renewal of transmission line components is necessary on a regular basis for longer term reliable operation.

Periodically, the right-of-way of a completed transmission line must be accessed to conduct inspections, perform maintenance, and repair damage. To ensure continued integrity, regular maintenance and inspections will be performed during the life of the transmission line. Minnesota Power will generally inspect the transmission lines annually as part of normal practices. These inspections will be limited to the right-of-way and to areas where obstructions or terrain may require off-right-of-way access. If issues are identified during inspection, repairs will be performed, and damage restored.

Vegetation within the right-of-way that interferes with the operation and maintenance of the transmission line will be removed. Native shrubs that will not interfere with the safe operation and maintenance of the transmission line will be allowed to reestablish in the outer edge of the right-of-way. Minnesota Power's practices require inspection of 230 kV transmission lines annually. Inspection of 345 kV and HVDC assets may occur on a more frequent basis. Right-of-way maintenance practices include a combination of mechanical and hand clearing and herbicide application where appropriate to remove or control vegetation growth. Noxious weed control with herbicides will be conducted as needed around structures and anchors.

6.4.3 Workforce Required

The HVDC Converter Station in Minnesota currently employs two fulltime workers. Two to three workers are anticipated to be necessary for the new HVDC Converter Station after the HVDC Modernization Project is completed. Two to four workers are typically required to perform inspections. For the life of the facility, regular maintenance and inspections will be performed to ensure a safe and reliable system. Annual inspections will be conducted on foot, by motorized vehicle, or by aerial methods.

6.5 ADDITIONAL HUMAN AND ENVIRONMENTAL IMPACT CONSIDERATIONS

6.5.1 Electric and Magnetic Fields

Electric and magnetic fields ("EMF") are invisible lines of force that are present anywhere electricity is produced or used, including around electric appliances and any wire that is conducting electricity. The term "EMF" is typically used to refer to electric and magnetic fields that are coupled together; however, for the lower frequencies associated with power lines, electric and magnetic fields are relatively decoupled and should be described separately. Electric fields are the result of electric charge, or voltage, on a conductor. The intensity of an electric field is related to the magnitude of the voltage on the conductor and is typically described in terms of kilovolts per meter ("kV/m"). Magnetic fields are the result of the flow of electricity, or current, traveling through a conductor. The intensity of a magnetic field is related to the magnitude of the current flow through the conductor and is typically described in units of magnetic flux density expressed as Gauss ("G") or milliGauss ("mG"). Electric and magnetic fields are found anywhere there are energized, current-carrying conductors, such as near transmission lines, distribution lines, substation transformers, household electrical wiring, and common household appliances.

6.5.1.1 Electric Fields

Voltage on any wire produces an electric field in the area surrounding the wire. The voltage on the conductors of a transmission line produces an electric field extending from the energized conductors to other nearby objects, such as the ground, structures, vegetation, buildings, and vehicles. The intensity of transmission line electric fields is proportional to the voltage of the line, and rapidly decreases with distance from the transmission line conductors. The presence of trees, buildings, and other solid structures nearby can also significantly reduce the magnitude of the electric field. Because the magnitude of the voltage on a transmission line is near-constant, the magnitude of the electric field will be near-constant for each of the proposed transmission lines, regardless of the power flowing on the line.

When an electric field reaches a nearby object, such as a vehicle or a metal fence, it induces a voltage on the object. The magnitude of the induced voltage is dependent on many factors, including the object's capacitance, shape, size, orientation, location, resistance to ground, and weather conditions. If the object is insulated or semi-insulated from the ground and a person touches it, a small current would 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 a grounded object, like a doorknob, or another 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 that any such spark discharge associated with transmission line induced voltage does not reach unsafe levels, the NESC requires that any discharge be less than five milliamperes. The Project will be designed consistent with this NESC requirement.

There is no federal standard for transmission line electric fields. The Commission, however, has historically imposed a maximum electric field limit of eight kV/m measured at one meter above ground for new transmission projects.[12] As demonstrated below, the electric field associated with the Project will be within the Commission's eight kV/m limit.

The predicted intensity of electric fields associated with the various structure configurations of the Project is given in Table 6.5.1-1 for the edge of right-of-way and at the location where the maximum electric field will be experienced. Because electric fields are particularly dependent on the voltage of the transmission line, the values in Table 6.5.1-1 were calculated at the lines' maximum continuous operating voltage. Maximum continuous operating voltage is defined for the Project as the nominal voltage plus 10 percent, in this case either 253 kV (for nominally 230 kV lines) or 380 kV (for nominally 345 kV lines). Values were calculated assuming minimum conductor-to-ground clearance (that is, at mid-span) and a height of one meter above ground. The maximum calculated electric field among all possible configurations is 6.26 kV/m, which is within the Commission's eight kV/m limit.

Table 6.5.1-1 – Calculated Electric Fields (kV/M) for Proposed Project

		Edge of ROW	Maximum Overall		
Structure Type	Line Voltage	Intensity (kV/m)	Intensity (kV/m)	Distance from ROW Centerline (feet)	ROW Width (feet)
230 kV Single-Circuit H-Frame	253 kV	1.24	5.51	23	130
230 kV Single Circuit H-Frames (2x Parallel)	253 kV	1.28	5.56	73	230
230 kV Double-Circuit	253 kV	0.15	4.10	14	130
345 kV Single-Circuit Monopole	380 kV	0.55	6.26	14	150

6.5.1.2 Magnetic Fields

Current passing through any conductive material, including a wire, produces a magnetic field in the area around the material. The current flowing through the conductors of a transmission line produces a magnetic field that extends from the energized conductors to other nearby objects. The intensity of the magnetic field associated with a transmission line is proportional to the amount

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[12] *In the Matter of the Route Permit Application for a 345 kV Transmission Line from Brookings County, S.D. to Hampton*, Docket No. ET2/TL-08-1474, Order Granting Route Permit (Sept. 14, 2010) (adopting the Administrative Law Judge's Findings of Fact, Conclusions, and Recommendation [Finding ¶ 194]).

of current flowing through the line's conductors, and rapidly decreases with the distance from the conductors. Unlike electric fields, magnetic fields are not significantly impacted by the presence of trees, buildings, or other solid structures nearby. Because the actual power flow on a transmission line could potentially vary widely throughout the day depending on electrical system conditions, the actual magnetic field level in the vicinity of the transmission line could also vary widely from hour to hour.

There are currently no Minnesota regulations pertaining to magnetic field exposure. The Commission has acknowledged that Florida, Massachusetts, and New York have established standards for magnetic field exposure.[13] To provide context for the calculated magnetic field levels associated with the Project, magnetic field levels associated with some common household electric appliances are provided in Table 6.5.1-2.

Table 6.5.1-2 – Table of Magnetic Fields of Common Electric Appliances

Appliance	6 Inches from Source	1 Foot from Source	2 Feet from Source
Hair Dryer	300 mG	1 mG	
Electric Shaver	100 mG	20 mG	
Can Opener	600 mG	150 mG	20 mG
Electric Stove	30 mG	8 mG	2 mG
Television	N/A	7 mG	2 mG
Portable Heater	100 mG	20 mG	4 mG
Vacuum Cleaner	300 mG	60 mG	10 mG
Copy Machine	90 mG	20 mG	7 mG
Computer	14 mG	5 mG	2 mG

The predicted intensity of magnetic fields associated with the various structure configurations of the Project are given in Table 6.5.1-3 and Table 6.5.1-4 below, for the edge of right-of-way and at the location where the maximum magnetic field will be experienced. Because magnetic fields are particularly dependent on the current flowing on the transmission line, magnetic field information is provided for two conditions: the maximum continuous rating of the Project's transmission lines, shown in Table 6.5.1-3, and the projected peak loading of the Project's transmission lines when placed into service, shown in Table 6.5.1-4. Maximum continuous rating is defined for the Project as the maximum allowable current flow based on the most limiting series element of the transmission facility as determined by the Company's Facility Ratings Methodology. Projected peak loading for the Project was derived from power system modeling of the Project under system normal conditions when the HVDC Line is scheduled at its maximum capacity. Values were calculated assuming minimum conductor-to-ground clearance (that is, at mid-span) and a height of one meter aboveground. Plots of the lateral magnetic field profile for each configuration are provided in Appendix M.

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[13] *In the Matter of the Route Permit Application for the North Rochester to Chester 116 kV Transmission Line Project*, Docket No. E-002/TL-11-800, Order at 20 (Sept. 12, 2012).

Table 6.5.1-3 – Calculated Magnetic Fields (mG) for Proposed Project (Maximum Continuous Rating)

		Edge of ROW	Maximum Overall		
Structure Type	Line Current	Intensity (mG)	Intensity (mG)	Distance from ROW Centerline (feet)	ROW Width (feet)
230 kV Single-Circuit H-Frame	3000 A	148.62	730.97	6	130
230 kV Single Circuit H-Frames (2x Parallel)	3000 A	170.37	693.34	60	230
230 kV Double-Circuit	3000 A	50.94	448.45	0	130
345 kV Single-Circuit Monopole	3000 A	136.15	363.59	14	150

Table 6.5.1-4 – Calculated Magnetic Fields (mG) for Proposed Project (Projected Peak Loading)

		Edge of ROW	Maximum Overall		
Structure Type	Line Current	Intensity (mG)	Intensity (mG)	Distance from ROW Centerline (feet)	ROW Width (feet)
230 kV Single-Circuit H-Frame	1017	51.22	251.91	6	130
230 kV Single Circuit H-Frames (2x Parallel)	1017	58.71	238.94	60	230
230 kV Double-Circuit	1017	12.63	154.54	0	130
345 kV Single-Circuit Monopole	1356	62.84	167.06	14	150

6.5.1.3 EMF and Health Effects

Significant research has been performed since the 1970s to determine whether exposure to power frequency magnetic fields causes biological responses and health effects. Reviews of this research by public health agencies such as the U.S. National Cancer Institute, the U.S. National Institute of Environmental Health Sciences, and the World Health Organization do not show that exposure to electric power EMF causes or contributes to adverse health effects. For instance, in 2016, the U.S. National Cancer Institute concluded that:

> Numerous epidemiologic studies and comprehensive reviews of the scientific literature have evaluated possible associations between exposure to non-ionizing EMFs and risk of cancer in children (12-14). (Magnetic fields are the component of non-ionizing EMFs that are usually studied in relation to their possible health effects.) Most of the research has focused on leukemia and brain tumors, the two most common cancers in children. Studies have examined associations of these cancers with living near power lines, with magnetic fields in the home, and with exposure of parents to high levels of magnetic fields in the workplace. No consistent evidence for an association between any source of non-ionizing EMF and cancer has been found.[14]

Minnesota, Wisconsin, and California have also all performed literature reviews or research to examine this issue. In 2002, Minnesota formed an Interagency Working Group to evaluate EMF research and develop policy recommendations to protect the public health from any potential

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[14] NATIONAL CANCER INSTITUTE, Electromagnetic Fields and Cancer (updated Jan. 3, 2019), available at https://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/electromagnetic-fields-fact-sheet.

problems arising from EMF effects associated with high-voltage transmission lines. The Working Group included staff from a number of state agencies and published its findings in *A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options.* The Working Group summarized its findings as follows:

> Research on the health effect of EMF has been carried out since the 1970s. Epidemiological studies have mixed results—some have shown no statistically significant association between exposure to EMF and health effects, some have shown a weak association. More recently, laboratory studies have failed to show such an association, or to establish a biological mechanism for how magnetic fields may cause cancer. A number of scientific panels convened by national and international health agencies and the United States Congress have reviewed the research carried out to date. Most concluded that there is insufficient evidence to prove an association between EMF and health effects; however, many of them also concluded that there is insufficient evidence to prove that EMF exposure is safe.[15]

Based on findings like the Working Group and U.S. National Cancer Institute, the Commission has consistently found that "there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects."[16]

The potential impacts of electric fields include interference with the operation of pacemakers and Implantable Cardioverter/Defibrillators ("ICDs"). Interference with implanted cardiac devices can occur if the electric field intensity is high enough to induce sufficient body currents to cause interaction. Generally, the response depends on the make and model of the device in addition to the individual's height, build and physical orientation with respect to the electric field. Pacemaker manufacturers such as Medtronic and Guidant have indicated that modern cardiac devices are considerably less susceptible to interactions with electric fields than older "unipolar" designs. A 2005 study (Scholten et al.) concludes that the risk of interference inhibition of unipolar cardiac pacemakers from high voltage power lines in everyday life is small. In 2007, Minnesota Power and Xcel Energy conducted studies with Medtronic to evaluate the impact of the electric fields associated with existing 115 kV, 230 kV, 345 kV, and 500 kV transmission on implantable medical devices. The analysis was based on real life public exposure levels under actual transmission lines in Minnesota; no adverse interaction with pacemakers or ICDs occurred (University of Minnesota Power Systems Conference Proceedings, 2007). The analysis concluded that, although interaction may be possible in unique situations, device interaction due to typical public exposure would be rare.

In the unlikely event a pacemaker is impacted, the effect is typically temporary asynchronous pacing. The pacemaker would return to its normal operation when the person moves away from the source of the interference.

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[15] Minnesota Department of Health, 2002. A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options.

[16] *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); see also 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 Issuing Route Permit (Sept. 14, 2010); OAH Docket No. 7-2500-20283-2, ALJ Findings of Fact, Conclusions and Recommendation at Finding 216 (April 22, 2010 and amended April 30, 2010) ("there is no demonstrated impact on human health and safety that is not adequately addressed by the existing State standards for exposure"); *In the Matter of the Application of Xcel Energy for a Route Permit for the Lake Yankton to Marshall Transmission Line Project in Lyon County*, Docket No. E002/TL-07-1407, Findings of Fact, Conclusions of Law and Order Issuing a Route Permit to Xcel Energy for the Lake Yankton to Marshall Transmission Project at 7-8 (Aug. 29, 2008).

6.5.2 Stray Voltage

"Stray voltage" is a condition that can occur on the electric service entrances to structures from distribution lines—not transmission 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. The U.S. Department of Agriculture ("USDA") further defines stray voltage as a small voltage (less than 10 volts) measured between two points that can be simultaneously contacted by an animal (USDA, 1991).

Since stray voltage is present when a voltage exists between the neutral wire of an electrical service entrance and grounded objects in buildings, transmission lines do not, by themselves, create stray voltage because the lines do not connect directly to businesses or residences. Transmission lines can, however, induce stray voltage on a distribution circuit that is parallel and immediately under the transmission line. The Project will not parallel any distribution lines.

6.5.3 Corona-Induced Ozone and Nitrogen Oxide Emissions

Corona, in the context of transmission lines, refers to the breakdown or ionization of air within a few centimeters of conductors. Corona occurs when the electric field intensity, or surface gradient, on the conductor exceeds the breakdown strength of air. Usually, a water droplet or some imperfection such as a sharp edge or scratch on the conductor is necessary to cause corona. Corona may result in a visible violet glow, hissing noise, and production of ozone gas in the air surrounding overhead transmission line conductors (CH2M Hill, 2012). Corona also produces ozone, which is created by chemical reactions between oxides of nitrogen and volatile organic compounds (U.S. Environmental Protection Agency ["EPA"], 2022a). Ozone is produced in the air surrounding the conductor from the operation of transmission lines (Electric Power Research Institute, 1982). The Company typically engineers transmission lines to limit corona, as it also signifies a loss of electricity (CH2M Hill, 2012).

In general, monitored concentrations of ozone due to corona discharge from transmission lines show no significant incremental ozone concentrations at ground level, and minimal (0 to 8 part per billion ["ppb"]) concentrations at an elevation nearer to the transmission line (Jeffers, 1999). Typically, these concentrations are detected only during heavy corona discharge in foul weather conditions. Additional testing has shown that production of nitrogen oxide due to corona discharges is approximately one-fourth of the production of ozone due to corona discharges (Jeffers, 1999).

Ozone also forms in the lower atmosphere from lightning discharges, and from reactions between solar ultraviolet radiation and air pollutants. The natural production rate of ozone is directly proportional to temperature and sunlight, and inversely proportional to humidity. Thus, humidity or moisture, the same factor that increases corona discharges from transmission lines, inhibits the natural production of ozone. Ozone is a very reactive form of oxygen molecules and combines readily with other elements and compounds in the atmosphere. Because of its reactivity it is relatively short-lived.

Both the State and federal governments currently have regulations regarding permissible concentrations of ozone and oxides of nitrogen. The National and State Ambient Air Quality Standards for ozone is 0.070 parts per million ("ppm") on an eight-hour averaging period per Minnesota Rules 7009.0080 and 7009.0090. The national and state standard for nitrogen dioxide ("NO_2"), one of several oxides of nitrogen, is 100 ppb and the annual standard is 53 ppb. The State of Minnesota is currently in compliance with the federal standards for ozone and NO_2. The operation of the proposed transmission lines would not create any potential for the concentration of these pollutants to exceed ambient air standards.

6.5.4 Radio and Television Interference

Generally, transmission lines do not cause interference with radio, television, or other communication signals and reception. While it is rare in everyday operations, four potential sources for interference do exist, including gap discharges, corona discharges, and shadowing and reflection effects.

Gap discharge interference is the most commonly noticed form of power line interference with radio and television signals, and also typically the most easily fixed. Gap discharges are usually caused by hardware defects or abnormalities on a transmission or distribution line causing small gaps to develop between mechanically connected metal parts. As sparks discharge across the gap, they create the potential for electrical noise. The degree of interference depends on the quality and strength of the transmitted communication signal, the quality of the receiving antenna, and the distance between the receive and the power line. Gap discharges are usually a maintenance issue, since they tend to occur in areas where gaps have formed due to broken or ill-fitted hardware (e.g., clamps, insulators, brackets). Because gap discharges are a hardware issue, they can be repaired relatively quickly once the issue has been identified. Corona from transmission line conductors can also generate electromagnetic noise at the same frequencies that radio and television signals are transmitted. The air ionization caused by corona generates audible noise, radio noise, light, heat, and small amounts of ozone as noted in Section 6.5.3. The potential for radio and television signal interference due to corona discharge relates to the magnitude of the transmission line-induced radio frequency noise compared to the strength of the broadcast signals. Because radio frequency noise, like electric and magnetic fields, becomes significantly weaker with distance from the transmission line conductors, very few practical interference problems related to corona-induced radio noise occur with transmission lines. In most cases, the strength of the radio or television broadcast signal within a broadcaster's primary coverage area is great enough to prevent interference.

If interference from transmission line corona associated with the Project does occur for an AM radio station within a station's primary coverage area where good reception existed before the Project was built, satisfactory reception can be obtained by appropriate modification of (or addition to) the receiving antenna system. The situation is unlikely, however, because AM radio frequency interference typically occurs immediately under a transmission line and dissipates rapidly with increasing distance from the line. FM radio receivers usually do not pick up interference from transmission lines because:

- Corona-generated radio frequency noise currents decrease in magnitude with increasing frequency and are quite small in the FM broadcast band (88-108 Megahertz ["MHz"]), and
- The interference rejection properties inherent in FM radio systems make them virtually immune to amplitude type disturbances.

The potential for television interference due to radio frequency noise caused by transmission lines is very low now that the United States has completed the transition to digital broadcasting. Digital reception is in most cases considerably more tolerant of noise than analog broadcasts. Due to the higher frequencies of television broadcast signals (54 MHz and above) a transmission line seldom causes reception problems within a station's primary coverage area. In the rare situation where the Project may cause interference within a station's primary coverage area, the problem can usually be corrected with the addition of an outside antenna.

Shadowing and reflection effects are typically associated with large structures, such as high buildings, that may cause reception problems by disturbing broadcast signals and leading to poor radio and television reception. Although the occurrence is rare, a transmission structure or the conductor can create a "shadow" on adjoining properties that obstructs or reduces the transmitted signal. Structures may also cause a "reflection" or scattering of the signal. Reflected signals from a structure result in the original signal "breaking" into two or more signals. Multipath reflection or "scattering" interference can be caused by the combination of a signal that travels directly to the receiver and a signal reflected by the structure that travels a slightly longer distance and is received slightly later by the receiver. If one signal arrives with significant delay relative to the other, the picture quality of digital television broadcast signals may be impacted. With digital broadcasts, the picture can become pixelated or freeze and become unstable. The most significant factors affecting the potential for signal shadow and multipath reflection are structure height above the surrounding landscape and the presence of large flat metallic facades. Television interference due to shadowing and reflection effects is rare but may occur when a large transmission structure is aligned between the receiver and a weak distant signal, creating a shadow effect. In the rare situation where the Project may cause interference within a station's primary coverage area, the problem can usually be corrected with the addition of an outside antenna. If television or radio interference is caused by or from the operation of the proposed facilities in those areas where good reception was available prior to construction of the Project, Minnesota Power will evaluate the circumstances contributing to the impacts and determine the necessary actions to restore reception to the present level, including the appropriate modification of receiving antenna systems if necessary.

6.5.5 Noise

An audible hissing and crackling sound can also be produced by corona on transmission lines and electrical equipment when applied voltage exceeds a certain value. This sound is typically only within the threshold of human hearing during rainy or foggy conditions and is often imperceptible due to background noise (CH2M Hill, 2012).

The main source of audible noise associated with the Project will be the HVDC Converter Station. Noise contributions from the HVDC Converter Station are highly dependent on the layout of buildings and equipment within the fence. The most significant sources of noise within the Converter Station are the converter transformers with integrated cooling fans, followed by the outdoor components of the valve cooling system, smoothing reactors, and other electrical equipment. Noise emissions from indoor equipment are not expected to propagate outside the building envelope. The Project will be designed to ensure that audible noise at the nearest receptor does not exceed State noise standards based on the applicable noise area classifications. If studies conducted during design of the Project indicate potential for the noise standards to be exceeded, the Company will incorporate noise-control measures within the design of the Converter Station, or otherwise implement measures to comply with the standards. The impacts and mitigation of audible noise for the Project are discussed further in Section 7.2.3.

6.5.6 Visual Impacts

Because the Project is located adjacent to an existing ±250 kV line and is within the same vicinity as an existing substation and multiple high voltage AC transmission lines, aesthetic impacts are anticipated to be minimal. The existing ±250 kV transmission line and substation have been in place for many years and are in a rural, sparsely populated area.

Where tree clearing is needed, there will be a noticeable visual impact to the landscape. However, because the Project is collocated within an area of existing transmission lines, the existing maintained right-of-way will minimize visual impacts. Minnesota Power will place emphasis on preserving the natural landscape whenever practical and implementing construction and operation practices to prevent any unnecessary disturbance of the natural surroundings in the vicinity of the work.

7.0 ENVIRONMENTAL ANALYSIS OF ROUTE

7.1 ENVIRONMENTAL SETTING

The Project Study Area is located in Section 31, Township 50N, Range 15W, and Section 36, Township 50N, Range 16W. The City of Hermantown and Solway Township are the two residential communities surrounding the Project Study Area in St. Louis County.

The Project Study Area is within the North Shore Highlands Subsection of the Northern Superior Uplands section of the Laurentian Mixed Forest Province as defined by the Minnesota Department of Natural Resources ("MnDNR") Ecological Classification System. This subsection is located adjacent to Lake Superior, and parallels the Highland Moraine associated with the lake, 20 to 25 miles inland. Lake Superior is the main feature in this region and moderates the climate throughout the year. Pre-settlement vegetation in this area included primarily pine, fir, and aspen-birch forest, along with conifer bogs and swamps. Today's landscape is still dominated by forest. Forest management, recreation, and tourism are the dominant economic activities (MnDNR, 2022a).

The environmental setting within several miles of the Project Study Area includes forested areas, pockets of open agricultural areas, rural residential development, and hydrologic features, including streams, wetlands, and small ponds. Many of the streams in this area run directly from the highland to Lake Superior. The terrain is gently rolling to steep hills (MnDNR, 2022a).

The Project Study Area is defined in Section 5.2.1 as the area initially reviewed for route development based on proximity to existing infrastructure and the proposed substation size. Further consideration was given to major physiographic features, jurisdictional boundaries, sensitive land uses and ownerships, and existing utility corridors. Existing conditions in the Project Study Area and potential human, economic, historic, jurisdictional, and environmental impacts in the Proposed Route are described within this chapter.

Existing right-of-way associated with two transmission lines, along with township and county roads are present within the Project Study Area (see Map 3). The term Project Study Area includes the Proposed Route, which consists of the area of the proposed HVDC Modernization Project facilities, including the segment of ±250 kV HVDC transmission line to connect the existing HVDC line to the new HVDC Converter Station; the 230 kV transmission line from the Arrowhead Substation to the proposed St. Louis County Substation; the St. Louis County Substation; the new HVDC Converter Station; and the new 345 kV transmission line connecting the new HVDC Converter Station to the new 345 kV/230 kV St. Louis County Substation.

7.2 HUMAN SETTLEMENT

The Project Study Area is located approximately 0.25 mile north of the southern border of St. Louis County within Minnesota's Arrowhead Region. The Proposed Route is located partially within the city limits of Hermantown, west of the existing Minnesota Power Arrowhead Substation, and partially within Solway Township, west of Hermantown. The Proposed Route is south of Morris Thomas Road W (County Road 56) and east of Sandberg Road (Township Road 5610). The City of Hermantown is a suburb of Duluth and has a population of 10,221 people (City of Hermantown, 2022a). The eastern part of Hermantown is moderately residential with large lots and occasional subdivisions. The western part of Hermantown is characterized as rural residential. Both the City of Hermantown and Solway Township are in St. Louis County. Solway Township is largely rural and is the location of the unincorporated community of Munger (Solway Township, 2022).

7.2.1 Proximity to Residences and Businesses

7.2.1.1 Existing Environment

Residences are located along most of the roads within and adjacent to the Project Study Area. The residential character of the area is low density and rural/suburban, with houses and other nonresidential structures on large, wooded lots. As of February 2023, there are ten residences within the Project Study Area, including six houses within the Proposed Route (see Map 4a).

7.2.1.2 Impacts on Residences and Businesses

Minnesota Power will purchase or acquire easements for all land within the Proposed Route and current residents within the Proposed Route will relocate prior to the start of the Project. Therefore, no private residence impacts are anticipated as a result of construction and operation of the Project. Because the proposed Project is an extension of the existing Arrowhead Station, no significant impacts are anticipated to residences near the Proposed Route.

The nearest business is over 0.75 mile away from the Proposed Route, no impacts to businesses are anticipated.

7.2.1.3 Mitigation

Because there will be no new impacts to occupied residential buildings or businesses, no additional mitigation is proposed.

7.2.2 Public Health and Safety

7.2.2.1 Existing Environment

During construction and operation of the proposed Project, public safety will be a priority. Safety concerns may include slow moving construction equipment on public roads, construction equipment crossing public roads, wire pulling across public roads and near public areas, and vegetation clearing operations.

The proposed Project will be designed in compliance with state and the NESC requirements regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and right-of-way widths. Safeguards will be implemented for construction and operation of the proposed Project transmission lines and Substations. Construction and/or contract crews will comply with state and NESC standards regarding installation of facilities and standard construction practices.

Minnesota Power's established safety procedures, as well as industry safety procedures, will be followed during construction of the Project and after installation of the transmission line, including clear signage during all construction activities. The proposed high-voltage transmission lines will be equipped with switching devices and the proposed substation will contain circuit breakers and relays at the transmission line terminations. These devices are intended to make, carry, and break line currents under normal conditions and in specified abnormal conditions such as a short circuit or fault. The circuit breakers stop the specified current and can protect other equipment and the extended power system from damaging currents and more extensive outages; however, any electrical facility which becomes isolated by operation of circuit breakers should not be considered de-energized or safe. Downed power lines and other damaged electrical equipment should always be assumed to be energized and dangerous.

7.2.2.2 Impacts on Public Health and Safety

No adverse impacts to public health and safety are anticipated because of the proposed Project. Minnesota Power will ensure that safety requirements are met during construction and operation of the transmission line and substation. During active construction, measures will be made to ensure the safety of local residents, including but not limited to signage where active construction is occurring, flaggers at roads, and barriers around active construction zones. Additionally, when crossing roads during stringing operations, guard structures will be used to provide safeguards for the public.

7.2.2.3 Mitigation

Because no negative impacts to public health and safety are anticipated, no mitigation is proposed.

7.2.3 Audible Noise

Noise is generally considered to be unwanted sound that may be an annoyance, loud or disruptive to hearing. it may be comprised of a variety of sounds of different intensities across the entire frequency spectrum. Noise is measured in units of decibels on the A-weighted scale ("dBA"). 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 decibel scale corresponds to the sensitivity range for human hearing. A noise level change of 3 dBA is barely perceptible to human hearing. A 5-dBA change in noise level, however, is clearly noticeable. A 10-dBA change in noise level is perceived as doubling (or halving) of noise loudness. For reference, Table 7.2.3-1 shows noise levels in dBA associated with common, everyday sources, providing context for the Project noise levels discussed later in this section.

Table 7.2.3-1 – Common Noise Sources and Levels

Sound Pressure Levels (dBA)	Common Indoor and Outdoor Noises
120	Rock Concert
100	Construction Noise
80	Typical City Traffic
60	Conversational Speech
40	Nighttime Urban Setting

Sound Pressure Levels (dBA)	Common Indoor and Outdoor Noises
30	Nighttime Rural Setting
10	Threshold of Human Hearing

Source: Minnesota Pollution Control Agency ("MPCA"), 2015

The Minnesota Pollution Control Agency ("MPCA") has established standards for the maximum noise allowable in certain areas based on the type of activities occurring in the area. Within the Proposed Route, the most limiting standard is 50 dBA (nighttime limit) in any residential land use location. The daytime and nighttime noise standards by Noise Area Classifications ("NAC") are provided in Table 7.2.3-2 Minn. R. 7030.0040). Noise standards are expressed using the L_{50} and L_{10} statistical descriptors, which represent the range of permissible dBA within a one-hour period. The L_{50} noise level represents the level exceeded 50 percent of the time, or for 30 minutes in an hour. The L_{10} noise level represents the level exceeded 10 percent of the time, or for 6 minutes in an hour. NACs are categorized by the type of land use activities at a location and the sensitivity of those activities to noise. Residential-type activities including homes; churches; camping and picnicking areas; public, health, and education services; and hotels are included in NAC-1. Commercial-type activities including transit terminals and retail, business, and government services are included in NAC-2. Industrial-type activities including manufacturing, fairgrounds and amusement parks, agriculture, and forestry activities are included in NAC-3. NAC 4 is for undeveloped or unused land.

Table 7.2.3-2 – MPCA Noise Limits by Noise Area Classification

	Daytime		Nighttime	
Noise Area Classification	L_{10}	L_{50}	L_{10}	L_{50}
1	65	60	55	50
2	70	65	70	65
3	80	75	80	75

Source: MPCA, 2015

7.2.3.1 Existing Environment

There is an existing HVDC Converter Station and AC transmission substation adjacent to the eastern boundary of the Proposed Route. Noise from substations primarily comes from the transformers during normal operation processes. Transformer noise is nearly constant and is present whenever the transformer is energized. Some variation in noise is associated with the operation of cooling fans or pumps. The size and voltage of power transformers are the primary factors influencing noise levels.

The existing transmission lines in the Proposed Route produce noise under certain conditions. The level of noise depends on conductor conditions, voltage level, and weather conditions. Operational noise levels produced by transmission lines are generally less than outdoor background levels and are therefore not usually perceivable. Proper design and construction of the transmission lines in accordance with industry standards helps to ensure that noise impacts are minimized. Noise emissions from transmission lines can sound like sizzles, crackles, or hissing noises during periods of high humidity. Noise levels and sounds are typically weather dependent. The sounds are caused by the ionization of the moist air near the wires. Though this noise is audible to those very close to the transmission lines, it quickly dissipates with distance and is easily drowned out by typical background noises. Ionization in foggy conditions can also cause a corona, which is a luminous blue discharge of light usually where the wires connect to the insulators (Public Service Commission of Wisconsin, 2013). During dry weather, audible noise from transmission lines is barely perceptible.

7.2.3.2 Impacts from Audible Noise

Audible noise will occur as part of the construction and operation phases of the Project. Noise-sensitive land uses within the vicinity of the Project primarily include residential homes.

Construction

Heavy construction equipment operation and increased vehicle traffic due to construction personnel will be the main source of the noise. Construction noise will be primarily limited to daytime hours and will be temporary in nature. Instances such as outages, operational limitations, customer schedules or other factors may cause construction to occur outside of daytime hours or on weekends. Minnesota Power will work with local governments if construction becomes necessary outside of these hours as well as maintaining compliance with noise standards. Heavy equipment will also be equipped with sound attenuation devices such as mufflers to minimize the daytime noise levels.

Operation

The main source of audible noise during operation of the Project will be the HVDC Converter Station. Noise contributions from the HVDC Converter Station are highly dependent on the layout of buildings and equipment within the fence. The most significant sources of noise within the Converter Station are the converter transformers with integrated cooling fans, followed by the outdoor components of the valve cooling system, smoothing reactors and other electrical equipment. Noise emissions from indoor equipment are not expected to propagate outside the building envelope. Transformer noise is nearly constant and is present whenever the transformer is energized. Variations in transformer noise may occur due to the operation of cooling pumps and fans at higher loading levels. In addition to transformers, valve cooling system components, smoothing reactors, and other outdoor electrical equipment may contribute to audible noise. Valve cooling system noise will vary with the operation of the HVDC system, generally producing more noise at higher transfer levels where cooling requirements become more significant. Noise from other electrical equipment, including smoothing reactors, will generally be constant and present whenever the equipment is energized.

Transmission line conductors also produce noise under certain conditions. The level of noise depends on conductor conditions, voltage level, and weather conditions. Operational noise levels produced by a transmission line are generally less than outdoor background levels and are therefore not usually perceivable. Proper design and construction of the transmission line in accordance with industry standards will help to ensure that noise impacts are minimized.

Noise emissions from transmission line conductors generally occur during heavy rain and wet conductor conditions. In foggy, damp or rainy weather, transmission lines can create a crackling sound due to corona discharges—the small amount of electricity ionizing the moist air near the conductors. 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. During light rain, dense fog, snow and other times where there is moisture in the air, transmission lines will produce audible noise equal to approximately household background levels. During dry weather, audible noise from transmission lines is barely perceptible. Several other 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 therefore its corona and noise performance.

7.2.3.3 Impacts and Mitigation

The Project HVDC Converter Station will be designed to ensure that it does not exceed noise standards at the nearest receptor locations (estimated to be approximately 1,500 feet from the HVDC Converter Station) during operation, based on the applicable NACs. If studies conducted during the design of the Project indicate potential for standards to be exceeded, the Company will incorporate noise-control measures within the design of the Converter Station to the extent practicable. Regularly performing proper maintenance practices on converter transformer components such as the cooling fans and pumps generally abate common noise issues.

Construction noise will be temporary and primarily limited to daytime hours. Instances such as outages, operational limitations, customer schedules or other factors may cause construction to occur outside of daytime hours or on weekends. Minnesota Power will work with local governments if construction becomes necessary outside of these hours as well as maintaining compliance with noise standards. Heavy equipment will also be equipped with sound attenuation devices such as mufflers to minimize the daytime noise levels.

The predicted L_{50} audible noise levels associated with the various structure configurations of the transmission lines are given in Table 7.2.3-3 for the edge of right-of-way. Because transmission line audible noise is primarily related to the electric field, and electric fields are particularly dependent on the voltage of the transmission line, the values in Table 7.2.3-3 were calculated at the lines' maximum continuous operating voltage. Maximum continuous operating voltage is defined for the Project as the nominal voltage plus 10 percent, in this case either 253 kV (for nominally 230 kV lines) or 380 kV (for nominally 345 kV lines). Values were calculated assuming minimum conductor-to-ground clearance (that is, at mid-span) and a height of one meter above ground.

As indicated in Table 7.2.3-2 above, the most stringent noise standard is the nighttime L_{50} limit for the land use category that includes residential areas (NAC-1). The NAC-1 nighttime limit is 50 dBA. The calculated L_{50} values at the edge of right-of-way for the Project presented in Table 7.2.3-3 below demonstrate that the audible noise associated with transmission lines will be within the most stringent limitations outside the right-of-way and areas immediately adjacent to it, and no mitigation is necessary.

Table 7.2.3-3 – Calculated L_{50} Audible Noise (dBA) for Proposed Project

Structure Type	Line Voltage	Edge of ROW L_{50} Noise (dBA)
230 kV Single-Circuit H-Frame	253 kV	35.49
230 kV Single Circuit H-Frames (2x Parallel)	253 kV	36.93
230 kV Double-Circuit	253 kV	41.54
345 kV Single-Circuit Monopole	380 kV	50.17

7.2.4 Aesthetics

7.2.4.1 Existing Environment

The Project will primarily be constructed on property owned by Minnesota Power within the Proposed Route, and generally surrounded by deciduous forest. Within this area, there is existing utility infrastructure.

The new St. Louis County Substation and HVDC Converter Station will be new features in the Proposed Route that may be visible off-site where there are open vegetated areas or maintained transmission corridors through the trees. The Arrowhead substation modifications will occur at an existing substation owned by Minnesota Power and are anticipated to occur entirely within the existing fenceline. Right-of-way tree clearing, clearing for the new substation and HVDC terminal, and construction activities associated with Project construction may be visible throughout the Proposed Route. The new HVDC Converter Station will be aesthetically similar to the current HVDC Converter Station, though considerably larger in size. Figure 7.2.4-1 shows an example of an existing VSC HVDC terminal provided by the HVDC OEM.

Figure 7.2.4-1 – Example of the Proposed HVDC Terminal

There are existing transmission lines within the Proposed Route. A portion of the new transmission line construction is proposed to be adjacent to existing transmission lines. The current land use within the Proposed Route consists of forested areas, with additional smaller areas of cropland and rural residential development, bounded on the east by the existing Arrowhead Substation and on the west by Sandberg Road. The new transmission lines will be new features that may be visible from some viewpoints in the general area of the Proposed Route. See Chapter 2.0 for anticipated structure types, heights, and spans.

Impacts on Aesthetics

Right-of-way clearing and substation and Converter Station construction will have the most visual impacts in areas close to roads and residential areas. Minnesota Power identified a Proposed Route that contains existing utility infrastructure. The proposed Project will be constructed in an area containing areas of forest, cropland, and rural residential development, along with existing right-of-way for the ±250 kV HVDC line. The right-of-way will be maintained for the existing ±250 kV transmission lines, but additional tree clearing may be necessary during construction.

Mitigation

The Project represents the expansion of an existing use in and adjacent to the Proposed Route, that is, utility infrastructure including several transmission lines and the Arrowhead Station. Aesthetic impacts will primarily be caused by the removal of trees for Project construction and the additional infrastructure on the landscape. To limit the aesthetic impacts that may be caused by the Project, Minnesota Power will maintain existing trees when practical to serve as a physical and visual barrier to the new Project facilities.

7.2.5 Socioeconomics and Environmental Justice

7.2.5.1 Existing Environment

The Project Study Area is located in St. Louis County in northeast Minnesota. The socioeconomic setting of the Project Study Area was evaluated on a regional level comparing data from the State of Minnesota; St. Louis County; the cities of Duluth, Hermantown, and Proctor; and Solway Township. Data gathered from the 2010 and 2020 U.S. Census are summarized in Table 7.2.5-1 (US Census, 2022).

Table 7.2.5-1 – Socioeconomic Characteristics within the Project Study Area

Location	Population 2010	Population 2020	Median Household Income	Population below poverty level (%)
State of Minnesota	5,303,925	5,706,494	$74,382	9.3%
St. Louis County	200,226	200,231	$64,959	13.8%
City of Duluth	86,265	86,697	$61,944	18.5%
City of Hermantown	9,414	10,221	$80,500	4.9%
City of Proctor	3,057	3,120	$61,176	4.1%
Solway Township	1,944	2,016	$85,625	2.6%

An environmental justice analysis for the Project was completed using the methodology in Minn. Stat. § 216B.1691, subd. 1(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, title 18, section 1151."[17]

The Project is in census tract 111.02. This census tract was analyzed for environmental justice areas, consistent with the above referenced statute. For this analysis, census tracts are the best approximation of a geographic area where adverse impacts can occur from the Project. St. Louis County was used as a reference population for the census tract.

Table 7.2.5-2 identifies the minority populations, low-income populations, and populations with a language other than English spoken at home for St. Louis County and census tract 111.02. The most recent available data was used: U.S. Census 2021 American Community Survey 5-Year Estimate Data File# DP05, File# B03002, File# S1701, and File# DP02.

Table 7.2.5-2 – Environmental Justice Data for Census Tract Where Project is Located

County / Census Tract	2021 Population	Percent Total Minority [a]	Percent of Population at or Below 200 Percent of Federal Poverty Level	Language Other Than English Spoken at Home (2017-2021)
St. Louis County	200,311	9.0%	29.5%	3.5%
Census Tract 111.02	5,454	8.0%	16.7%	1.5%

[a] "Minority" refers to people who reported their ethnicity and race as something other than White, non-Hispanic.

Sources: U.S. Census Bureau, 2021a; 2021b; 2021c; 2021d

No federally recognized Tribal Areas are crossed by the Project. As presented in Table 7.2.5-2, The Project is not in an environmental justice community under the definition provided in Minn. Stat. § 216B.1691, subd. 1(e).

Additionally, Minnesota Power conducted an environmental justice analysis in accordance with the U.S. Environmental Protection Agency ("USEPA") Federal Interagency Working Group on Environmental Justice ("EJ") and National Environmental Policy Act ("NEPA") Committee's publication, Promising Practices for EJ Methodologies in NEPA Reviews (Promising Practices) given that analyses in prior Route Permit Applications have utilized this methodology.

Using this methodology, Minnesota Power first used the USEPA's Environmental Justice Screening Tool ("EJScreen") 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 Project plus a 0.25-mile buffer (EPA, 2022b). The tool's output is included in Appendix I and suggests the nearby population's exposure to environmental hazards is similar to or less than the state and national average exposure values across a range of many variables.

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

Next, Minnesota Power used the guidance provided in Promising Practices to determine whether the Project would be located in a census block group with an environmental justice population. Promising Practices defines minority populations as people who reported their ethnicity and race as something other than White, non-Hispanic. Following the recommendations set forth in Promising Practices, the 50 percent and the meaningfully greater analysis methods were 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. St. Louis County is the comparable reference community to ensure that all affected environmental justice communities are properly identified.

Table 7.2.5-3 identifies the minority populations by race and ethnicity and low-income populations within Minnesota, St. Louis County, and census tract 111.02, block group 4, where the Project is located. Data from U.S. Census 2021 American Community Survey 5-Year Estimate Data File# B03002 and File# B17017 were analyzed at the block group level for the analysis.

Table 7.2.5-3 – Minority Populations by Race and Ethnicity and Low-Income Populations within the Project Area

State / County / Census Block Group	% White	% Black/ African American	% American Indian or Alaskan Native	% Asian	% Native Hawaiian/ Pacific Islander	% Some Other Race	% Two or More Races	Hispanic or Latino	% Total Minority [a]	% Below Poverty Level
Minnesota	80.7%	6.6%	0.9%	5.0%	0.0%	2.1%	4.6%	5.6%	21.7%	9.2%
St. Louis County	91.4%	1.6%	1.8%	1.1%	0.0%	0.5%	3.6%	1.9%	9.5%	14.0%
Census Tract 111.02, Block Group 4	96.2%	0.0%	1.3%	1.4%	0.0%	0.0%	1.1%	2.5%	6.2%	8.4%

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[a] "Minority" refers to people who reported their ethnicity and race as something other than White, non-Hispanic.

Sources: U.S. Census Bureau, 2021b; 2021e

As presented in Table 7.2.5-3, based on the analysis, the block group where the Project is proposed is not considered an environmental justice community.

7.2.5.2 Impacts on Socioeconomics

Local and regional impacts to socioeconomics and environmental justice would be minor due to the short-term timeframe of construction of the proposed Project. Revenue may increase for local businesses from purchases made by utility personnel and contractors during construction. Long-term societal benefits of the proposed Project will include increased property tax revenue of approximately $14.5 million for Minnesota counties (i.e., Wilkin, Ottertail, Becker, Hubbard, Wadena, Cass, Crow Wing, Aitkin, and St. Louis counties) in which the HVDC system is located and continued clean, reliable electric service to local customers supporting the local economy.

During the construction phase, activities will provide a seasonal influx of additional dollars into the communities with labor procured from local employment resources and construction materials purchased from local vendors where practicable.

7.2.5.3 Mitigation

There are no environmental justice communities impacted by the Project, so no environmental justice impacts are anticipated. Because negative socioeconomic impacts associated with construction activities are anticipated to be short-term to the local communities, no mitigation is proposed. The project will enable the continued delivery of renewable energy to all customers from varying socioeconomic backgrounds.

7.2.6 Cultural Values

7.2.6.1 Existing Environment

Cultural values include those shared community attitudes expressed within a given area, where they provide a framework for community unity. The Project Study Area is rural in nature with an economy based on tourism, recreation, and logging. Mining, manufacturing, shipping, and service industries are concentrated in urban areas to the east, namely in Duluth and its surrounding communities.

Tourism is primarily a factor of natural amenities, including lakes, rivers, and state and national forests, which attract local and regional recreational users. These amenities are important to the identity of the area and provide opportunities for recreational activities such as fishing, hunting, hiking, and snowmobiling. The regional iron mining industry of the Iron Range is a historically important economic factor and is still valued today in the Project vicinity. Like the mining industry, logging and manufacture of wood products, including paper, lumber, and household goods, have been valued industries for generations of area residents.

7.2.6.2 Impacts on Cultural Values

Construction of the Project is not expected to conflict with local cultural values. The area is rural in nature with an economy based on tourism, recreation, and logging and is anticipated to remain so after construction. The area is already used for electric system infrastructure, including an existing HVDC Line, an HVDC terminal, the Arrowhead Substation, and associated facilities. All proposed facilities will be constructed on privately owned lands and therefore no public recreation or tourism will be affected. No commercial logging or mining currently happens on lands within the Proposed Route. None of these aspects of the culture of the area are anticipated to be significantly impacted or changed as a result of the construction and operation of the Project.

7.2.6.3 Mitigation

No impacts to cultural values are expected, therefore no mitigation is proposed.

7.2.7 Recreation

7.2.7.1 Existing Environment

Common recreational activities within St. Louis County include hunting, biking, hiking, snowmobiling, alpine and Nordic skiing, fishing, and camping. There are three recreational areas within one mile of the Proposed Route as described below.

One perennial designated trout stream is located on the east side of the Proposed Route. The stream is surrounded by private land within the Proposed Route. A MnDNR Forestry parcel, designated as Other Forest Land, is located 0.25 mile west of the Proposed Route (see Map 4b). A recreational snowmobile trail is located approximately one mile north-northeast of the Proposed Route, within the City of Hermantown.

The Midway River Aquatic Management Area ("AMA") is approximately 0.8 mile east of the Project and is part of an AMA made up of six subunits. This is an easement AMA, which is on private property and is acquired specifically to allow angling access. All other uses require landowner permission. Midway River is a MnDNR designated Trout Stream (MnDNR, 2023).

7.2.7.2 Impacts on Recreation

Construction of the Project is not anticipated to disrupt nearby recreational activities. Minnesota Power and their construction contractor will use signs informing the public of construction in the area and any restricted access to transportation routes during construction. The Applicant will coordinate with the MnDNR, U.S. Fish and Wildlife Service ("USFWS"), Hermantown Parks and Recreation Department, and Solway Township to ensure construction of the Project will not cause any significant impacts to nearby natural resources and trout streams. Because the portion of the designated trout stream in the Proposed Route is surrounded by land privately owned by Minnesota Power, and for safety purposes related to operation of the Project and other existing utility infrastructure, no public angling would be allowed. Section 7.5.2.5 further discusses impacts on rivers and streams crossed by the proposed route.

7.2.7.3 Mitigation

No impacts to local recreational activities are expected, therefore no mitigation is proposed. None of the recreational areas outside of the Proposed Route are likely to be impacted by Project activities. As stated above, Minnesota Power will work with the MnDNR and other agencies to avoid and minimize impacts to the designated trout stream.

7.2.8 Public Services and Transportation

7.2.8.1 Existing Environment

The Proposed Route is located in a forested, agricultural, and rural residential area where public services such as electricity, natural gas, and water systems, along with fire protection and law enforcement are available.

Town Road 889 is located within the Proposed Route, entering on the north from Morris Thomas Road and traveling south to several former residences. Roadways adjacent to the Proposed Route include Morris Thomas Road (County Road 56) and Sandberg Road (Township Road 5610). No public transportation services are available in the vicinity of the Project.

7.2.8.2 Impacts on Public Services and Transportation

Minnesota Power will coordinate with the Minnesota Department of Transportation ("MnDOT") to confirm that construction of the Project will not interfere with routine roadway maintenance. Temporary, infrequent localized traffic delays may occur when heavy equipment enters and exits local roadways near the Project or equipment and materials are delivered to the Project construction site. To minimize traffic impacts, Minnesota Power will coordinate with local road authorities to schedule large material and or equipment deliveries to avoid periods when traffic volumes are high whenever practical. Traffic control barriers and warning devices will also be used when appropriate. Safety requirements to maintain flow of public traffic will be followed at all times and construction operations will be conducted to offer the least practical obstruction and inconvenience to public travel. Temporary access for construction of the transmission line would be along existing transmission line right-of-way and on Minnesota Power property. Temporary access for construction of the substation would be on Minnesota Power property or right-of-way. Immediate impacts to Town Road 889 may include increased use as an access road for vehicles and equipment associated with Project transmission line and substation construction. Future use of the road will be determined by Minnesota Power upon completion of the Project.

Minnesota Power will coordinate any planned outages associated with the Project to avoid and/or minimize disruptions to service in the area. Specific standards are required for the design and operating process of transmission lines and associated facilities. These standards and mitigation are outlined in NERC, Federal Energy Regulatory Commission, and NESC, which aid in the compatibility of new construction with existing utilities. All existing utilities will also be identified and marked prior to construction using public and private utility locator services. Because the Project will primarily be constructed on land owned by Minnesota Power and a portion follows existing electric utility right-of-way, no permanent impacts to utility services or other public services are anticipated; temporary interruptions of the HVDC Line will occur during the commissioning of the new HVDC Converter Stations, but Minnesota Power does not anticipate that its customers will observe any impacts to their utility service as a result of these efforts.

7.2.8.3 Mitigation

Because the coordination and safety procedures outlined above will be implemented during Project construction and significant impacts to utilities and Town Road 889 during and after Project construction are not expected, no mitigation is proposed.

7.3 LAND-BASED ECONOMIES

7.3.1 Agriculture

7.3.1.1 Existing Environment

While most land in St. Louis County is forested, some land is put to agricultural uses. Most agricultural land in the county is cultivated cropland, with some hay and pastureland. The USDA 2017 Census of Agriculture for St. Louis County indicates that there are 779 farms within the county, which is an increase of 14 percent from 2012. The average farm size in St. Louis County is 178 acres and there is a total of 138,753 acres of farmland in the county. In 2017, the total market value of products sold from farms in St. Louis County was over $16 million, which is a 5 percent decrease from 2012 (USDA, 2017).

Prime farmland is defined by the NRCS as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops, and is also available for these uses. There is no prime farmland within the Proposed Route; therefore, there will be no impacts to prime farmland.

The NRCS classifies farmland of statewide importance as lands other than prime farmland that are used for production of specific high-value food and fiber crops, such as tree nuts, fruits, and vegetables. Farmland of statewide importance is similar to prime farmland but with minor shortcomings such as greater slopes or less ability to store soil moisture. The Proposed Route includes approximately 14 acres of land classified as farmland of statewide importance. The areas within the Proposed Route that were formerly used for agriculture, primarily hay production, have been out of production for several years and are currently lying fallow. The degree to which any areas classified as farmland of statewide importance will be converted to other uses by the Project will be determined based on a final design. However, because the land within the Proposed Route will be owned or otherwise managed by Minnesota Power for the primary use of the proposed Project, it is unlikely that such lands will return to agricultural production.

7.3.1.2 Impacts on Agriculture

Based on the preliminary Project design, the Proposed Route includes approximately 41.6 acres of agricultural land previously used for pasture or hay production Based on the preliminary Project design, the substation will permanently impact up to 4 acres of land previously used for agriculture and the transmission lines will impact up to 3.5 acres of agricultural land.

7.3.1.3 Mitigation

Minnesota Power will limit impacts to agricultural production to the extent practical. Because Minnesota Power will own or manage through easements all lands within the Proposed Route, and because no active agricultural uses exist within the Proposed Route at this time, no impacts will occur to active agricultural land. As a result, Minnesota Power anticipates that an Agricultural Impact Mitigation Plan will not be required.

7.3.2 Forestry

7.3.2.1 Existing Environment

According to St. Louis County (St. Louis County, 2022a), the production of wood and paper products is a major industry within the county. Based on aerial photographs and site reconnaissance, there are no commercial forestry activities within the Proposed Route as of the time of this application.

7.3.2.2 Impacts on Forestry

Because there are no known commercial forestry operations within the Proposed Route, the Project will have no impacts on commercial forestry operations.

7.3.2.3 Mitigation

No impacts to forestry are anticipated; therefore, no mitigation is proposed.

7.3.3 Tourism

7.3.3.1 Existing Environment

No local, state, or federal parks or recreation areas are located within one mile of the Project Study Area. The nearest snowmobile trail is approximately one mile north/northeast of the Study Area. No tourism attractions are located within one mile of the Project Study Area.

7.3.3.2 Impacts on Tourism

No tourism attractions are located within one mile of the Project Study Area; therefore, impacts on tourism are not anticipated.

7.3.3.3 Mitigation

No impacts to tourism are anticipated; therefore, no mitigation is proposed.

7.3.4 Mining

7.3.4.1 Existing Environment

Based on aerial photographs, site reconnaissance, and data from the Aggregate Source Information System (MnDOT, 2023), two mines/gravel pits are located west and north of the Project Study Area, and one is located within the Project Study Area, but outside of the Proposed Route (see Map 5).

Mine 69367 is an inactive aggregate source, which indicates a source that is either depleted or at least unavailable for future use (If future circumstances make such sources available, the status may be changed).

Mine 69368 is an aggregate pit, which indicates an aggregate source that is owned and managed by MnDOT. Based on a review of aerial photographs, there was historically an aggregate pit at this location; however, one is not currently present.

Mine 69581 is a commercial aggregate, which indicates an identified commercial source of aggregate that has been assigned a source number in order to facilitate tracking of test results when the source is used on MnDOT or county projects.

7.3.4.2 Impacts on Mining

No mining operations are present within the Proposed Route; therefore, impacts are not anticipated.

7.3.4.3 Mitigation

No impacts to mining are anticipated; therefore, no mitigation is proposed.

7.4 ARCHAEOLOGICAL AND HISTORIC RESOURCES

7.4.1 Existing Environment

Information on known archaeological and historic resources was gathered in August 2022 from the Minnesota State Historic Preservation Office ("SHPO") and the Minnesota Office of the State Archaeologist ("OSA"), both in St. Paul. This desktop investigation queried the area within one mile of the Project Study Area. The SHPO and OSA datasets stem from previous professional cultural resources surveys and otherwise reported archaeological and architectural sites, also known as historic structures. Sites in these datasets typically include, but are not limited to, Native American mounds and earthworks, prehistoric burial grounds and habitation sites, remains of EuroAmerican home- and farmsteads, logging camps or other industrial land use, and standing buildings, bridges, or other features of the built environmental or infrastructure. Sites not included in these datasets may include locations known to Native Americans to have cultural importance.

7.4.1.1 Previously Recorded Archaeological Sites

No previously recorded archaeological sites are in the Proposed Route or within one mile of the Project Study Area.

7.4.1.2 Fond du Lac THPO-Identified Resources

On November 17, 2022, the Applicant solicited comments from the Tribal Historic Preservation Office ("THPO") of the Fond du Lac Band of Lake Superior Chippewa ("FDL") regarding places of cultural importance that were known to exist within the Project Study Area. The FDL THPO indicated that a potential, unconfirmed trail may be present in the very southwest of the Project Study Area, but outside of the Proposed Route.

7.4.1.3 Previously Recorded Historic Resources

US Highway 2 is the single previously recorded historic resource within one mile of the Project Study Area. There is no indication that this historic resource is eligible for inclusion on the National Register of Historic Places.

7.4.1.4 Conventional Archaeological Survey

In September 2022, the Applicant sponsored a conventional archaeological survey of those portions of the Study Area where landowner permission was available, amounting to 142 acres (or 40 percent) of the total 357 acres within the Study Area (as shown in Map 6 – Privileged and Confidential, in Appendix P). Of the surveyed acres, 66.2 acres are within the Proposed Route. Site 21SL1274, a historic period occupation, was identified and recommended not eligible for inclusion on the National Register of Historic Places ("NRHP") (Merjent, 2023). The Applicant provided the survey report to the SHPO and OSA for review on May 5, 2023. The results of the SHPO's review and concurrence in the report's findings will be provided to the MPUC after they are received by Minnesota Power.

The Applicant plans to sponsor conventional archaeological survey of any additional parcels that may eventually serve as Project workspace, plus the remaining unsurveyed parcels, as landowner permissions are granted or parcels are acquired. These surveys are anticipated to occur in the summer or fall of 2023. The Applicant will provide any additional reports to the SHPO and OSA and request comment on report adequacy, resource-specific NRHP eligibility recommendations, and (if applicable) measures for avoidance, minimization, or mitigation of adverse effects to NRHP-eligible resources.

7.4.2 Impacts

Based on the September 2022 field investigation, no sites eligible for inclusion on the NRHP would be adversely affected by Project construction, operations, or maintenance (within the 142 acres surveyed). As noted above, the Applicant plans to sponsor conventional archaeological survey of additional and remaining parcels as landowner permissions are granted.

Impacts on the unconfirmed trail, identified by the FDL THPO, are unanticipated because it is located outside of the Proposed Route.

7.4.3 Mitigation

Should an NRHP-eligible site be identified in other Project workspaces during preconstruction surveys, the Applicant will coordinate with SHPO and OSA to avoid, minimize, or mitigate adverse effects. Such efforts may be achieved through, but not limited to, Project design changes (avoidance), engineering or construction controls (minimization), or data recovery excavation (mitigation).

Conventional archaeological surveys are designed to identify NRHP-eligible sites. Not all isolated artifacts or other ephemeral evidence of human occupation, or even human remains, are identifiable during conventional archaeological surveys. While not expected, in the event archaeological materials and/or human remains are identified during Project construction activities, such activities will cease in the immediate area, and a professional archaeologist will be contacted to investigate the find. In the event of a confirmed archaeological site, steps will be taken to record and evaluate the site in consultation with SHPO and the OSA. If the site is determined to be eligible for inclusion on the NRHP, consultation among these parties will determine any procedures for avoidance, minimization, or mitigation. Should human remains be identified, the procedures as outlined in Minnesota Statutes Chapter 307, “Private Cemeteries” will be followed in coordination with the OSA and Minnesota Indian Affairs Council. In addition, an Unanticipated Discovery Plan will be prepared.

7.5 NATURAL ENVIRONMENT

7.5.1 Air Quality

7.5.1.1 Existing Environment

Existing air quality in the Project Study Area is good and intermittently impacted by emissions from traffic on nearby roads, farm vehicles, and home heating systems. No significant emissions occur from the existing utility infrastructure within and adjacent to the Project Study Area.

In Minnesota, air quality is tracked using air quality monitoring stations across the State. The MPCA uses data from these monitors to calculate the Air Quality Index (“AQI”), on an hourly basis, for ozone, particulate matter 2.5 microns or less in diameter (“$PM_{2.5}$”), sulfur dioxide, NO_2, and carbon monoxide. The pollutant with the highest AQI value for a particular hour sets the overall AQI for that hour. The AQI is used to categorize the air quality of a region as one of five levels of quality: good, moderate, unhealthy for sensitive groups, unhealthy, or very unhealthy (MPCA, 2021b).

The Project is located nearest to the air quality monitor in Duluth, Minnesota. This station monitors for ozone and $PM_{2.5}$. The AQI for Duluth for the past five years is provided in Table 7.5.1-1 (MPCA, 2021c).

Table 7.5.1-1 – Days in Each Air Quality Index Category (Duluth, Minnesota)

Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
2021	332	25	0	0	0
2020	338	28	0	0	0
2019	342	23	0	0	0
2018	330	30	0	0	0
2017	342	21	0	0	0

Source: MPCA, 2021c.

Air quality has been considered good for the majority of the past five reported years in Duluth. Since 2017, the largest number of days classified as moderate occurred in 2018. Only three days were unhealthy for sensitive groups in the last five years. No days have been classified as unhealthy or very unhealthy.

7.5.1.2 Air Quality Impacts

Emissions from fossil fuel combustion in the heavy equipment during construction of the Project, as well as fugitive dust emissions from the vehicles traveling on- and off-road, will contribute a negligible amount of air emissions on a temporary basis.

The only potential air emissions from a transmission line or conductors within the substation result from corona, which may produce ozone and oxides of nitrogen. Refer to Section 6.5.3 for a discussion of ozone and nitrogen oxide emissions. The use of sulfur hexafluoride (“SF_6”) circuit breakers within the stations also has the potential for temporary, localized air quality impacts if an accidental release was to occur.

Temporary and localized air quality impacts caused by construction vehicle emissions and fugitive dust from right-of-way clearing and construction activities are expected to occur. Exhaust emissions from diesel equipment will vary during construction but will be minimal and temporary. The magnitude of emissions is influenced heavily by weather conditions and the specific construction activity taking place.

No impacts to air quality are anticipated due to the operation of the substation or transmission line.

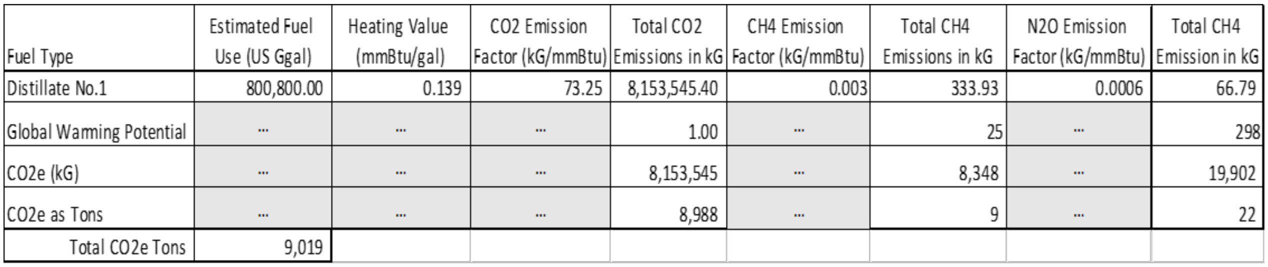
7.5.1.3 Greenhouse Gas Emissions and Climate Change

During construction of the transmission line, switching and Converter Stations, small amounts of air pollutants, including greenhouse gasses (“GHGs”), would be temporarily generated. The largest source of GHG emissions during construction is the combustion of fuels such as gasoline or diesel by construction equipment. These construction emissions would be temporary in nature, would fall off rapidly with distance from construction areas, and are not anticipated to result in long-term impacts. Once the construction activities are completed, construction-related emissions would cease. Additionally, the proposed project will be used to support existing and new renewable electricity generation which may displace higher carbon emitting electricity generating sources.

Climate change could result in an increased risk of flooding in the Project area, increased temperatures, extreme weather events such as high winds, and excessive rainfall; however, the Project location has been identified to be resistant to the effects of climate change due to Project infrastructure being sited outside of the 100-year floodplain and on upland areas to minimize susceptibility. In addition, transmission towers and the buildings associated with the Project will be designed to withstand extreme weather events, including high winds, and will increase electric service reliability within the Project area. As a result, the Project is not anticipated to contribute to any long-term GHG emissions or climate change impacts. Nor is the Project anticipated to be impacted by the effects of climate change.

Total GHG emissions for project construction are estimated to be approximately 9,019 tons of carbon dioxide (“CO_2”). Most emissions are due to the use of construction equipment and semi-trucks and trailers. Using EPA emissions factors, Table 7.5.1-2 shows a preliminary estimate of the emission estimates for the greenhouse gas emissions of CO_2, methane (“CH_4”), and nitrous oxide (“N_2O”)

Table 7.5.1-2 – Preliminary Emission Estimates for Greenhouse Gas Emissions



Fuel Type	Estimated Fuel Use (US Ggal)	Heating Value (mmBtu/gal)	CO2 Emission Factor (kG/mmBtu)	Total CO2 Emissions in kG	CH4 Emission Factor (kG/mmBtu)	Total CH4 Emissions in kG	N2O Emission Factor (kG/mmBtu)	Total CH4 Emission in kG
Distillate No.1	800,800.00	0.139	73.25	8,153,545.40	0.003	333.93	0.0006	66.79
Global Warming Potential	...	...	...	1.00	...	25	...	298
CO2e (kG)	...	...	...	8,153,545	...	8,348	...	19,902
CO2e as Tons	...	...	...	8,988	...	9	...	22
Total CO2e Tons	9,019							

Currently, there are no Minnesota-specific thresholds of significance for determining impacts of GHG emissions from an individual project on global climate change. In the absence of such a threshold, Minn. R. 4410.4300, Subp. 15(B), establishes a mandatory category requiring preparation of an EAW for stationary source facilities generating 100,000 tons of GHGs per year as the threshold to aid in determining if potential significant environmental effects might exist. A reasonable conclusion is that a project with GHG emissions below 100,000 tons per year does not have the potential to result in significant GHG effects. Potential impacts due to construction GHG emissions are anticipated to be negligible.

Once operational, the Project will generate minimal GHG emissions. Emissions that do occur would result from vehicle usage to and from the transmission lines and substation for O&M activities. GHG emissions for Project O&M are estimated to be approximately 440 tons of CO_2 annually.

Another potential source of GHG emissions during operation of the Project stems from the use of SF_6-containing equipment, such as high-voltage circuit breakers. The use of such equipment within high-voltage transmission systems is extremely common because of the substance’s stability and effectiveness at insulating electrical equipment. SF_6 is a highly potent GHG. For this reason, equipment containing SF_6 is designed to avoid emissions to the atmosphere. One of the best ways to avoid SF_6 emissions is to maintain or replace old equipment. The use of modern SF_6 equipment also supports system reliability and efficiency. Potential impacts due to operational GHG emissions are anticipated to be negligible.

7.5.1.4 Mitigation

Because no significant impacts to air quality are anticipated from the operation of the new or existing substations or the HVDC Converter Station, no mitigation is proposed with respect to operational impacts. The transmission lines and associated structures included in the Project will be designed to remove points of potential corona concentrations to minimize potential losses.

Construction best management practices for dust control including the use of wetting unpaved roads and right-of-way access points will be implemented and equipment idling will be minimized to reduce any short-term air quality impacts.

7.5.2 Water Resources

Hydraulic features within the Project Study Area include groundwater, wetlands, waterways, waterbodies, and floodplains (see Maps 8a, b and c). The Proposed Route is located entirely within the St. Louis River watershed (HUC 04010201).

7.5.2.1 Groundwater

Existing Environment

The MnDNR divides the State of Minnesota into six groundwater provinces, which are based on bedrock, glacial geology, and with unique combinations of sources and availability for drinking water, industry, and agriculture. The Project Study Area is located within the Central Province, which is characterized by a thick glacial sediment; however, sand and gravel aquifers are common. The deeper, fractured crystalline bedrock is characterized by poor aquifer properties and is of limited use as an aquifer (MnDNR, 2022e).

Based on the Minnesota County Well Index, four domestic wells are currently located within the Proposed Route (Minnesota Department of Health, 2023) (see Map 7a). Details for each well are provided in Table 7.5.2-1.

Table 7.5.2-1 – Wells Within the Proposed Route

Unique Well ID	Use	Date Drilled	Depth	Aquifer
786235	Domestic	11/20/2011	244 feet	Quaternary buried artesian aquifer
751462	Domestic	11/12/2007	215 feet	Quaternary buried artesian aquifer
143009	Domestic	12/15/1977	137 feet	Quaternary buried artesian aquifer
160987	Domestic	07/11/1979	125 feet	Quaternary buried artesian aquifer

A sole source aquifer ("SSA") or principal source aquifer area is one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer, where contamination of the aquifer could create a significant hazard to public health, and where there are no alternative water sources that could reasonably be expected to replace the water supplied by the aquifer (EPA, 2016). The closest EPA-designated SSA is approximately 59 miles southwest of the Proposed Route.

Under the U.S. Safe Drinking Water Act ("SDWA"), each state is required to develop and implement a Wellhead Protection Program to identify the land and recharge areas contributing to public supply wells and prevent the contamination of drinking water supplies. The SDWA was updated in 1986 with an amendment requiring the development of a broader-based Source Water Assessment Program, which includes the assessment of potential contamination to both groundwater and surface water through a watershed approach. A Wellhead Protection Area ("WHPA") encompasses the area around a drinking water well where contaminants could enter and pollute the well. The closest WHPA is located approximately 4.6 miles southeast of the Project Study Area.

Impacts on Groundwater

Existing domestic groundwater wells currently exist within the proposed route. As part of Project construction of these wells will be sealed in accordance with Minnesota Department of Health regulations. A groundwater well for minimal appropriation will be required at the HVDC Converter Station for sanitary water and fire suppression (a second well may be required depending on fire suppression requirements). However, equipment cooling will be via a closed loop cooling system. Minimal impacts to groundwater from operational appropriation are anticipated with the Project.

Structure foundations will generally range from 25 feet to 60 feet in depth. All foundation materials will be non-hazardous. Any effects on water tables would be localized and short term and would not affect hydrologic resources. Prior to construction, geotechnical investigations will be completed to help identify shallow depth to groundwater resource areas, which may require special foundation designs. Minnesota Power will continue to work with landowners to identify springs and wells near the Proposed Route.

Mitigation

No impacts to groundwater are anticipated; therefore, no mitigation is proposed.

7.5.2.2 Floodplains

Existing Environment

A floodplain is any land area susceptible to being inundated by floodwaters from any source, and is usually flat, or nearly flat, land adjacent to a river or stream that experiences occasional or periodic flooding. It includes the floodway, which consists of the stream channel and adjacent areas that carry flood flows, and the flood fringe, which includes areas covered by the flood but that do not experience strong current. Floodplains function to prevent damage to downstream areas by detaining debris, sediment, water, and ice. The Federal Emergency Management Agency ("FEMA") delineates floodplains and determines flood risks in areas susceptible to flooding. FEMA designates floodplain areas based on the percent chance of a flood occurring in that area every year. These designations include the 100-year floodplain, which has a 1 percent chance of flooding each year, and the 500-year floodplain, which has a 0.2 percent chance of flooding each year.

At the state level, the MnDNR oversees the administration of the state floodplain management program by promoting and ensuring sound land use development in areas to promote the health and safety of the public, minimize loss of life, and reduce economic losses caused by flood damages. The MnDNR also oversees the national flood insurance program for the state of Minnesota. Floodplains are also regulated at the local level by each county. Associated ordinances allow for utility transmission lines as a conditional use for floodway and floodplain districts.

Impacts on Floodplains

Within the Project Study Area, a 100-year floodplain is associated with West Rocky Run Creek (see Map 7b). Minnesota Power will place new transmission line structures outside of the floodplain area, although lines will span it. During construction, approximately 0.84 acre within the floodplain could experience temporary impacts from construction vehicles, access routes, structure work areas, and wire pull sites. The temporary impacts are not anticipated to alter the flood storage capacity of the floodplain.

Mitigation

No permanent impacts to floodplains are anticipated; therefore, no mitigation is proposed.

7.5.2.3 Impaired Waters

Existing Environment

Under Section 303(d) of the Clean Water Act ("CWA"), the MPCA assesses all waters of the state and creates a list of impaired waters every two years. The listings are based on water quality monitoring of lakes and major streams and are used to set pollutant reduction goals needed to restore waters to the extent that they meet water quality standards for designated uses, which are referred to as total maximum daily loads. The list, known as the 303(d) list, is based on violations of water quality standards. In Minnesota, the MPCA has jurisdiction over determining 303(d) waters. These waters are described as "impaired." The 303(d) list was approved by the EPA on April 29, 2022.

The Proposed Route includes one impaired waterbody, West Rocky Run Creek (AUID 04010201-625), which is listed as having an impaired designated use of aquatic life, due to *Escherichia coli* (MPCA, 2022) (see Map 7b).

Impacts on Impaired Waters

Minnesota Power will place new transmission line structures outside of the impaired waterbody and transmission lines will span the waterbody. Direct impacts to impaired surface waters are not anticipated, and no Project activities are likely to exacerbate the existing impairment for *E. coli*. Minnesota Power will employ best management practices during construction and in compliance with local and state permits to prevent erosion and sedimentation near surface waters.

Mitigation

No impacts to impaired waters are anticipated; therefore, no mitigation is proposed.

7.5.2.4 Lakes and Other Waterbodies

Existing Environment

Based on a review of aerial photography and field survey results, no lakes are present within the Project Study Area. Several small ponds are present within the Project Study Area but there are no non-wetland waterbodies of any kind within the Proposed Route. Pike Lake, the closest lake, is approximately six miles north of the Project Study Area.

Impacts on Waterbodies

No waterbodies are present within the Proposed Route; therefore, impacts are not anticipated.

Mitigation

No impacts to waterbodies are anticipated; therefore, no mitigation is proposed.

7.5.2.5 Rivers and Streams (Waterways)

Existing Environment

Waterways include rivers, streams, and other watercourses that move water across the landscape within a defined path. Public Waters are wetlands, water basins, and watercourses of significant recreational or natural resource value in Minnesota as defined in Minn. Stat. § 103G.005. The MnDNR has regulatory jurisdiction over these waters, which are identified on the MnDNR Public Waters Inventory ("PWI") maps. In addition to Public Waters, certain surface waters in Minnesota are designated as trout streams or trout lakes by the State of Minnesota, according to Minn. Stat. § 6264.0050. By definition, trout streams and trout lakes are considered Public Waters and are regulated by the MnDNR. One waterway, West Rocky Run Creek, is located within the Proposed Route (see Map 7b) and will be crossed by the two parallel 230 kV transmission lines. West Rocky Run Creek is a designated trout stream and a Minnesota Public Water.

Impacts on Rivers and Streams

Trout rely on coldwater habitat. As a result, clearing of trees along designated trout streams and their tributaries may result in adverse warming of the stream water. Shade provided by trees and shrubs is important to minimize thermal impacts to trout streams. The Applicant will work with the MnDNR to obtain proper licenses and approvals for Public Water crossings by the proposed Project and to identify appropriate measures to minimize temperature-related impacts to the stream.

Through the license approval process, Minnesota Power and the MnDNR will determine the appropriate mitigation or avoidance measures for Public Water crossings, including trout streams. Avoidance measures may include timing restrictions, including no in-water work between September 15th and June 30th. In addition, special clearing setbacks may be required when working near the trout stream. Where practicable, a 75-foot vegetated buffer will be maintained adjacent to trout streams, except for a 20-foot-wide travel path. In locations where clearing activities must take place within the 75-foot buffer, hand clearing techniques will be used to minimize impacts to soils and existing vegetation. Rootstock of woody vegetation will remain in place to avoid impacts to soils and allow existing vegetation to regrow quicker.

Through the National Pollutant Discharge Elimination System ("NPDES") permitting process the Project will be required to comply with Section 23.1 of the Construction General Permit MNR100001, which includes designated trout streams within the definition of special waters. BMPs such as redundant perimeter controls and the stabilization of exposed soils immediately upon completion of work within the 75-foot buffer will be implemented to minimize erosion near MnDNR designated trout streams.

Mitigation

No permanent impacts to waterbodies are anticipated; therefore, no mitigation is proposed.

7.5.2.6 Wetlands

Existing Environment

Wetlands are important resources for flood abatement, wildlife habitat, and water quality. Wetlands that are hydrologically connected to the nation's navigable streams are protected under Section 404 of the federal CWA and most wetlands in Minnesota are protected under the state Wetland Conservation Act ("WCA"). The USFWS National Wetlands Inventory ("NWI") is a publicly available GIS database that provides information regarding the potential existence of wetlands. NWI data should be used as a reference only and may be inconsistent with wetland conditions on the ground.

Wetland types within the NWI data are classified using the Cowardin wetland habitat classification system. The Cowardin classification system is hierarchical and defines wetland habitats based on vegetative and sediment class along with water regime.

In August and September 2022, Merjent completed a wetland and other waters delineation of approximately 142 acres ("Survey Area") within the Project Study Area, or 66.2 acres within the Proposed Route. The Survey Area was defined based on landowner permissions and encompassed portions of the Proposed Route. Additional detail can be found in the Wetland and Other Waters delineation report, which is included as Appendix I. Areas that were not surveyed in 2022 will be surveyed in 2023, pending land acquisition by Minnesota Power or landowner permissions.

Based on field delineations and NWI data where field delineations are incomplete, approximately 16.13 acres of wetlands may be present within the Proposed Route (see Map 7c). Details on wetland types are included in Table 7.5.2-2.

Table 7.5.2-2 – Delineated Wetlands and NWI Wetlands Within the Proposed Route

Wetland Type	Delineated	NWI
PEM	5.24	0.38
PFO	2.06	-
PSS	2.43	5.82
PUB	0.04	0.03
R3UBH	-	0.12
TOTAL	**9.77**	**6.35**

Impacts on Wetlands

Based on the preliminary Project design, permanent impacts to wetlands may result from construction of the substation (see Table 7.5.2-3). The Converter Station is not anticipated to impact wetlands, based on NWI data; however, field delineations will occur in 2023. Temporary fill impacts to wetlands may occur in the form of the placement of temporary construction matting along access routes, transmission line structure work areas, and wire pull sites. Transmission structures will be sited outside of wetlands, so permanent impacts are not anticipated (see Table 7.5.2-3).

Table 7.5.2-3 – Potential Impacts on Wetlands and Other Waters

Wetland Type	Delineated	NWI
Substation (Permanent impacts based on preliminary design)		
PEM	0.34	-
PSS	0.41	-
Subtotal	**0.75**	**0.00**
Transmission Line (Temporary impacts based on preliminary design)		
PEM	0.93	-
PFO	0.34	-
PSS	-	0.38
PUB	-	0.03
R3UBH	-	0.01
Subtotal	**1.27**	**0.42**
TOTAL	**2.02**	**0.42**

The Applicant will continue to minimize wetland impacts to the extent possible. Minnesota Power will continue to coordinate with U.S. Army Corps of Engineers ("USACE") and will apply for a permit once design details are available. Minnesota Power will also coordinate with the Local Governmental Unit to confirm compliance with the WCA.

Mitigation

Minnesota Power will work with the USACE to determine mitigation ratios, if necessary. Mitigation typically occurs in the form of wetland replacement credits for permanent impacts to wetland areas.

Minnesota Power believes that the Project will qualify for the Utility Exemption from preparing a Wetland Replacement Plan under WCA; see Section 9.2.5 for additional details.

7.5.3 Flora and Fauna

7.5.3.1 Flora

Existing Environment

Vegetation communities in the Project Study Area currently include agricultural land, deciduous forest, transmission line rights-of-way, and residential lawns. The Project Study Area lies within the Laurentian Mixed Forest Province as defined by the Ecological Classification System of Minnesota and more specifically within the North Shore Highlands Subsection. Pre-European settlement vegetation consisted mainly of fire-dependent forests such as aspen-birch forest with white pine-red pine forest, mixed hardwood-pine forest, and conifer bogs and swamps. Mixed hardwood-pine forests, which included sugar maples (*Acer saccharum*), was found mainly on ridges made of clay lake plain. The northern half of the subsection was dominated by aspen-birch forest with little pine forest mixed in (MnDNR, 2022a).

Currently, the majority of the subsection remains forested. However, after extensive logging, white and red pine forests were replaced by quaking aspen (*Populus tremuloides*) and paper birch (*Betula papyrifera*). There has been little to no mining or agriculture in this area though the subsection is home to ports for iron ore and agricultural commodities (MnDNR 2022b).

Impacts on Flora

Impacts on existing vegetation are anticipated due to construction and operation of the proposed Project. The disturbance would be minimized by using the existing road system to the extent practical, traveling within the right-of-way as appropriate, and not building new roads unless necessary. Further, the transmission line may span sensitive resources, such as streams and wetlands to the extent practical. Last, the Project facilities are mostly being constructed in proximity to existing utility infrastructure. Impacts on specific land cover types are discussed in Section 7.6.3 – Land Cover, impacts from right-of-way clearing are discussed in Section 6.2.2, and operations and maintenance activities are discussed in Section 6.4.

Construction within the Proposed Route could lead to the introduction or spread of invasive species and noxious weeds. Construction activities that could potentially lead to the introduction of invasive species include ground disturbance that leaves soils exposed for extended periods, introduction of topsoil contaminated with weed seeds, vehicles importing weed seed from a contaminated site to an uncontaminated site, and conversion of landscape type, particularly from forested to open settings.

Mitigation

Potential impacts due to invasive species and noxious weeds can be mitigated by:

- Revegetating disturbed areas using weed-free seed mixes and using weed-free straw and hay for erosion control.
- Removal of invasive species/noxious weeds via herbicide and manual means.
- Cleaning and inspecting construction vehicles to remove dirt, mud, plant, and debris from vehicles prior to arriving at and leaving construction sites.

Minnesota Power will prepare a vegetation management plan for the Project prior to construction in consultation with the Minnesota Vegetation Management Working Group. The plan will include measures to mitigate the introduction of invasive species and noxious weeks to the Proposed Route.

7.5.3.2 Fauna

Existing Environment

Wildlife species in St. Louis County include bald eagles, woodcock, ruffed grouse, wild turkeys, white-tailed deer, black bear, beaver, muskrat, river otter, grey wolf, rabbits, squirrels, red and gray fox, raccoon, migratory waterfowl (geese, ducks, trumpeter swans, herons, raptors), and various birds (meadowlarks, sparrows, thrushes, various woodpeckers, shore birds) (MnDNR, 2022c). Several of these species are likely to be present within the Project Study Area.

The National Audubon Society works to identify, monitor, and protect habitat for bird species throughout the United States, in part by designating sites as Important Bird Areas ("IBA"). IBAs are designated when they meet certain criteria, including providing habitat for at least one of the following (National Audubon Society ["NAS"], 2022):

- Species of conservation concern (e.g., threatened and endangered species);

- Range-restricted species (species vulnerable because they are not widely distributed);
- Species that are vulnerable because their populations are concentrated in one general habitat type or biome; and/or
- Species, or groups of similar species (such as waterfowl or shorebirds), that are vulnerable because they occur at high densities due to their congregatory behavior.

Audubon works to identify and implement conservation strategies within IBAs to minimize the effects of habitat loss on birds and, by extension, other species (NAS, 2022).

No IBAs are located within the Project Study Area.

7.5.3.3 Impacts on Fauna

There is minimal potential for the displacement of wildlife and loss of habitat from construction of the proposed Project. Wildlife that inhabits natural areas could be impacted in the short-term within the immediate area of construction. The distance that animals will be displaced will depend on the species. Additionally, these animals will be typical of those found in forested rural settings and should not incur population level effects due to construction.

Due to the confined nature of the Project, impacts to raptors, waterfowl and other bird species are anticipated to be minimal.

Where practical the Project will consider the Avian Powerline Interaction Committee ("APLIC") recommendations to reduce electrocution and collisions with transmission line conductors.

Mitigation

Impacts on fauna species are anticipated to be temporary in nature and APLIC design recommendations will be considered in the Project design where practicable.

7.6 ZONING AND LAND USE

7.6.1 Zoning

7.6.1.1 Existing Environment

The Proposed Route intersects both the City of Hermantown and Solway Township zoning ordinances. Solway Township zoning is managed by St. Louis County. Within the City of Hermantown, the Proposed Route is zoned Rural Residential, S1 (City of Hermantown, 2022b). The Solway Township portion of the Proposed Route is zoned Residential, RES-3 (St. Louis County, 2022). Zoning information for the Proposed Route is shown on Map 8. The Proposed Route also contains a Natural Environment Shoreland Overlay Zone (City of Hermantown, 2022b) that covers West Rocky Run, a Minnesota Public Water and perennial designated trout stream. Activity near, in, or across West Rocky Run may require additional review and permitting due to the Shoreland Zoning designation.

7.6.1.2 Impacts on Zoning

Construction and operation of the Project will not require a zoning change due to the preemption of local land use laws that is granted with LHVTL Route Permits.

7.6.1.3 Mitigation

In accordance with Minn. Stat. § 216E.10, subd. 1, after the Commission approves a route, local zoning, building, and land use regulations are preempted; therefore, no mitigation is anticipated.

7.6.2 Land Use

7.6.2.1 Existing Environment

Current land use within the Proposed Route is mainly forested, agricultural, utility corridor, and rural residential (Google Earth, 2022). The Proposed Route includes existing transmission line infrastructure rights-of-way, and the Arrowhead Substation is adjacent to the eastern boundary of the Proposed Route.

7.6.2.2 Impacts on Land Use

Land use for utility infrastructure would increase by approximately 43.5 acres as a result of the Project and would be the primary impact to land use. Although a large majority of the Proposed Route is forested, commercial forestry is not an active commercial activity; therefore, no impacts to forestry land use activities would occur. Minor impacts to agricultural land use (less than five acres) may occur depending on final Project design. See Section 7.3 – Land Based Economies for additional information on impacts to agricultural and forest lands.

7.6.2.3 Mitigation

Minnesota Power will minimize impacts to existing land uses to the extent practical. See Section 7.3 – Land Based Economies for additional information on Land Use mitigation.

7.6.3 Land Cover

7.6.3.1 Existing Environment

Based on U.S. Geological Survey Gap Analysis Project data, the total acreage of each land cover type within the Proposed Route is provided in Table 7.6.3-1 and shown on Map 9. The table includes land cover by specific type and identifies a summary acreage of those covers included in forested land cover as a separate row.

Table 7.6.3-1 – Land Cover Within Proposed Route

Land Cover Type	Acres	Percentage of Total
Forest and Shrubs	112.94	64.06
Developed	36.59	20.76
Cropland	24.31	13.79
Grassland	2.44	1.39
TOTAL	**176.28**	**100.00**

7.6.3.2 Impacts on Land Cover

As previously stated, the Project will be constructed entirely on property owned or managed by Minnesota Power within the Proposed Route. Within this area, there is existing utility infrastructure, including existing transmission lines. Impacts on forested and rural developed land will be the most obvious impact to overall land cover within the Proposed Route. Approximately 26 acres of forested land will be cleared as a result of the proposed Project construction. Tree clearing will occur per Minnesota Power standards and based on consultation with USFWS. Secondary impacts include impacts to approximately 14 acres of rural developed land and three acres of cropland.

Table 7.6.3-2 – Land Cover Impacts from Project

Land Cover Type	Impact (Acres)	Percentage of Total
Forest and Shrubs	26.24	60.35
Developed	13.85	31.85
Cropland	3.39	7.80
Grassland	0.00	0.00
TOTAL	**43.48**	**100.00**

7.6.3.3 Mitigation

Minnesota Power will minimize impacts to land cover to the extent practical. See Section 7.3 – Land Based Economies for additional information on Land Use and associated Land Cover Impacts and Mitigation.

7.7 RARE AND UNIQUE RESOURCES

7.7.1 Existing Environment

7.7.1.1 Threatened and Endangered Species

On behalf of Minnesota Power, Merjent submitted a formal Natural Heritage Review Request (2022-0070) on November 11, 2022 (see Appendix J) through the MnDNR's Minnesota Conservation Explorer ("MCE").

Merjent also reviewed the USFWS Information for Planning and Conservation ("IPaC") website for a list of federally threatened and endangered species, candidate species, and designated critical habitat that may be present within the Project Study Area (USFWS, 2022a).

State Listed Species

An automated response provided by the MnDNR on November 11, 2022 indicated that no state-listed endangered or threatened species have been documented within the vicinity of the Project Study Area (see Appendix J).

Federally Listed Species

Based on the official species list provided by the USFWS (see Appendix J), four federally listed species and one candidate species have been previously documented within the vicinity of the

Project Study Area (see Table 7.7.1-1). No federally designated critical habitat is present within the Project Study Area.

Table 7.7.1-1 – Federally Listed Species Previously Documented within the Project Area

Common Name	Scientific Name	Federal Status
Northern long-eared bat	*Myotis septentrionalis*	Endangered
Canada lynx	*Lynx canadensis*	Threatened
Gray wolf	*Canis lupus*	Threatened
Tricolored bat	*Perimyotis subflavus*	Proposed Endangered
Piping Plover	*Charadrius melodus*	Endangered
Monarch butterfly	*Danaus plexippus*	Candidate

Northern Long-eared Bat

The range of the northern long-eared bat 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, northern long-eared bats use caves and mines as hibernacula (USFWS, 2023a).

Canada Lynx

Canada lynx are most likely to occur in Minnesota after populations of snowshoe hare decline significantly in Canada (a cyclical occurrence). Lynx are primarily found in boreal forests (USFWS, 2023c); in Minnesota, this habitat is dominated by spruce (*Picea* spp.), fir (*Abies* spp.), and pine (*Pinus* spp.). Lynx may also use transitional zones where boreal forest gives way to northern hardwood forest where hardwood species, including birch (*Betula* spp.), aspen (*Populus* spp.), and willow (*Salix* spp.) are interspersed among conifers. Lynx use these areas for hunting and traveling between preferred patches of boreal and mixed conifer-hardwood forest types (MnDNR 2023b).

Gray Wolf

A habitat generalist, the gray wolf originally occupied most habitat types in North America. They show no preference for one cover type over another and successfully utilize alpine, forest, grassland, shrubland, and woodland habitats across their range (USFWS, 2023d). Once thought to require wilderness areas with little to no human disturbance, recent range expansions have demonstrated the species' ability to tolerate higher rates of anthropogenic development than previously thought. Given abundant prey and low rates of human-caused mortality, wolves can survive in proximity to human-dominated environments (MnDNR, 2023c).

Piping Plover

The Great Lakes Population of Piping Plovers nests along sandy gravel shorelines of large lakes and rivers in the upper Midwest, including the shores of Lake Superior near Duluth, Minnesota (MnDNR, 2023d). The species can also be found in sand and gravel mine sandpits, lake shore housing developments, and reservoir shorelines. Piping Plovers overwinter along the Gulf of Mexico and southern Atlantic coast (USFWS, 2023e).

Tricolored Bat

The tricolored bat is one of the smallest bats species native to North America. Ranging from the eastern and central United States into portions of southern Canada, Mexico, and into Central America. The species is named for its unique fur that appears darker on the tips and base, and lighter in the middle, ranging from yellow to orange in color, but may also appear silver-gray to brown and black. Average adults measure 3 to 3.5 inches in length.

The species overwinters in caves and mines where available. However, throughout much of its range in the southern United States, roadside culverts, tree cavities, and abandoned water wells may also serve as suitable overwintering habitat.

During the active season (generally, April 1 to October 31), the species may be found roosting among leaf clusters (live and dead) on living or recently dead deciduous hardwood trees. Roost choice may also vary by region: the species utilizes Spanish moss in the southern portion of its range and “bony beard” lichen plants (*Usnea trichodea*) in the north. The species has also been observed roosting in eastern red cedar trees and pine needles as well as within manmade structures such as barns and bridges (USFWS, 2023f).

On September 13, 2022, the USFWS published a proposed rule listing the tricolored bat as federally endangered under the Endangered Species Act (“ESA”). A final rule is expected in October 2023 (USFWS, 2022d).

Monarch Butterfly

The monarch butterfly is a large butterfly with an approximate 3-4-inch wingspan and characterized by bright orange coloring on the wings, with distinctive black borders and veining. The species can be found in a wide variety of habitats including prairies, grasslands, urban gardens, road ditches, and agricultural fields, provided a supply of nectaring plants are available for adult foraging and milkweed plants are present for laying eggs and as a food source for caterpillars (USFWS, 2022c).

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 (USFWS, 2020). The USFWS has added the monarch to the updated national listing workplan and, based on its listing priorities and workload, intends to propose listing the monarch in Fiscal Year 2024, if listing is still warranted at that time, with a possible effective date within 12 months of the proposed rule (USFWS, 2022c). The USFWS will also conduct an annual status review to determine if changes in prioritization are necessary.

7.7.2 Impacts

7.7.2.1 Northern Long-eared Bat

Potential impacts to individual northern long-eared bats may occur if clearing or construction takes place when the species is breeding, foraging, or raising pups in its summer habitat. 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 foraging and roosting habitat (USFWS, 2023a).

In Minnesota, the species is most likely to be found in forested wetlands and riparian areas (MnDNR, 2023e); however, individual trees, fence rows, or small wooded lots (fewer than 10 acres) that are greater than 1,000 feet from forested or wooded areas are considered unsuitable for the species, as are pure stands of less than three-inch diameter-at-breast-height trees that are not mixed with larger trees and trees found in highly developed urban areas (USFWS, 2022e). Potentially suitable roosting and foraging habitat is present in the Proposed Route.

Based on the USFWS Determination Key ("Dkey") for the northern long-eared bat, the Project *may affect, but is not likely to adversely affect* the species (see Attachment K). With that determination of effect, a "Consistency Letter" (see Attachment K) was generated that will support the lead federal agency in consultation with the USFWS. The Applicant will commit to the minimization and avoidance measures outlined in the Dkey and therefore no impacts are anticipated.

7.7.2.2 Canada Lynx

Suitable habitat for the Canada lynx is present within the Project Study Area; however, due to the transient nature of the Canada lynx and the development within the Project Study Area it is unlikely that the Canada lynx would persist within the Proposed Route. The Applicant will support the lead federal agency in consultation with the USFWS to develop necessary avoidance and mitigation measures for this species.

7.7.2.3 Gray Wolf

Suitable habitat for the gray wolf is present within the Project Study Area; however, due to the transient nature of the gray wolf and the development within the Project Study Area, it is unlikely that the gray wolf would persist within the Proposed Route. The Applicant will support the lead federal agency in consultation with the USFWS to develop necessary avoidance and mitigation measures for this species.

7.7.2.4 Piping Plover

Suitable habitat for the Piping Plover is not present within the Project Study Area; therefore, impacts are not anticipated, and no mitigation is proposed.

7.7.2.5 Tricolored Bat

Potential impacts to individual tricolored bats 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 (USFWS, 2021).

Suitable habitat for the tricolored bat is present within the Proposed Route. Minnesota Power will support the lead federal agency to conference on any necessary tricolored bat avoidance or mitigation measures.

7.7.2.6 Monarch Butterfly

Suitable habitat for monarchs may be present within the Project Study Area. If the USFWS determines the species should be listed and protections for the species will coincide with Project planning, permitting, and/or construction, the Applicant will review Project activities for potential impacts to the species, develop appropriate avoidance and mitigation measures, and consult with the USFWS as appropriate.

7.7.3 Mitigation

Minnesota Power will support the lead federal agency to consult with the USFWS to develop necessary avoidance and mitigation measures for the northern long-eared bat, Canada lynx, gray wolf, and tricolored bat. Minnesota Power will coordinate with the lead federal agency in the event that the monarch is proposed for listing.

Impacts on state-listed species are not anticipated; therefore, no mitigation is proposed.

7.7.4 Natural Resource Sites

7.7.4.1 Existing Environment

There are no MnDNR Wildlife Management Areas ("WMA") and MnDNR Scientific and Natural Areas ("SNA") in the Project Study Area. Additionally, there are no MnDNR Minnesota Biological Survey areas of Biological Significance ("SOBS") located within the Project Study Area. The nearest SOBS, Midway Peatland, is approximately 1.6 miles south of the Project Study Area. The nearest WMA, Canosia WMA, is located approximately 8.5 miles north of the Project Study Area. The nearest SNA, Hemlock Ravine, is located approximately 7 miles south of the Project Study Area.

In addition, the MnDNR's Natural Heritage Review Request (2022-0070) automatically generated letter indicated that no ecologically significant areas have been documented within the vicinity of the Project (see Appendix J).

7.7.4.2 Impacts

No natural resource sites are located within the Proposed Route; therefore, impacts are not anticipated.

7.7.4.3 Mitigation

No natural resource sites will be impacted by the Project; therefore, no mitigation is proposed.

7.8 PHYSIOGRAPHIC FEATURES

7.8.1 Topography

7.8.1.1 Existing Environment

The Proposed Route is located within the North Shore Highlands Subsection of the Northern Superior Uplands section of the Laurentian Mixed Forest Province as defined by the MnDNR Ecological Classification System (MnDNR, 2022a). The North Shore Highlands subsection which has gently rolling to steep topography, occupies the area adjacent to Lake Superior. In this area, bedrock outcroppings are common, and soils are shallow. Ground and end moraines from the Superior lobe glacier cover a large portion of the subsection (Hobbs et al., 1982). In the southern half of the subsection, the glacial clay lake plain forms a broad band along the Lake Superior shoreline. The clay lake plain is flat to rolling, with steep, narrow ravines along waterbodies and outwash deposits along the western edge of the subsection.

Elevations along the Proposed Route range from 1,276 to 1,500 feet above sea level (MnDNR, 2022d). Slopes of variable grades are present throughout the Proposed Route, (see Map 10a).

7.8.1.2 Impacts on Topography

The proposed substation and HVDC Converter Station will require grading and leveling for construction access and activities and therefore will have localized impacts on topography. Best management practices, along with sediment stabilization and erosion control methods as required by the Project's NPDES Construction Stormwater Permit will be utilized during construction activities to minimize and control erosion and sedimentation. Ground disturbance will be minimized where practical, and disturbed ground will be re-stabilized as soon as practical after construction activities cease.

Transmission line structures are typically designed for installation at existing grades. Because of this, minimal grading and leveling will be needed at structure sites unless it is necessary to provide a reasonably level area for construction access and activities. Construction of the transmission lines will have minimal to no impact on the topography of the area.

7.8.1.3 Mitigation

Because construction of the Project will have only localized impacts to the topography of the area, no mitigation is proposed.

7.8.2 Geology

7.8.2.1 Existing Environment

The area of the Project Study Area has thin glacial drift over the entire subsection and large areas of exposed bedrock near the surface. The underlying bedrock consists of Upper Precambrian basalt, rhyolite, gabbro, diabase, anorthosite, granite, sandstone, and shale. (Morey et al., 1976) Bedrock within the Proposed Route is part of the Animikie Group. The Animikie Group is a geologic group composed of sedimentary and metasedimentary rock and was deposited between 2,500 and 1,800 million years ago during the Paleoproterozoic era. This group of formations is geographically divided into the Gunflint, the Mesabi, the Vermillion, and the Cuyuna Ranges. The Mesabi Range is located largely in St. Louis County. The bedrock unit of the Animikie Group in Proposed Route is the Thomson Formation once deformed, consisting of Paleoproterozoic Virginia, Thompson, and Rove Formations, mudstone, and greywacke (Jirsa et al., 2011) (see Map 10b).

7.8.2.2 Impacts on Geology

Construction of the Project will not alter the geology of the region because construction methods will not cause significant bedrock and geologic structure modification.

7.8.2.3 Mitigation

No alteration of the geologic structure of the region will occur due to Project construction; therefore, no mitigation is proposed.

7.8.3 Soils

7.8.3.1 Existing Environment

USDA soils data was reviewed to determine soil type within the approximately 176 acre Proposed Route (USDA; 2023) (see Map 10c). The majority of the Proposed Route (approximately 154 acres) is classified as course-loamy soil, 65 acres of which is considered Farmland of Statewide Importance. Table 7.8.3-1 below contains additional information about each soil type in the Proposed Route.

Table 7.8.3-1 – Soil Types within the Proposed Route

Soil ID	Soil Type	Farmland Designation	Acres	Percent of Total
F144D	Aldenlake-Ahmeek complex, 8 to 18 percent slopes	Not prime farmland	51.76	29.36
F121B	Aldenlake sandy loam, 2 to 8 percent slopes	Farmland of statewide importance	48.5	27.51
F145F	Ahmeek-Aldenlake complex, 18 to 45 percent slopes	Not prime farmland	22.99	13.04
F137B	Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes	Farmland of statewide importance	16.07	9.12
F142A	Canosia loam, 0 to 2 percent slopes	Not prime farmland	13.96	7.92
1020A	Bowstring and Fluvaquents, loamy, 0 to 2 percent slopes, frequently flooded	Not prime farmland	10.91	6.19
F117D	Rollins sandy loam, 8 to 18 percent slopes	Not prime farmland	4.84	2.75
GP	Pits, gravel-Udipsamments complex	Not prime farmland	4.09	2.32
F151A	Tacoosh mucky peat, dense substratum, 0 to 1 percent slopes	Not prime farmland	2.44	1.38
F154A	Urban land-Hermantown-Canosia complex, 0 to 3 percent slopes	Not prime farmland	0.55	0.31
F136A	Hermantown silt loam, 1 to 3 percent slopes	Farmland of statewide importance	0.19	0.11
		TOTAL	**176.30**	**100.00**

Impacts on Soils

Construction of the proposed Project will not have significant impacts on the overall soil profile of the area except where side slopes may be excavated to provide a flat construction surface. Such areas will be identified during the detailed design process prior to construction. Potential impacts during construction may include the compaction of soil and the exposure of soil to wind and water during construction activities. These impacts should be short term in nature and minimal during and after construction activities. There should be no long-term impacts to the soil profile because of this Project. Approximately 44 acres of the 176-acre Proposed Route will be temporarily impacted by construction activities. Of the 44 acres, approximately 14 acres are designated as Farmland of Statewide Importance. Table 7.8.3-2 below contains additional information about each soil type impacted by the Project, along with the Farmland Designation.

Table 7.8.3-2 – Farmland Designation within the Proposed Route

Soil ID	Soil Type	Farmland Designation	Acres
F121B	Aldenlake sandy loam, 2 to 8 percent slopes	Farmland of statewide importance	10.84
F137B	Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes	Farmland of statewide importance	2.92
F144D	Aldenlake-Ahmeek complex, 8 to 18 percent slopes	Not prime farmland	12.12
F142A	Canosia loam, 0 to 2 percent slopes	Not prime farmland	8.47
1020A	Bowstring and Fluvaquents, loamy, 0 to 2 percent slopes, frequently flooded	Not prime farmland	1.38
F117D	Rollins sandy loam, 8 to 18 percent slopes	Not prime farmland	3.26
GP	Pits, gravel-Udipsamments complex	Not prime farmland	4.08
F154A	Urban land-Hermantown-Canosia complex, 0 to 3 percent slopes	Not prime farmland	0.21
F145F	Ahmeek-Aldenlake complex, 18 to 45 percent slopes	Not prime farmland	0.19
		TOTAL	**43.48**

Approximately 13 acres of soil may have permanent impacts from the proposed construction of the Project substation and Converter Station. Less than three acres of these soils are designated as Farmland of Statewide Importance. Table 7.8.3-3 contains additional information on the soils impacted by the proposed substation and Converter Station.

Table 7.8.3-3 – Soils Impacted by Substation and Converter

Soil ID	Soil Type	Farmland Designation	Acres
F121B	Aldenlake sandy loam, 2 to 8 percent slopes	Farmland of statewide importance	2.87
F137B	Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes	Farmland of statewide importance	0.10
F144D	Aldenlake-Ahmeek complex, 8 to 18 percent slopes	Not prime farmland	3.16
F142A	Canosia loam, 0 to 2 percent slopes	Not prime farmland	3.32
F117D	Rollins sandy loam, 8 to 18 percent slopes	Not prime farmland	2.02
GP	Pits, gravel-Udipsamments complex	Not prime farmland	1.57
		TOTAL	**13.05**

Steep slopes are shown on Map 10a and include a hillside in the southwest portion of the Proposed Route and a streambank associated with West Rocky Run Creek. Impacts to the streambanks will largely be avoided because the proposed 230 kV lines will span the creek. Steep slopes in the southwest part of the Proposed Route will be avoided to the extent possible, but portions may be excavated and flattened to accommodate an even construction surface. Future project designs and grading plans will identify these areas so that impacts can be minimized. NRCS SSURGO data does not have erodibility information for this area.

Best management practices and erosion control methods will be implemented during all construction activities to protect soils and minimize and control erosion and sedimentation. Groundcover protecting soils will be left undisturbed whenever practical. Minnesota Power's construction stormwater SWPPP will be developed prior to construction and will designate soil erosion and sedimentation control and management methods and temporary soil storage locations. Disturbed groundcover will be re-stabilized as soon as practical after construction activities cease in accordance with the Vegetation Management Plan.

7.8.3.2 Mitigation

Because long term impacts to soils are not anticipated, mitigation is not proposed.

7.9 UNAVOIDABLE IMPACTS

The design, construction, and operation of the Proposed Route will use the procedures and process described in this Application to specifically mitigate potential impacts. Minimal impacts from construction activities are unavoidable and could include short-term traffic delays, soil compaction and erosion, vegetative clearing, wetland conversion, visual impacts, habitat loss, warming of the trout stream, disturbance and displacement of wildlife, and loss of land use for other purposes. Nominal impacts include conversion of forested land to cleared right-of-way, wetland fill impacts, visual impacts, and seasonal maintenance of tall growing vegetation.

The Project will require only minimal commitments of resources that are irreversible and irretrievable. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources have on future generations. 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.

Those commitments that do exist are primarily related to construction. Construction resources include aggregate resources, concrete, steel, and hydrocarbon fuel. Concrete and steel at the existing facility will be recycled to the greatest extent practicable in the event existing foundations are removed. During construction, vehicles necessary for these activities would be deployed on site and would need to travel to and from the construction area, consuming hydrocarbon fuels. Other resources would be used in structure construction, structure placement, and other construction activities.

8.0 AGENCY, TRIBAL, AND PUBLIC OUTREACH

8.1 AGENCY AND TRIBAL OUTREACH

As part of the pre-application process, Minnesota Power initiated outreach to federal, tribal, state, and local agencies through in-person meetings and project notification letters. Appendix J provides copies of correspondence and meeting notes from discussions with agency representatives.

In November 2022, Minnesota Power attended meetings with local government agencies to provide preliminary project details and a timeline of major milestones. Minnesota Power also requested input with respect to the resources under their jurisdiction as well as the identification of federal and state permits and/or approvals that may be required for the Project.

In November 2022, Minnesota Power met with the Fond du Lac Band of Lake Superior Chippewa to review the Project and request input with respect to resources of interest that may be located within and near the Project Study Area.

On November 30, 2022, Minnesota Power sent a letter to each local government unit (“LGU”) within which the Proposed Route is located, as required by Minn. Stat. § 216E.03, subd. 3a. A copy of the letter and affidavit of mailing is available in Appendix F.

In December 2022, Minnesota Power mailed Project introduction letters with maps of the Project Study Area to federal, tribal, state, and local agencies whose constituents may have an interest in the proposed Project. The letter introduced the Project and requested agency input regarding public and environmental resources that may be located within the Project Study Area, or resources that could potentially be affected by the proposed Project.

A summary of communications with tribes and public agencies is included below. Minnesota Power will continue to meet with federal, tribal, state, and local agencies as the Project moves forward. Table 8.1-1 identifies agencies that were contacted through meetings or a notification email outside of the public outreach outlined in Section 8.2 and the date that the consultation was conducted.

Table 8.1-1 – Agency and Tribal Contacts

Tribe or Agency	Date and Type of Communication
U.S. Fish and Wildlife Service	December 16, 2022, Introduction letter
U.S. Army Corps of Engineers	December 16, 2022, Introduction letter
U.S. Department of Agriculture – Natural Resources Conservation Services	December 16, 2022, Introduction letter
Fond du Lac Band of Lake Superior Chippewa	November 17, 2022, In-person meeting
Tribal Historic Preservation Offices and Tribal Government Contacts	December 22, 2022
MN Dept. of Commerce – Energy Environmental Review and Analysis	November 21, 2022, conference call; December 16, 2022, Introduction letter
MN Public Utilities Commission Staff	November 21, 2022, conference call; December 16, 2022, Introduction letter
Minnesota Department of Natural Resources – Ecological Services	December 16, 2022, Introduction letter
Minnesota Department of Natural Resources – Lands and Minerals	December 16, 2022, Introduction letter
Minnesota Department of Natural Resources – Parks and Trails	December 16, 2022, Introduction letter
Minnesota Department of Agriculture	December 16, 2022, Introduction letter
Minnesota Pollution Control Agency	December 16, 2022, Introduction letter
Minnesota State Historic Preservation Office	December 16, 2022, Introduction letter
Minnesota State Historic Preservation Office	December 16, 2022, Introduction letter
NRCS – Duluth Service Center	December 16, 2022, Introduction letter
St. Louis County	November 30, 2022, local government unit (LGU) Notice Letter
City of Hermantown	November 9, 2022, In-person meeting; Nov. 30, 2022, LGU Notice Letter;
Solway Township	November 15, 2022, In-person meeting; Nov. 30, 2022, LGU Notice Letter;
South St. Louis Soil and Water Conservation District	December 16, 2022, Introduction letter
State Legislators (Natalie Zeleznikar, Grant Hauschild, Pete Stauber)	November 30, 2022, LGU Notice Letter;
Federal Legislators (Amy Klobuchar, Tina Smith)	November 30, 2022, LGU Notice Letter;

8.1.1 Federal Agencies

8.1.1.1 U.S Army Corps of Engineers

The USACE will be consulted regarding potential impacts to Waters of the United States as the Project's design becomes better defined in relation to the delineated features identified during field surveys in 2022 and 2023.

8.1.1.2 U.S. Fish and Wildlife Service

The USFWS will be consulted regarding potential impacts to federally listed species as the Project's design becomes better defined.

8.1.2 Tribal Nations

8.1.2.1 Fond du Lac Band of Lake Superior Chippewa

Minnesota Power met with the FDL THPO Evan Schroeder on November 17, 2022. The Project was introduced with a summary of the proposed activities and timeline. FDL stated there was the potential for a historic trail in the southwest corner of the Project Study Area and had some general project questions.

8.1.3 State Agencies

8.1.3.1 Minnesota Department of Commerce – Energy Environmental Review and Analysis and Minnesota Public Utilities Commission Staff

Minnesota Power held an informational conference call with staff members from the DOC EERA and the Commission on November 21, 2022. Minnesota Power provided an overview of the proposed Project, Project need, Project scope, the anticipated schedule for submitting a combined Certificate of Need and Route Permit application, and the Project construction and completion schedule. Additionally, Minnesota Power provided more detail on the bidirectional capabilities for the HVDC Line as a result of the HVDC Modernization Project and that Minnesota Power would be seeking one Route Permit for the combined Project facilities.

8.1.3.2 Minnesota Department of Natural Resources

The MnDNR participates in the Commission review process, MCE concurrence, and PWI crossings. These discussions included the following:

- On behalf of Minnesota Power, Merjent submitted a formal Natural Heritage Review Request (2022-0070) on November 11, 2022 (see Appendix J) through the MnDNR's MCE.
- On behalf of Minnesota Power, Merjent submitted introduction letters December 16, 2023.

8.1.4 Local Government Units

8.1.4.1 City of Hermantown

Minnesota Power met with John Mulder, the City Administrator of the City of Hermantown on November 9, 2022. Minnesota Power provided an overview of the proposed Project and a summary of the proposed activities and timeline. The City had some general Project layout and land acquisition questions.

8.1.4.2 Solway Township

Minnesota Power met with the Solway Town Board Chair, Town Supervisors, Town Clerk, and Town Treasurer on November 15, 2022. Minnesota Power provided an overview of the proposed Project and a summary of the proposed activities and timeline. The Township had some general Project layout and noise questions.

8.2 PUBLIC OUTREACH

8.2.1 Open Houses

On November 22, 2022, Minnesota Power hosted an open house at Midway Township Town Hall. Landowners located within 0.25 mile of the Project Study Area received a mailer inviting them to the open house. See Appendix K for open house materials. Staff from Minnesota Power were on hand to describe the proposed Project and answer questions from attendees.

On January 11, 2023 and April 19, 2023, Minnesota Power hosted open houses at the Solway Township Town Hall. Landowners within Solway Township received a mailer inviting them to the open house. See Appendix K for open house materials. Staff from Minnesota Power were on hand to describe the proposed Project and answer questions from attendees.

8.2.2 Key Communication Channels

Additional information about the Project can be found on the Company's website at: https://www.mnpower.com/Company/Transmission.

9.0 REQUIRED PERMITS, APPROVALS, AND CONSULTATIONS

The North Dakota HVDC Terminal Modernization will require a Certificate of Corridor Compatibility and Route Permit from the North Dakota Public Service Commission ("ND PSC"). In addition, the project will require a National Pollutant Discharge Elimination System permit from the North Dakota Department of Health ("ND DOH") prior to beginning construction. These permits will be obtained by Minnesota Power through separate ND PSC and ND DOH permitting processes.

The Minnesota HVDC Modernization Project will require a Certificate of Need and Route Permit from the Commission as well as several other permits from state and federal agencies and LGUs to construct the Project. These permits are dependent on the final route selected and construction conditions. A list of the local, state, and federal permits that may be required for this Project is provided in Table 9.0-1.

Table 9.0-1 – Minnesota Permit and Approval List

Permit, Approval, or Consultation	Administering Agency
Local Approvals	
Road Crossing/Right-of-Way (Utility) Permit	St. Louis County
Oversize/Overweight Permit	St. Louis County
Driveway/Access Permits	St. Louis County, City of Hermantown
Land Alteration Permit	St. Louis County
Wetlands Permits	St. Louis County, City of Hermantown
Minnesota State Approvals	
Endangered Species Consultation	MnDNR – Ecological and Water Resources Division

Permit, Approval, or Consultation	Administering Agency
Licenses to Cross Public Waters	MnDNR – Lands and Minerals Regional Operations
National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit	Minnesota Pollution Control Agency (MPCA)
Section 401 Clean Water Act (CWA) Water Quality Certification	MPCA
Wetland Conservation Act (WCA) Wetland Replacement Plan	Board of Water and Soil Resources, Soil and Water Conservation District
Minn. Stat. Ch. 138 (Minnesota Field Archaeology Act and Minnesota Historic Sites Act)	Minnesota SHPO, Office of State Archaeologist, and Minnesota Indian Affairs Council
Oversize and/or Overweight Permit	MnDOT
Federal Approvals	
Section 404 of the CWA Discharge of Dredged or Fill Material in Waters of the U.S. Permit	United States Army Corps of Engineers (USACE)
Spill Prevention, Control, and Countermeasures Plan	US Environmental Protection Agency (EPA)
Endangered Species Act Consultation	United States Fish and Wildlife Service
Section 106 of National Historic Preservation Act Consultation	USACE, Minnesota SHPO
Part 7460 Airport Obstruction Evaluation	Federal Aviation Administration (FAA)
Other Approvals	
Crossing Permits/Agreements/Approvals	Other utilities such as pipelines, railroads

9.1 LOCAL APPROVALS

After the Commission approves a route and any appropriate design engineering is completed, the Applicant will work with LGUs to obtain any of the above approvals if necessary. In accordance with Minn. Stat. § 216E.10, subd. 1, after the Commission approves a route, local zoning, building, and land use regulations are preempted. Minnesota Power will work with LGUs to obtain the necessary permits in the required timeframe for Project construction.

Permits required in Solway Township, such as driveway permits, are obtained through the St. Louis County permitting authorities.

9.1.1 Road Crossing/Right of Way Permits

St. Louis County, Zoning Ordinance No. 62, outlines requirements for setbacks from utilities and roads. Permits may be required to cross or occupy county or city road right-of-way. Minnesota Power and its contractors will work with St. Louis County should a road right-of-way need to be crossed or occupied once the Commission approves a route for the Project and more detailed transmission engineering is completed.

9.1.2 Oversize/Overweight Load Permits

St. Louis County, Ordinance No. 13 is an ordinance relating to seasonal and other weight and load restrictions on all highways under the jurisdiction of St. Louis County. The Oversize/Overweight permit allows for truck/trailer/load combinations that exceed the maximum dimensions and weight specified in state law to operate on county roads. Minnesota Power and its contractors will work with St. Louis County should oversize/overweight load permits be required for the construction of the Project.

9.1.3 Driveway/Access Permits

In accordance with St. Louis County, Zoning Ordinance No. 62 and City of Hermantown Ordinance, Chapter 10, authorization for driveway or private road access to any parcel or lot from any public roadway shall be obtained from the appropriate road authority. These permits may be required to construct access roads or driveways from county or city roadways. Minnesota Power and its contractors will work with St. Louis County or the City of Hermantown should an access road or driveway be needed from a county or city roadway.

9.1.4 Erosion Control and Fill Permit

Construction stormwater and erosion control for the Project is regulated by the MPCA and is discussed further in Section 9.2.3.

9.1.5 Land Alteration Permit

In accordance with St. Louis County, Zoning Ordinance No 62, land alteration permits are required for filling, grading, or excavating on shoreland. Construction of the Project is not expected to require a land alteration permit. However, if such a permit is required, Minnesota Power will obtain any required permits from St. Louis County once the Commission approves a route for the Project and more detailed engineering is available.

9.1.6 Wetlands Permits

Wetland permits may be required for construction or alteration within wetland areas. St. Louis County Zoning Ordinance No 62 states that the County Planning and Community Development Department is responsible for administration and enforcement of the Minnesota Wetland Conservation Act ("WCA") in accordance with Minn. R. ch. 8420 outside the municipalities. In accordance with City of Hermantown Zoning Code, Chapter 21, the City of Hermantown enforces and administers the WCA with respect to property located within the City. WCA permitting requirements are further outlined in Section 9.2.5.

9.2 STATE APPROVALS

9.2.1 Endangered Species Consultation

The MnDNR Natural Heritage and Nongame Research Program collects, manages, and interprets information about nongame species. Merjent, on behalf of Minnesota Power, submitted a formal Natural Heritage Review Request 2022-0070) on November 11, 2022 (see Appendix J) through the MnDNR's MCE. An automated response provided by the MnDNR on November 11, 2022, indicated that no state-listed endangered or threatened species have been documented within the vicinity of the Project (see Appendix J).

9.2.2 License to Cross Public Waters

The MnDNR 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, because the proposed parallel 230 kV transmission lines would cross a MnDNR Public Water. The Applicant will work with the MnDNR to obtain the license once sufficient engineering work is completed to support the MnDNR application process.

9.2.3 NPDES Permit

Minnesota's construction stormwater permit is an extension of the NPDES Stormwater Program, which is part of the Federal Clean Water Act. MPCA administers this federal program as well as the related State Disposal System ("SDS") permit program. The state's combined NPDES/SDS construction stormwater permit fulfills federal and state requirements by requiring permittees to control runoff. In accordance with Minnesota Administrative Rules, Chapter 7090, an NPDES permit from the MPCA is required for stormwater discharges associated with construction activities disturbing one or more acres of land. A requirement of the permit is to develop and implement a Stormwater Pollution Prevention Plan ("SWPPP"), which includes BMPs to minimize discharge of pollutants into Waters of the U.S. Construction of the Project will disturb more than one acre of land. Minnesota Power will develop a comprehensive SWPPP for the Project and obtain any required permits from the MPCA, and associated permits from the City of Hermantown and St. Louis County once the Commission approves a route for the Project. The Project does not meet the definition of an industrial facility, nor expect activities defined as "Industrial Activities" per the NPDES Stormwater Program, therefore, no Industrial Stormwater permit will be required.

9.2.4 Section 401 Water Quality Certification

A Section 401 Water Quality Certification ("WQC") under the federal CWA is necessary to obtain a federal permit for a project that could result in a discharge to navigable waters. A Section 401 WQC is a part of the Section 404 process and would be obtained with the joint applications for WCA and the Section 404 permit. While the CWA is a federal statue, the MPCA has delegated authority under the Act to administer the Section 401 WQC process in Minnesota.

9.2.5 Wetland Conservation Act

The Minnesota Board of Water and Soil Resources administers the state WCA, under Minn. R. ch. 8420. In accordance with these rules, A Federal Approval Exemption for Utilities ("Exemption") is available and states that a replacement plan is not required for wetland impacts resulting from the construction, maintenance, or repair of utility lines and associated facilities when certain conditions are met. The proposed Project may require federal approval for anticipated permanent and temporary impacts to wetlands from Project construction. If approval is required and the Applicant applies for USACE permits (a joint application with the Section 404 permit) or for a USACE non-reporting general permit, the Project may meet the conditions of the Exemption. The use of the Exemption will be evaluated, if applicable once more detailed transmission engineering and design is completed.

If the Federal Approval Exemption does not apply to the Project and if a Wetland Replacement Plan is required under WCA, the Local Governmental Units will oversee the process as described in Section 9.1.6 above.

9.2.6 Minnesota Field Archaeology Act (MS 138.31-.42) and Minnesota Historic Sites Act (MS 138.661-138.669)

These statutes direct state agencies to coordinate with the Minnesota Historical Society ("MHS"), the SHPO (housed under the Department of Administration), and the OSA to consider effects to significant historic and archaeological resources and establish measures to avoid, reduce or mitigate adverse impacts, when considering an administrative action such as the approval of a Certificate of Need and Route Permit from the Commission. The Applicant will coordinate with the SHPO and OSA to develop a record of the conventional archaeological survey and each agency's review. The Applicant will provide this same record to facilitate federal agency permit review under Section 106 of the National Historic Preservation Act (such as USACE Section 404 CWA Permit, if required).

9.2.7 Oversize and/or Overweight Permit

In accordance with Minnesota Commercial Truck and Passenger Regulations, Section 05, an Oversize and/or Overweight permit is required by MnDOT when a vehicle is transporting an oversize/overweight load on Minnesota trunk highways. If the Project requires the transport of oversize or overweight loads, the Applicant and its contractors will work with MnDOT to obtain any required permits.

9.3 FEDERAL APPROVALS

9.3.1 Section 404 CWA Permit

A Section 404 permit is required from the USACE under the federal CWA for discharges of dredged or fill material into waters of the United States. Once the Commission approves a final route and a more detailed design of the substation construction and transmission line is completed, the Applicant will determine if impacts exceed the permitting threshold. If impacts exceed the permitting threshold, the Applicant will apply for any required permits.

9.3.2 Spill Prevention, Control and Countermeasure Plan

A non-transportation related facility is subject to Spill Prevention, Control and Countermeasure Plan ("SPCC") regulations if the total aboveground storage capacity exceeds 1,320 gallons or the underground oil storage capacity exceeds 42,000 gallons and the facility could reasonably expect to discharge oil into or upon the navigable waters of the United States. SPCC plans are prepared and implemented according to EPA regulations Title 40, Code of Federal Regulations, Part 112. Minnesota Power's new substation and HVDC Converter Station are anticipated to have a total aboveground oil storage capacity of over 1,320 gallons; therefore, SPCC regulations apply, and an SPCC plan will be developed for the project before oil-filled equipment is brought onsite.

9.3.3 Endangered Species Act Consultation

Minnesota Power reviewed the USFWS IPaC website for a list of federally threatened and endangered species, candidate species, and designated critical habitat that may be present within the Project Study Area (see Section 7.7). The Applicant will work with the USFWS regarding Project-specific construction considerations after the Commission approves a route for the Project, and the mechanism for consultation will be based on whether there is a federal nexus. The Applicant will work with the USFWS to comply with the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act, to identify any areas that may require marking transmission line shield wires, and/or to use alternate structures to reduce the likelihood of avian collisions and electrocution to the extent practical.

9.3.4 Part 7460 Airport Obstruction Evaluation

A Federal Aviation Administration ("FAA") notice and approval is required for structures 200 feet above ground level or those that may exceed an imaginary surface extending outward and upward at certain slopes from nearby airports as defined in the Code of Federal Regulations Chapter 77.9. Form 7460-1 shall be submitted to the FAA for notice of construction at least 45 days before the start date of proposed construction. The FAA Notice Criteria Tool screens Project structures for proximity to airports and slope ratio to assist in determination of exceedances requiring filing of Notice to FAA. If notice is required, following construction completion, as built information will be submitted using Form 7460-2.

10.0 APPLICATION OF RULE CRITERIA

10.1 CERTIFICATE OF NEED CRITERIA

Pursuant to Minn. Stat. § 216B.243, the Commission has established criteria under Minnesota Rule 7849.0120 that it will apply to determine whether an applicant has established that a new proposed high voltage transmission line is needed and shall be granted a Certificate of Need. Minnesota Power has described in this application the reasons why the Commission should grant a Certificate of Need to build the Project, which includes: (1) denial of the HVDC Modernization Project would result in an increase in outages of the HVDC system that is critical to connecting renewable resources from North Dakota to Minnesota customers; (2) there is no reasonable and prudent alternative to the HVDC Modernization Project; and (3) the Project is important to achieving the state's goals of ensuring 100 percent of the electricity consumed in Minnesota is carbon free by 2040. Those reasons are summarized here.

10.1.1 Denial would Adversely Affect the Energy Supply

Denial of a Certificate of Need for the Project would adversely affect the future adequacy, reliability, or efficiency of energy supply to Minnesota Power and its customers in the region, which includes a unique mix of industrial customers vital to Minnesota and the regional economy. As detailed in Chapters 2.0 and 3.0, the existing HVDC Converter Station is reaching the end of its anticipated operational life and many of the original equipment is falling into obsolescence with replacement or refurbished parts no longer readily available in the event of failure. The HVDC Modernization Project includes the construction of major transmission and system upgrades that will enhance reliability and provide the continued operation of an important renewable resource connection between Minnesota and North Dakota.

10.1.2 No Reasonable and Prudent Project Alternative

As discussed in Chapter 4.0, a more reasonable and prudent alternative was not demonstrated by the work study and analysis conducted by Minnesota Power. Minnesota Power evaluated multiple Project alternatives including: 1) size alternatives (different voltages or conductor arrays, AC/DC, and double-circuit); 2) generation alternatives; and 3) no build alternatives. After evaluating these alternatives, Minnesota Power concluded that none of these alternatives is a more reasonable and prudent alternative to the proposed Project.

10.1.3 Project will Provide Benefits to Society in a Manner Compatible with Protecting the Environment

The Project is needed to provide transmission reliability and grid strength and stability solutions to accommodate a transition away from coal-fired baseload generation to increasingly lower-carbon and renewable sources of energy, which lowers emissions and benefits the environment. The Project will also benefit Minnesota Power customers by modernizing aged infrastructure that is experiencing increasing operational concerns and ensuring an adequate power supply for years to come. In addition, consistent with the Commission's routing criteria, the proposed Project will be sited in a manner compatible with protecting the natural and socioeconomic environment.

10.1.4 Project will Comply with all Applicable Requirements

Minnesota Power has identified the other permits and approvals that may be required for the Project in Chapter 9.0. Minnesota Power has demonstrated that it will comply with all applicable requirements and obtain all necessary permits.

10.2 ROUTE PERMIT FACTORS

According to Minn. Stat. § 216E.02, subd. 1, it is the policy of the state of Minnesota to locate high voltage transmission lines in an orderly manner that minimizes adverse human and environmental impacts and ensures continuing electric power system reliability and integrity. Under Minn. R. 7850.4000, the Commission's rules require that applicants for route permits meet applicable standards and factors under Minn. Stat. §§ 216E.03 and 216E.04, and under other Minnesota law and Commission rules. The Commission shall issue a route permit for a high voltage transmission line that is consistent with state goals to conserve resources, minimize environmental impacts and impacts to human settlement, minimize land use conflicts, and ensure the state's electric energy security through efficient, cost-effective transmission infrastructure.

The Proposed Route for the Project meets these factors by utilizing land owned in fee by Minnesota Power to the extent possible, collocating adjacent to the existing Arrowhead Station to minimize the amount of new transmission, consolidates transmission corridors to reduce impacts to established residences, and upgrading existing transmission infrastructure.

10.3 CONCLUSION AND REQUEST FOR COMMISSION APPROVAL

For all the reasons set forth in this Application and as supported by the Appendices hereto, Minnesota Power respectfully requests that the Commission issue a Certificate of Need and Route Permit authorizing construction of the Project.

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Appendix A

Certificate of Need Checklist

HVDC Upgrade Project
Certificate of Need Application
Completeness Checklist

Authority	Required Information	Location in Application
Minn. R. 7829.2500, Subp. 2	Brief summary of filing on separate page sufficient to apprise potentially interested parties of its nature and general content	Filing Summary
Minn. R. 7849.0200, Subp. 2	Title Page and Table of Contents	Title Page and Table of Contents
Minn. R. 7849.0200, Subp. 4	Cover Letter	Cover Letter
Minn. R. 7849.0220, Subp. 3	Joint Ownership and Multiparty use	N/A
Minn. R. 7849.0240	Need summary and additional considerations	
Subp. 1	Summary of the major factors that justify the need for the proposed facility	§§ 1.2, 3.1., 3.2, 3.3, 3.4
Subp. 2	Relationship of the proposed facility to the following socioeconomic considerations:	—
A.	Socially beneficial uses of the output of the facility	§ 3.11
B.	Promotional activities that may have given rise to the demand for the facility	§ 3.9
C.	Effects of the facility in inducing future development	§ 3.10
Minn. R. 7849.0260	Proposed LHVTL and Alternatives	—
A.	A description of the type and general location of the proposed line, including:	—
(1)	Design voltage	§ 2.1
(2)	Number, sizes and types of conductors	§ 2.1

Authority	Required Information	Location in Application
(3)	Expected losses under projected maximum loading and under projected average loading in the length of the line and at terminals or substations	§ 3.7
(4)	Approximate length of the proposed line	§ 2.1
(5)	Approximate locations of DC terminals or AC substations on a map	§ 2.1, Appendix L
(6)	List of likely affected counties	§ 7.2
B.	Discussion of the available alternatives including:	—
(1)	New generation	§ 4.2
(2)	Upgrading existing transmission lines	§ 4.4
(3)	Transmission lines with different voltages or conductor arrays	§§ 4.3, 4.7
(4)	Transmission lines with different terminals or substations	§ 4.5
(5)	Double circuiting of existing transmission lines	§ 4.6
(6)	If facility for DC (AC) transmission, an AC (DC) transmission line	§ 4.8
(7)	If proposed facility is for overhead (underground) transmission, an underground (overhead) transmission line	§ 4.10
(8)	Any reasonable combination of alternatives (1) – (7)	Chapter 4
C.	For the facility and for each alternative in B, a discussion of:	—
(1)	Total cost in current dollars	§ 2.2.1 and Chapter 4

Authority	Required Information	Location in Application
(2)	Service life	§ 6.4 and Chapter 4
(3)	Estimated average annual availability	§ 2.2.4 and Chapter 4
(4)	Estimated annual O&M costs in current dollars	§ 2.2.2 and Chapter 4
(5)	Estimate of its effect on rates system wide and in Minnesota	§ 2.2.3 and Chapter 4
(6)	Efficiency expressed for a transmission facility as the estimated losses under projected maximum loading and under projected average loading in the length of the transmission line and at the terminals or substations	§ 3.7 and Chapter 4
(7)	Major assumptions made in subitems (1) – (6)	Chapters 2, 3, and 4
D.	A map (of appropriate scale) showing the applicant's system or load center to be served by the proposed LHVTL	§1.1
E.	Such other information about the proposed facility and each alternative as may be relevant to determination of need.	Chapter 4
Minn. R. 7849.0270	Content of Forecast	—
Minn. R. 7849.0270, Subp. 1	Peak demand and annual consumption data within the applicant's service area and system	EXEMPT provided alternative data is supplied
	ALTERNATIVE DATA –Minnesota Power's most recent Annual Electric Utility Forecast Report	§ 3.6, Appendix N
Minn. R. 7849.0270, Subp. 2	Minnesota forecast data; forecast demand data by customer class, peak period, and month; estimated system annual revenue per kilowatt hour; estimated average weekday system load factor by month.	EXEMPT except as noted below and provided alternative data is supplied

Authority	Required Information	Location in Application
	ALTERNATIVE DATA –Minnesota Power's most recent Annual Electric Utility Forecast Report	§ 3.6, Appendix N
	Subp. 2 (E) – Alternative explanation of how wholesale electricity costs are spread and general financial effect on Minnesota Power customers.	§ 2.2.3
Minn. R. 7849.0270, Subp. 3	Detail of the forecast methodology used in subp. 2.	EXEMPT provided alternative data is supplied
Minn. R. 7849.0270, Subp. 4	Discussion of database used in current forecasting.	EXEMPT provided alternative data is supplied
Minn. R. 7849.0270, Subp. 5	Discussion of each essential assumption made in forecast preparation and sensitivity to variations in assumptions.	EXEMPT provided alternative data is supplied
Minn. R. 7849.0270, Subp. 6	Coordination of forecasts.	EXEMPT provided alternative data is supplied
	ALTERNATIVE DATA FOR SUBPS. 3-6 – Minnesota Power's most recent Annual Electric Utility Forecast Report	§ 3.6, Appendix N
Minn. R. 7849.0280	System Capacity	—
	Description of ability of existing system to meet demand forecast including:	—
A.	Power planning programs	Appendix N and Appendix O
B.	Seasonal firm purchases and sales	EXEMPT
C.	Seasonal participation purchases and sales	EXEMPT
D.	Load and generation capacity data requested in subitems 1-13 for summer and winter seasons for each forecast year, including anticipated purchases, sales, and capacity retirements and additions except those that depend on a not yet issued certificate of need.	EXEMPT

Authority	Required Information	Location in Application
E.	Summer and winter season load generation and capacity in years subsequent to application contingent on proposed facility	EXEMPT
F.	Summer and winter season load generation and capacity including all projected purchases, sales and generation in years subsequent to application	EXEMPT
G.	List of proposed additions and retirements in generating capacity for each forecast year subsequent to application	EXEMPT
H.	Graph of monthly adjusted net demand and capability with difference between capability and maintenance outages plotted	EXEMPT
I.	Appropriateness and method of determining system reserve margins	EXEMPT
Minn. R. 7849.0290	Conservation Programs	—
A.	Persons responsible for energy conservation and efficiency programs	EXEMPT provided alternative data is supplied
B.	List of energy conservation and efficiency goals and objectives	EXEMPT provided alternative data is supplied
C.	Description of programs considered, implemented and rejected	EXEMPT provided alternative data is supplied
D.	Description of major accomplishments in conservation and efficiency	EXEMPT provided alternative data is supplied
E.	Description of future plans with respect to conservation and efficiency	EXEMPT provided alternative data is supplied
F.	Quantification of the manner by which these programs impact the forecast	EXEMPT provided alternative data is supplied
	ALTERNATIVE DATA FOR A-F – Minnesota Power will provide a summary of its 2021 Integrated Resource Plan and Conservation Improvement Program filings.	Appendix O
Minn. R. 7849.0300	Consequence of Delay	EXEMPT from three levels of demand
Minn. R. 7849.0310	Required Environmental Information	

Authority	Required Information	Location in Application
Minn. R. 7849.0330	Transmission Facilities	—
	Data for each alternative that would require LHVTL construction including:	—
A.	For overhead transmission lines	—
(1)	Schematics showing dimensions of support structures	§ 2.1, Appendix M
(2)	Discussion of electric fields	§ 6.5
(3)	Discussion of ozone and nitrogen oxide emissions	§§ 6.5, 7.5
(4)	Discussion of radio and television interference	§ 6.5
(5)	Discussion of audible noise	§ 7.2
B.	For underground transmission facilities:	N/A
(1)	Types and dimensions of cable systems	N/A
(2)	Types and qualities of cable system materials	N/A
(3)	Heat released in kW per foot of cable	N/A
C.	Estimated right-of-way required for the facility	§ 6.1
D.	Description of construction practices	§ 6.2
E.	Description of O&M practices	§ 6.4
F.	Estimated workforce required for construction and O&M	§§ 6.2, 6.4

Authority	Required Information	Location in Application
G.	Description of region between endpoints in likely area for routes emphasizing a three mile radius of endpoints including:	—
(1)	Hydrological features	§§ 7.1, 7.5
(2)	Vegetation and wildlife	§§ 7.1, 7.5
(3)	Physiographic regions	§§ 7.1, 7.5, 7.6
(4)	Land use types	§ 7.6
Minn. R. 7849.0340	No-Facility Alternative	EXEMPT from three levels of demand

Appendix B

Route Permit Checklist

HVDC Modernization Project
Route Permit Application (Alternative Review)
Completeness Checklist

Authority	Required Information	Location in Application
Minn. Stat. § 216E.04, subds. 2(3), 2(4); H.F. No. 7 (2023) Minn. R. 7850.2800, subp. 1(C), 1(D)	**Alternative Review of Applications.** Alternative review is available for **high voltage transmission lines of between 100 and 200 kV and for high voltage transmission lines in excess of 200 kV and less than 30 miles in length.**	§ 2.1
Minn. Stat. § 216E.04, subd. 4	**Notice of application.** Upon submission of an application under this section, the applicant shall provide the same notice as required by section 216E.03, subdivision 4.	To be provided
Minn. R. 7850.2800, subp. 2	**Notice to PUC.** An applicant for a permit for one of the qualifying projects in subpart 1, who intends to follow the procedures of parts 7850.2800 to 7850.3700, shall notify the PUC of such intent, in writing, at least ten days before submitting an application for the project.	Appendix G
Minn. R. 7850.3100	**Contents of Application (Alternative Review).** The applicant shall include in the application the same information required in part 7850.1900, except the applicant need not propose any alternative sites or routes to the preferred site or route. If the applicant has rejected alternative sites or routes, the applicant shall include in the application the identity of the rejected sites or routes and an explanation of the reasons for rejecting them.	No alternative sites or routes were considered and rejected for the Project.
Minn. R. 7850.1900, subp. 2	**Route permit for HVTL.** An application for a route permit for a high voltage transmission line shall contain the following information:	
	A. a statement of proposed ownership of the facility at the time of filing the application and after commercial operation;	§ 1.1
	B. the precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the permit may be transferred if transfer of the permit is contemplated;	§ 1.1

Authority	Required Information	Location in Application
	C. at least two proposed routes for the proposed high voltage transmission line and identification of the applicant's preferred route and the reasons for the preference;	Not required by Minn. R. 7850.3100.
	D. a description of the proposed high voltage transmission line and all associated facilities including the size and type of the high voltage transmission line;	§ 2.1
	E. the environmental information required under subpart 3;	Chapter 7
	F. identification of land uses and environmental conditions along the proposed routes;	§§ 7.1, 7.6
	G. the names of each owner whose property is within any of the proposed routes for the high voltage transmission line;	Appendix Q, Map 2
	H. United States Geological Survey topographical maps or other maps acceptable to the commission showing the entire length of the high voltage transmission line on all proposed routes;	Appendix L, Map 11a
	I. identification of existing utility and public rights-of-way along or parallel to the proposed routes that have the potential to share the right-of-way with the proposed line;	§§ 5.1, 5.2, 5.3, 6.1
	J. the engineering and operational design concepts for the proposed high voltage transmission line, including information on the electric and magnetic fields of the transmission line;	§§ 2.1, 6.5
	K. cost analysis of each route, including the costs of constructing, operating, and maintaining the high voltage transmission line that are dependent on design and route;	§ 2.2
	L. a description of possible design options to accommodate expansion of the high voltage transmission line in the future;	§ 2.1
	M. the procedures and practices proposed for the acquisition and restoration of the right-of-way, construction, and maintenance of the high voltage transmission line;	§§ 6.1, 6.2, 6.3, 6.4
	N. a listing and brief description of federal, state, and local permits that may be required for the proposed high voltage transmission line; and	Chapter 9

Authority	Required Information	Location in Application
	O. a copy of the Certificate of Need or the certified HVTL list containing the proposed high voltage transmission line or documentation that an application for a Certificate of Need has been submitted or is not required.	This Joint Certificate of Need and Route Permit Application
Minn. R. 7850.3100	Identification of rejected route alternatives and explanation for rejection.	No alternative sites or routes were considered and rejected for the Project.
Minn. R. 7850.1900, subp. 3	**Environmental information.** An applicant for a site permit or a route permit shall include in the application the following environmental information for each proposed site or route to aid in the preparation of an environmental impact statement:	
	A. a description of the environmental setting for each site or route;	§ 7.1
	B. a description of the effects of construction and operation of the facility on human settlement, including, but not limited to, public health and safety, displacement, noise, aesthetics, socioeconomic impacts, cultural values, recreation, and public services;	§ 7.2
	C. a description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining;	§ 7.3
	D. a description of the effects of the facility on archaeological and historic resources;	§ 7.4
	E. a description of the effects of the facility on the natural environment, including effects on air and water quality resources and flora and fauna;	§ 7.5
	F. a description of the effects of the facility on rare and unique natural resources;	§ 7.7
	G. identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route; and	Chapter 7
	H. a description of measures that might be implemented to mitigate the potential human and environmental impacts identified in items A to G	Chapter 7

Authority	Required Information	Location in Application
	and the estimated costs of such mitigative measures.	
Minn. R. 7850.3300 Minn. R. 7850.2100, subp. 2	**Notice of Project.** Notification to persons on PUC's general list, to local officials, and to property owners. Content of notice governed by Minn. R. 7850.2100, subp. 3.	To be provided
Minn. R. 7850.2100, subp. 4	**Publication of notice.** Within 15 days after submission of an application, the applicant shall publish notice in a legal newspaper of general circulation in each county in which a site, route, or any alternative is proposed to be located that an application has been submitted and a description of the proposed project. The notice must also state where a copy of the application may be reviewed.	To be published
Minn. R. 7850.2100, subp. 5	**Confirmation of notice.** Within 30 days after providing the requisite notice, the applicant shall submit to the PUC documentation that all notices required under this part have been given. The applicant shall document the giving of the notice by providing the PUC with affidavits of publication or mailing and copies of the notice provided.	Will file once completed
Minn. R. 7850.4100	**Factors Considered.** In determining whether to issue a permit for a large electric power generating plant or a high voltage transmission line, the commission shall consider the following:	
	A. effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services;	§ 7.2
	B. effects on public health and safety;	§ 7.2
	C. effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining;	§ 7.3
	D. effects on archaeological and historic resources;	§ 7.4
	E. effects on the natural environment, including effects on air and water quality resources and flora and fauna;	§ 7.5
	F. effects on rare and unique natural resources;	§ 7.7

Authority	Required Information	Location in Application
	G. application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity;	§ 2.1, Chapter 7
	H. use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries;	§§ 5.1, 5.2, 5.3
	I. use of existing large electric power generating plant sites;	Not applicable
	J. use of existing transportation, pipeline, and electrical transmission systems or rights-of-way;	§§ 5.1, 5.2, 5.3, 6.1
	K. electrical system reliability;	Chapter 3
	L. costs of constructing, operating, and maintaining the facility which are dependent on design and route;	§ 2.2
	M. adverse human and natural environmental effects which cannot be avoided; and	Chapter 7
	N. irreversible and irretrievable commitments of resources.	§ 7.9
Minn. R. 7850.4300, subps. 1, 2	**Wilderness areas.** No high voltage transmission line may be routed through state or national wilderness areas. **Parks and natural areas.** No high voltage transmission line may be routed through state or national parks or state scientific and natural areas unless the transmission line would not materially damage or impair the purpose for which the area was designated and no feasible and prudent alternative exists. Economic considerations alone do not justify use of these areas for a high voltage transmission line.	No wilderness areas or parks are crossed
Minn. Stat. § 216E.03, subd. 7 (applicable per § 216E.04, subd. 8); H.F. No. 7.	**Considerations in designating sites and routes.** (a) The commission's site and route permit determinations must be guided by the state's goals to conserve resources, minimize environmental impacts, minimize human settlement and other land use conflicts, and ensure the state's electric energy security through efficient, cost-effective	

Authority	Required Information	Location in Application
	power supply and electric transmission infrastructure. (b) To facilitate the study, research, evaluation, and designation of sites and routes, the commission shall be guided by, but not limited to, the following considerations:	
	(1) evaluation of research and investigations relating to the effects on land, water and air resources of large electric power generating plants and high-voltage transmission lines and the effects of water and air discharges and electric and magnetic fields resulting from such facilities on public health and welfare, vegetation, animals, materials and aesthetic values, including baseline studies, predictive modeling, and evaluation of new or improved methods for minimizing adverse impacts of water and air discharges and other matters pertaining to the effects of power plants on the water and air environment;	Chapter 7
	(2) environmental evaluation of sites and routes proposed for future development and expansion and their relationship to the land, water, air and human resources of the state;	§ 2.1, Chapter 7
	(3) evaluation of the effects of new electric power generation and transmission technologies and systems related to power plants designed to minimize adverse environmental effects;	Not applicable
	(4) evaluation of the potential for beneficial uses of waste energy from proposed large electric power generating plants;	Not applicable
	(5) analysis of the direct and indirect economic impact of proposed sites and routes including, but not limited to, productive agricultural land lost or impaired;	§ 7.3
	(6) evaluation of adverse direct and indirect environmental effects that cannot be avoided should the proposed site and route be accepted;	§ 1.5, Chapter 7
	(7) evaluation of alternatives to the applicant's proposed site or route proposed pursuant to subdivisions 1 and 2;	No alternative sites or routes were considered and

Authority	Required Information	Location in Application
		rejected for the Project.
	(8) evaluation of potential routes that would use or parallel existing railroad and highway rights-of-way;	§§ 5.1, 5.2, 5.3
	(9) evaluation of governmental survey lines and other natural division lines of agricultural land so as to minimize interference with agricultural operations;	§ 5.1
	(10) evaluation of the future needs for additional high-voltage transmission lines in the same general area as any proposed route, and the advisability of ordering the construction of structures capable of expansion in transmission capacity through multiple circuiting or design modifications;	§ 2.1
	(11) evaluation of irreversible and irretrievable commitments of resources should the proposed site or route be approved;	§ 1.5
	(12) when appropriate, consideration of problems raised by other state and federal agencies and local entities;	Chapter 8
	(13) evaluation of the benefits of the proposed facility with respect to (i) the protection and enhancement of environmental quality, and (ii) the reliability of state and regional energy supplies;	Chapters 3 and 7
	(14) evaluation of the proposed facility's impact on socioeconomic factors; and	§§ 6.2, 6.4, 6.5, Chapter 7
	(15) evaluation of the proposed facility's employment and economic impacts in the vicinity of the facility site and throughout Minnesota, including the quantity and quality of construction and permanent jobs and their compensation levels. The commission must consider a facility's local employment and economic impacts, and may reject or place conditions on a site or route permit based on the local employment and economic impacts.	§§ 6.2, 6.4

Appendix C

Applicant's Exemption Request

minnesota power
AN ALLETE COMPANY

30 West Superior Street
Duluth, MN 55802-2093
www.mnpower.com

November 30, 2022

VIA E-FILING

Mr. Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101

Re: *In the Matter of the Application of Minnesota Power for the HVDC Modernization Project*
MPUC Docket No. E015/CN-22-607

Dear Mr. Seuffert:

Minnesota Power respectfully submits this Request for Exemptions from Certain Certificate of Need Application Content Requirements to the Minnesota Public Utilities Commission pursuant to Minnesota Rule 7849.0200, Subp. 6.

If you have any questions regarding this filing, please contact me at (218) 723-3963 or dmoeller@allete.com.

Yours truly,

David R. Moeller

David R. Moeller
Senior Regulatory Counsel

Enclosure
cc: Service List

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

Katie Sieben	Chair
Valerie Means	Commissioner
Matthew Schuerger	Commissioner
Joseph K. Sullivan	Commissioner
John A. Tuma	Commissioner

IN THE MATTER OF THE APPLICATION OF MINNESOTA POWER FOR A CERTIFICATE OF NEED FOR THE HVDC MODERNIZATION PROJECT

MPUC Docket No. E015/CN-22-607

REQUEST FOR EXEMPTIONS FROM CERTAIN CERTIFICATE OF NEED APPLICATION CONTENT REQUIREMENTS

I. INTRODUCTION

Minnesota Power (or the "Company") respectfully submits this request for exemptions from certain content requirements for a Certificate of Need application for the High-Voltage Direct-Current ("HVDC") Modernization Project, (the "HVDC Modernization Project" or "Project"), pursuant to Minn. R. 7849.0200, subp. 6. Minnesota Power intends to file a combined Application for a Certificate of Need and Route Permit for the Project pursuant to Minn. Stat. §§ 216B.243 and 216E.03 in the first quarter of 2023.

The Project involves modernizing and upgrading both HVDC terminals for the 465-mile-long HVDC transmission line ("HVDC Line") and interconnecting the upgraded HVDC terminals to the existing alternating-current ("AC") transmission system. These HVDC terminals are currently located near the Arrowhead Substation in Hermantown, Minnesota and the Center Substation in Center, North Dakota. In order to modernize the HVDC terminals and implement the latest technology, new buildings and electrical infrastructure need to be constructed on a new site near the existing HVDC terminals. In Minnesota, to connect the new HVDC terminal to the existing AC system, the Project would require the construction of a new St Louis County 345 kilovolt ("kV")/230 kV substation located less than one mile west of the current Arrowhead Substation. The new HVDC terminal would be connected to the St Louis County Substation by less than one mile of 345 kV large high-voltage transmission line ("LHVTL")[1] and the new St Louis County Substation would be connected to the existing Arrowhead Substation by two parallel 230 kV LHVTLs less than one mile in length. Additionally, a short portion of the existing ±250 kV HVDC Line

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[1] As defined by Minn. Stat. § 216B.2421, subd. 2(2); Minn. R. 7849.0010, subp. 14. The exemption found in Minn. Stat. 216B.243, subd. 8(a)(4) for "a high-voltage transmission line of one mile or less required to connect a new or upgraded substation to an existing, new, or upgraded high-voltage transmission line" does not apply because the proposed LHVTL in Minnesota is greater than one mile in length.

in Minnesota will need to be reconfigured to terminate at the new HVDC terminal. The Project is currently scheduled to be in service in 2027.

The HVDC Modernization Project is needed to modernize aging HVDC assets, continue to position the transmission grid for clean energy transition, and improve the reliability of the transmission system in Minnesota and North Dakota. The existing HVDC terminal has operated for 45 years, 15 years in excess of its 30-year design life. In recent years Minnesota Power has experienced HVDC terminal outages due to failures in the control system, power electronics, transformers, and other components. Based on experience with other electric system components, the failure rate is expected to increase in both frequency and duration, which is of particular concern for the existing HVDC system because of limited parts availability. The orderly replacement of the HVDC terminal equipment is prudent to ensure continuous efficient delivery (and potential expansion) of Minnesota Power's renewable, carbon-free energy resources into the future.

In addition to the replacement of the existing HVDC terminals, the new HVDC technology implemented for the Project will be designed to provide voltage regulation, frequency response, blackstart capability, and bidirectional power transfer capability; all of which will enable Minnesota Power and the region to continue to support our clean energy transition.

A Certificate of Need is required under Minn. Stat. § 216B.243 before a high voltage transmission line of the voltage and length proposed for the Project is constructed. Minnesota Power believes that certain Certificate of Need application content requirements in Minn. R. Ch. 7849 should be modified to better address the nature of this Project. These rules were broadly drafted to encompass the content requirements for both LHVTLs, like the Project, and large generation facilities. This petition seeks exemptions to those requirements that are not applicable to a transmission line project. The Minnesota Public Utilities Commission ("Commission") has previously allowed similar adjustments for other transmission line projects.[2] Therefore, Minnesota Power respectfully requests that the Commission grant exemptions from certain requirements as provided under Minn. R. 7849.0200, subp. 6. In lieu of some content requirements, Minnesota Power proposes to submit alternative information that it believes will better inform the Commission's decision regarding the need for the Project.

II. BACKGROUND

In early 2010, Minnesota Power finalized its purchase of a 465 mile, ±250 kV HVDC line with HVDC terminals located in Center, North Dakota, and Hermantown, Minnesota. After

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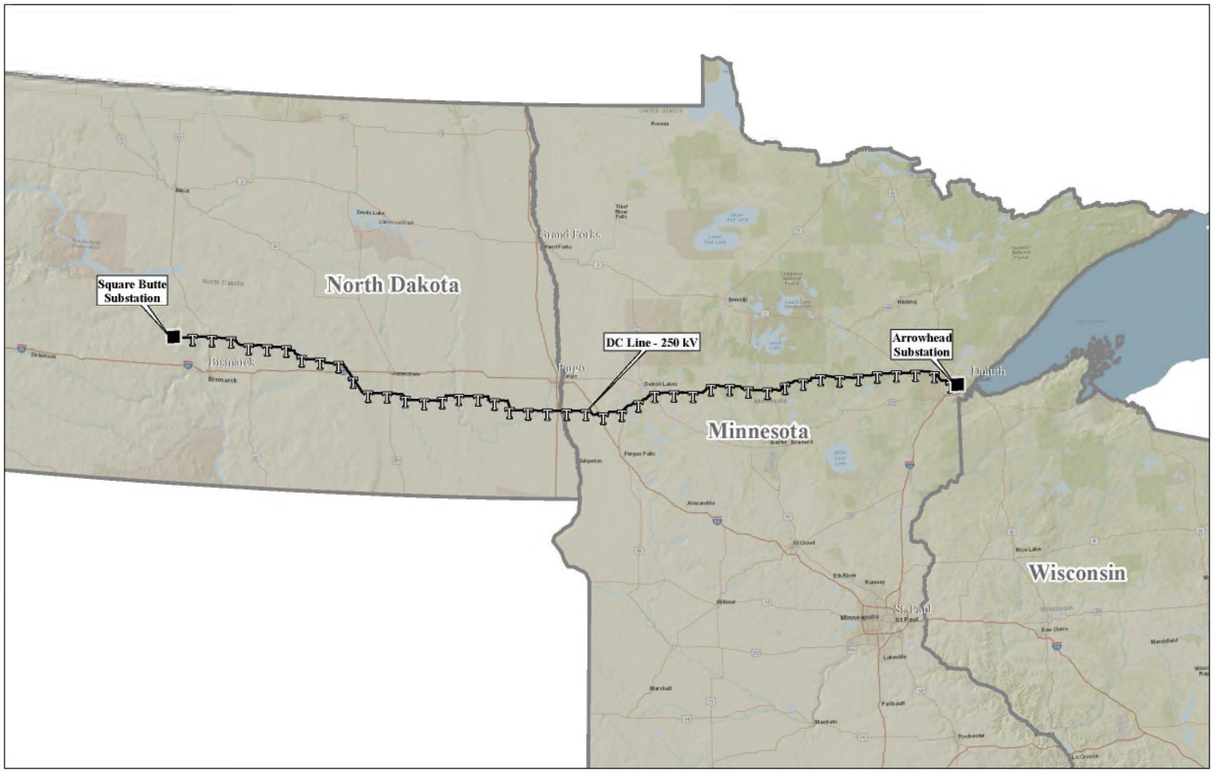
[2] *See In re Application of Minnesota Power for a Certificate of Need for the Duluth Loop Reliability Project in St. Louis Cnty.*, Docket No. E-015/CN-21-140, Order Approving Notice Plan and Granting Variances and Exemptions (May 17, 2021); *In re Request of Minnesota Power for a Certificate of Need for the Great Northern Transmission Line*, Docket No. E-015/CN-12-1163, Order Approving Notice Plan, Granting Variance Request, and Approving Exemption Request (Feb. 28, 2013); *In re Application of Great River Energy and Minnesota Power for a Certificate of Need for a 115 kV High Voltage Transmission Line in St. Louis and Carlton Counties*, Docket No. E-002/CN-10-973, Order Approving Exemptions and Proposed Provision of Alternative Data (Nov. 2, 2010).

a contested case proceeding, the Commission approved the Company's purchase of the HVDC Line from the Square Butte Cooperative, finding the proposed transactions associated with the acquisition to be reasonable, prudent, and in the public interest.[3] This HVDC system is shown in Figure 1.

Figure 1. Existing HVDC Line Path Map



The HVDC Line and its HVDC terminals at the Center and Arrowhead substations were built in the 1970s to bring electricity from the coal-fired Milton R. Young 2 ("Young 2") generating station in Center, North Dakota, directly to Minnesota Power's customers. Minnesota Power's purchase of the HVDC Line in 2010 cleared the way for the line to be repurposed to facilitate the delivery of wind power generated in North Dakota directly to Minnesota Power's customers. Minnesota Power subsequently purchased and developed a portfolio of approximately 600 MW of North Dakota wind that now relies on the HVDC Line for reliable and efficient transmission deliverability. In recent years, Minnesota Power has been evaluating the need for modernization of the HVDC terminals to extend the life and expand the usefulness of the HVDC Line.

The Center and Arrowhead HVDC terminals were originally designed by General Electric ("GE") for a 30 year operating lifetime. They have now been operating reliably for over 45

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[3] *See In re Minnesota Power's Petition to Purchase Square Butte Cooperative's Transmission Assets and for Restructuring Power Purchase Agreements from Milton R. Young Unit 2 Generating Station*, Docket No. E-015/PA-09-526, Order Granting Petition with Conditions (Dec. 21, 2009).

years, 15 years in excess of their original design life. The main components of the HVDC terminals include power electronics (thyristor valves) and their associated cooling system, converter transformers, smoothing reactors, harmonic filters and reactive resources to complete the conversion between AC and direct current ("DC"), as well as the control system that governs the operation of the line. The original vendor, GE, left the HVDC business in the 1980s and in recent years it has been increasingly difficult to procure spare parts for the components of the HVDC terminals as the technology has become obsolete and the original designers are well into retirement. Minnesota Power has researched reverse engineering solutions to this technology issue, but has had limited results and thus spare and replacement parts for the HVDC terminals are becoming increasingly limited. As component failures continue to occur and spare parts are consumed, the risk of extended outages due to failures in the HVDC terminals will continue to grow. At some point, one or both poles may be rendered inoperable due to critical component failures.

Modernizing the HVDC terminals by replacing the original HVDC terminal equipment with the latest HVDC technology will greatly reduce the frequency and duration of outages due to component failures in the HVDC terminals. In addition to replacement of the existing HVDC terminals, the new HVDC technology implemented for the Project will be designed to provide value-added support to the grid which will enable Minnesota Power and the regional to continue to support our clean energy transition.

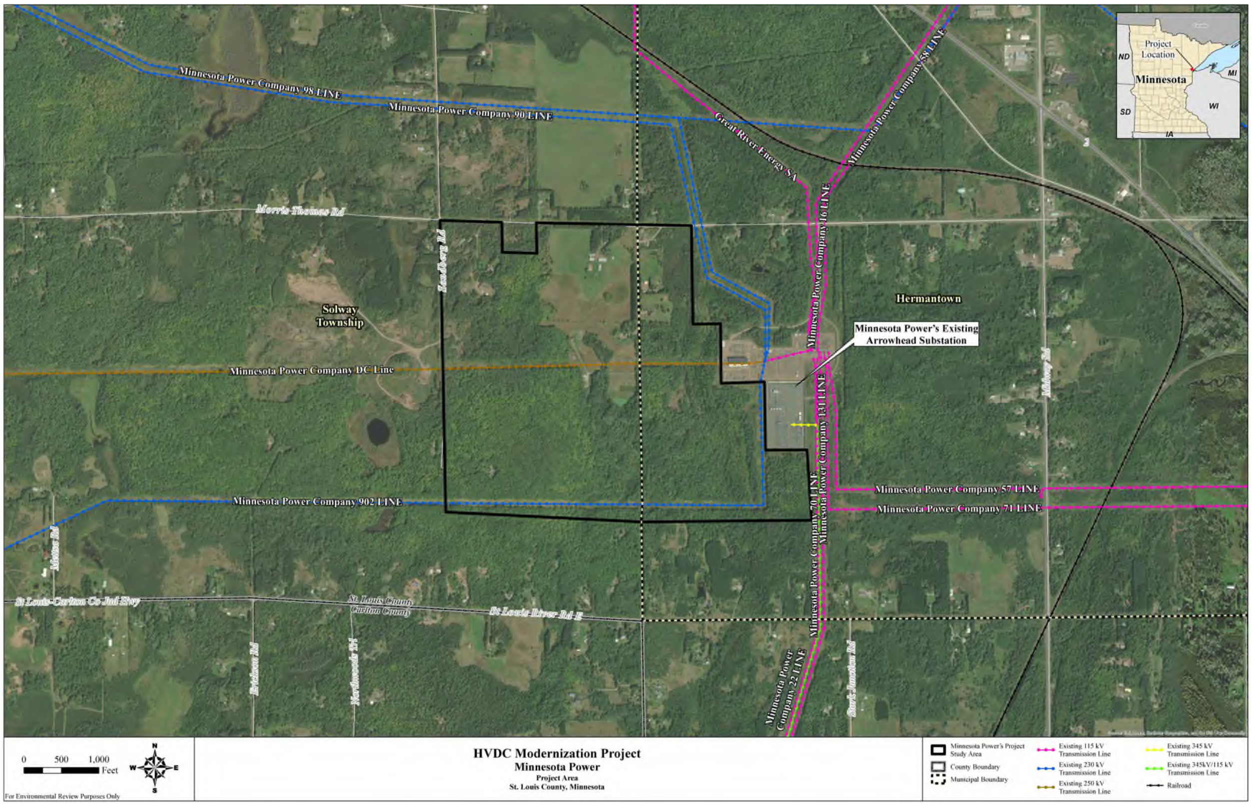
A. Need for Replacement of Existing HVDC Terminals

The HVDC Line connecting energy-rich North Dakota to northeastern Minnesota is increasingly valuable for bringing renewable energy from North Dakota to customers in the Company's service territory. As noted above, the existing HVDC terminal equipment is now over 45 years old, well past its original design life. While the HVDC Line equipment has been reliable for most of its history, forced (unplanned) and scheduled outage hours have increased significantly in the last five years. This is of particular concern for the HVDC system because of limited parts availability for equipment such as pulse transformers, racking, filters, and control equipment. As the frequency and duration of outages due to HVDC terminal equipment failures increases, so does the risk of significant impacts to Minnesota Power's ability to efficiently deliver its North Dakota wind generation to customers in Northeastern Minnesota.

The Company's current risk assessment, which is updated annually based on current market prices, has seen significant increases in forward energy market prices for replacement energy. In addition to the high forward market prices, MISO (and neighboring markets like SPP) are seeing unprecedented congestion between generation and load, which the HVDC Line helps to mitigate for Minnesota Power's wind generation assets. The Company expects future years to show higher replacement energy prices as more baseload coal units retire and grid congestion patterns continue to change.

The HVDC Modernization Project will mitigate risks associated with HVDC terminal equipment outages by replacing the aging HVDC infrastructure with newer and more reliable HVDC terminal equipment. A visual overview of the HVDC Modernization Project area in Minnesota is provided in Figure 2.

Figure 2: HVDC Modernization Project – Minnesota Portion



The HVDC Modernization Project is currently in the MISO MTEP Appendix B (MTEP Project #4295) and has been reported in the Minnesota Biennial Transmission Projects Report since 2013 under tracking number 2013-NE-N16. Minnesota Power currently anticipates that the HVDC Modernization Project will be completed and placed in service by the end of 2027.

B. Upgrades to HVDC Terminals Will Provide Value-Added Grid Support

The Company proposes to upgrade the HVDC terminals with technology that provides greater grid support functionality to the surrounding transmission system while also being more flexible and adaptable to navigate rapidly-changing system conditions. The orderly replacement of the HVDC terminal equipment is prudent to ensure continuous efficient delivery (and potential expansion) of Minnesota Power's renewable, carbon-free energy resources into the future. This new technology and optionality will enhance the value of the HVDC converter stations for the local and regional power grid in the near-term and over the next several decades.

C. AC Transmission Needed for the HVDC Modernization Project

To complete the modernization and upgrade of the Company's HVDC facilities and keep the existing HVDC Line in service as much as possible to serve its customers and the region, the Company must develop new HVDC terminals on both ends of the line at the Center and Arrowhead substations. As part of the HVDC Modernization Project, the existing ±250 kV HVDC Line will be rerouted to the new HVDC terminals so that the existing HVDC terminals can be retired. To interconnect the new HVDC terminals to the existing AC transmission system in Minnesota, a new St Louis County 345 kV/230 kV substation will be constructed. The HVDC terminal will be connected to St Louis County Substation by a new 345 kV transmission line, and the St Louis County Substation will be connected to the existing Arrowhead Substation by two parallel 230 kV lines. The new sites will also be designed to accommodate future expansion of the HVDC system and support regional extra-high voltage AC transmission development.

In Minnesota, the Company determined that the most suitable parcels for relocation of the HVDC terminals are located west of the existing Arrowhead Substation. This site is preferable due to its proximity to the existing Arrowhead Substation, the existing HVDC terminal, and the existing HVDC line

III. LEGAL STANDARD AND SUMMARY OF EXEMPTION REQUESTS

Minn. R. 7849.0220, subp. 2, part 7849.0240, and parts 7849.0260 to 7849.0340 specify the content requirements for Certificate of Need applications for LHVTL projects. The Commission has authority to grant exemptions from the requirements of Minnesota Rules Chapter 7849 pursuant to Minn. R. 7849.0200, subp. 6, which provides:

> Before submitting an application, a person is exempted from any data requirement of parts 7849.0010 to 7849.0400 if the person (1) requests an exemption from specified rules, in writing to the commission, and (2) shows that the data requirement is unnecessary to determine the need for the proposed facility or may be satisfied by submitting another document. A request for exemption must be filed at least 45 days before submitting an application. The commission shall respond in writing to a request for exemption within 30 days of receipt and include the reasons for the decision. The commission shall file a statement of exemptions granted and reasons for granting them before beginning the hearing.

Based on the standard set forth in this rule, the Commission may grant exemptions when the data requirements: (1) are unnecessary to determine need in a specific case; or (2) can be satisfied by submitting documents other than those required by the rules.[4] For the

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[4] *In re Application for a Certificate of Need for the Appleton – Canby 115 kV Line*, Docket No. E-017/CN-06-0677, Order Granting Exemptions and Approving Notice Plan (Aug. 1, 2006).

Project, Minnesota Power requests that the Commission grant exemptions from the following rules as they are either unnecessary to determine the need for the Project or can be satisfied by submitting alternative data:

Minnesota Rules	Scope of Exemption
Minn. R. 7849.0270, subps. 1-6 (Peak Demand and Annual Consumption Forecast; System Revenue Requirements)	Request exemption from providing forecasting and capacity information for Minnesota Power's system and to provide forecast information from Minnesota Power's most recent Annual Forecast Report ("AFR"). Request exemption from providing system revenue requirements and provide explanation of how MISO spreads wholesale electricity costs and a general estimate of rate impact of Project on Minnesota Power customers.
Minn. R. 7849.0280 (System Capacity)	Request full exemption from providing a discussion of the ability of the existing system to meet the forecasted demand for electrical energy identified in response to Minn. R. 7849.0270.
Minn. R. 7849.0290 (Conservation)	Request exemption from discussing conservation programs and their effect on the forecast information required by Minn. R. 7849.0270. Minnesota Power proposes to provide substitute information on its conservation efforts from its most recent Conservation Improvement Plan and Integrated Resource Plan filings.
Minn. R. 7849.0300 (Consequences of Delay)	Request to be exempt from providing analysis using three confidence levels. Minnesota Power proposes to provide substitute data regarding potential impacts caused by delay in implementing the Project.
Minn. R. 7849.0340 (No Facility Alternative)	Request to be exempt from providing analysis using three confidence levels. Minnesota Power proposes to provide substitute data regarding potential impacts caused by no build alternative.

Each of these requests is discussed in more detail below. This request is being made at least 45 days prior to submitting an application for a Certificate of Need as required by Minn. R. 7849.0200, subp. 6.[5]

IV. REQUESTED EXEMPTIONS

A. Minn. R. 7849.0270, subps. 1-6– Peak Demand and Annual Consumption Forecast and System Revenue Requirements

1. Rule 7849.0270, subp. 1 – Peak Demand and Annual Consumption Data

Minn. R. 7849.0270, subp. 1 requires information concerning peak demand and annual consumption for the applicant's entire service area and system. The Project is not proposed to address growing peak demand or system capacity issues. Instead, the Project is designed to upgrade and modernize the existing infrastructure of the HVDC terminals to assure reliability for the coming decades given the age of the infrastructure and the increasing failure rates of certain critical components, while ensuring expandability options for future development. Minnesota Power will provide forecast information from its most recent AFR filed on June 24, 2022 in Docket No. E999/PR-22-11.

2. Rule 7849.0270, subps. 2(A) and 2(B) – Customer Annual Consumption Data

Minn. R. 7849.0270, subps. 2(A) and 2(B) requires an applicant to estimate the number of customers and the amount of energy consumed annually by nine classes of customers (residential, commercial, industrial, farming, etc). Energy consumption data is not relevant to establishing the need for a proposed Project. Transmission systems must be sized so that they have sufficient capacity to operate reliably during periods of peak demand. It is the demand for power during peak times, not the amount of power consumed annually, that is key to determining the need for transmission facilities. Since energy consumption data has no direct impact on transmission planning, the Commission should exempt Minnesota Power from providing this data and accept substitute data in the form of AFR forecast information.[6]

3. Minn. R. 7849.0270, subps. 2(C) and 2(D) – System Demand and Peak Demand

Minn. R. 7849.0270, subp. 2(C) seeks an estimate of the demand for power in the system at the time of annual system peak demand. Minn. R. 7849.0270, subp. 2(D) calls for

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[5] A proposed completeness checklist of the Certificate of Need requirements, reflecting this exemption request, is provided at Attachment A.

[6] *In re Application of Minnesota Power for a Certificate of Need for the Duluth Loop Reliability Project in St. Louis Cnty.*, Docket No. E-015/CN-21-140, Order Approving Notice Plan and Granting Variances and Exemptions (May 17, 2021); *In re Application of Great River Energy and Minnesota Power for a Certificate of Need for a 115 kV High Voltage Transmission Line in St. Louis and Carlton Counties*, Docket No. E-002/CN-10-973, Order Approving Exemptions and Proposed Provision of Alternative Data (Nov. 2, 2010).

monthly system peak demand data. Instead of the information called for in Minn. R. 7849.0270, subps. 2(C) and (D), the Company proposes to provide data actually utilized in studying and planning the Project and AFR forecast information.

4. Minn. R. 7849.0270, subp. 2(E) – System Revenue Requirements

Minn. R. 7849.0270, subp. 2(E) requires an estimate of the "annual revenue requirement per kilowatt-hour for the system in current dollars." Minnesota Power proposes to provide the general rate impact of the Project on Minnesota Power's customers. The Commission has previously granted similar exemption requests for other transmission projects.[7]

5. Minn. R. 7849.0270, subp. 2(F) – Weekday Load Factor

Minn. R. 7849.0270, subp. 2(F) requires an applicant's average system weekday load factor for each month. Minnesota Power requests an exemption from this requirement because load factor is not a relevant consideration when evaluating the need for a transmission facility. Load factor is a measure of how demand varies over time and is relevant to the need determination for new generation. Load factor has no bearing on the need for a new transmission line. Rather, transmission capacity must be designed to meet peak demand and other system power flow circumstances. This is done to ensure there is sufficient transmission capacity to meet lower levels of instantaneous demand. Thus, Minnesota Power respectfully requests an exemption from this requirement which the Commission has granted in the past for other transmission projects.[8]

6. Minn. R. 7849.0270, subps. 3-6 – Forecast Methodology, Data Base, Assumptions, and Coordination of Forecasts

Minn. R. 7849.0270, subps. 3-6 require the applicant to detail the forecast methodology employed, identify the database used for the forecast, detail the assumptions made in preparing the forecasts provided under subpart 2 of the same Rules part, and a description of load forecast coordination efforts with other systems. As stated above, the need for transmission facilities is not prompted by energy consumption, but rather, by demand during peak times. Thus, instead of providing energy consumption forecasts, Minnesota Power believes that the Company's most recent AFR will better enable the Commission to evaluate the need for this Project. The AFR discusses forecast

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[7] *In re Application of Minnesota Power for a Certificate of Need for the Duluth Loop Reliability Project in St. Louis Cnty.*, Docket No. E-015/CN-21-140, Order Approving Notice Plan and Granting Variances and Exemptions (May 17, 2021); *In re Application of Great River Energy and Minnesota Power for a Certificate of Need for a 115 kV High Voltage Transmission Line in St. Louis and Carlton Counties*, Docket No. ET2,E-015/CN-10-973, Order Approving Exemptions and Proposed Provision of Alternative Data (Nov. 2, 2010).

[8] *In re Application of Minnesota Power for a Certificate of Need for the Duluth Loop Reliability Project in St. Louis Cnty.*, Docket No. E-015/CN-21-140, Order Approving Notice Plan and Granting Variances and Exemptions (May 17, 2021); *In re Request of Minnesota Power for a Certificate of Need for the Great Northern Transmission Line*, Docket No. E-015/CN-12-1163, Order Approving Notice Plan, Granting Variance Request, and Approving Exemption Reques*t* (Feb. 28, 2013); *In the Matter of the Application of Great River Energy and Minnesota Power for a Certificate of Need for a 115 kV High Voltage Transmission Line in St. Louis and Carlton Counties*, Docket No. ET2,E-015/CN-10-973, Order Approving Exemption Request (Nov. 2, 2010).

methodology, databases, forecast assumptions, and coordination of forecasts with other systems. Minnesota Power respectfully requests an exemption from this requirement, which the Commission has granted in the past for other transmission projects.[9]

In sum, Minnesota Power requests an exemption from the data requirements of Minn. R. 7849.0270, subps. 1-6 and will provide the relevant AFR forecast information. This substitute information is better tailored to the need for the Project and will assist the Commission in evaluating whether the Project is needed.

B. Minn. R. 7849.0280 – System Capacity

Minn. R. 7849.0280 pertains to system capacity and generation data. The general purpose of this section is to provide a discussion of the ability of the existing system to meet the forecasted demand for electrical energy in response to Minn. R. 7849.0270. Part 7849.0280 (A) through (I) pertain to an examination of generation adequacy and do not address transmission planning considerations. Minnesota Power therefore requests that the Commission grant an exemption from part 7849.0280 (A) through (I). The Commission has previously granted exemption requests from part 7849.0280 in several other transmission line Certificate of Need dockets where issues of transmission adequacy, rather than generation adequacy, were at issue.[10]

C. Minn. R. 7849.0290 – Conservation

Minnesota Power requests an exemption from Minn. R. 7849.0290, which relates to conservation programs the applicant has in place and their effect on the forecast information called for in Minn. R. 7849.0270. This rule is intended to ensure that regulated load serving utilities fully consider conservation as well as generation when planning for future needs of their customers.[11] Minnesota Power's conservation and efficiency information is examined in detail in the resource planning process. All of the information requested by Minn. R. 7849.0290 is contained in Minnesota Power's Integrated Resource Plan and Conservation Improvement Plan ("CIP") filings.[12] Instead of replicating that information in this application, Minnesota Power proposes to present a summary of these filings. This will allow interested parties to pursue their investigation into this issue further through those materials if they wish. The Commission has granted Minnesota Power an

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[9] *See, e.g.*, *In re Application of Minnesota Power for a Certificate of Need for the Duluth Loop Reliability Project in St. Louis Cnty.*, Docket No. E-015/CN-21-140, Order Approving Notice Plan and Granting Variances and Exemptions (May 17, 2021).

[10] *In re Application of Minnesota Power for a Certificate of Need for the Duluth Loop Reliability Project in St. Louis Cnty.*, Docket No. E-015/CN-21-140, Order Approving Notice Plan and Granting Variances and Exemptions (May 17, 2021); *In re Application of Great River Energy and Minnesota Power for a Certificate of Need for a 115 kV High Voltage Transmission Line in St. Louis and Carlton Counties*, Docket No. ET2,E-015/CN-10-973, Order Approving Exemptions and Proposed Provision of Alternative Data (Nov. 2, 2010).

[11] *In re Application of Rapids Power LLC for a Certificate of Need for its Grand Rapids Cogeneration Project*, Docket No. IP4/CN-01-1306, Order Granting Exemptions from Filing Requirements at 6 (Oct. 9, 2001).

[12] *See* Docket Nos. E-015/RP-21-33 and E-015/CIP-20-476.

exemption from this requirement in prior dockets and it is appropriate to do so here as well.[13]

D. Minn. R. 7849.0300 – Consequences of Delay and Minnesota Rule 7849.0340 – No Facility Alternative

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 part 7849.0300 for the no-build alternative. While Minnesota Power will discuss the consequences of delay and a no build alternative in its application, there is no need to discuss these items in terms of three levels of demand. Rather, as noted above, for transmission planning purposes, the relevant inquiry is whether the system can meet peak demand. The Commission has approved similar partial exemption requests from the requirements of Minn. R. 7849.0300 and 7849.0340 in other transmission line Certificate of Need dockets.[14]

V. CONCLUSION

Minnesota Power respectfully requests that the Commission grant the requested exemptions to allow Minnesota Power to provide information in its application that is relevant to determining the need for the HVDC Modernization Project without imposing unnecessary filing burdens.

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[13] *In re Application of Minnesota Power for a Certificate of Need for the Duluth Loop Reliability Project in St. Louis Cnty.*, Docket No. E-015/CN-21-140, Order Approving Notice Plan and Granting Variances and Exemptions (May 17, 2021); *In re Request of Minnesota Power for a Certificate of Need for the Great Northern Transmission Line*, Docket No. E015/CN-12-1163, Order Approving Notice Plan, Granting Variance Request, and Approving Exemption Request (Feb. 28, 2013).

[14] *In re Request of Minnesota Power for a Certificate of Need for the Great Northern Transmission Line*, Docket No. E-015/CN-12-1163, Order Approving Notice Plan, Granting Variance Request, and Approving Exemption Request (Feb. 28, 2013); *In re Application of Northern States Power Company d/b/a Xcel Energy and Great River Energy for a Certificate of Need for the Upgrade of the Southwest Twin Cities (SWTC) Chaska Area 69 kV Transmission Line to 115 kV Capacity*, Docket No. E-002/CN-11-826, Order Granting The Company' Exemption Request (Nov. 4, 2011).

November 30, 2022

Respectfully submitted,

MINNESOTA POWER

David R Moeller

David R. Moeller
Senior Regulatory Counsel
30 West Superior Street
Duluth, MN 55802
dmoeller@allete.com
(218) 723-3963

Kodi Jean Verhalen
Valerie T. Herring
Peter Madsen
Taft Stettinius & Hollister LLP
2200 IDS Center
80 South 8th Street
Minneapolis, MN 55402-2157
(612) 977-8400
kverhalen@taftlaw.com
vherring@taftlaw.com
pmadsen@taftlaw.com

ATTORNEYS FOR MINNESOTA POWER

ATTACHMENT A

HVDC Modernization Project
Certificate of Need Application
Completeness Checklist

Authority	Required Information	Location in Application
Minn. R. 7829.2500, Subp. 2	Brief summary of filing on separate page sufficient to apprise potentially interested parties of its nature and general content	
Minn. R. 7849.0200, Subp. 2	Title Page and Table of Contents	
Minn. R. 7849.0200, Subp. 4	Cover Letter	
Minn. R. 7849.0220, Subp. 3	Joint Ownership and Multiparty use	N/A
Minn. R. 7849.0240	Need summary and additional considerations	
Subp. 1	Summary of the major factors that justify the need for the proposed facility	
Subp. 2	Relationship of the proposed facility to the following socioeconomic considerations:	—
A.	Socially beneficial uses of the output of the facility	
B.	Promotional activities that may have given rise to the demand for the facility	
C.	Effects of the facility in inducing future development	
Minn. R. 7849.0260	Proposed LHVTL and Alternatives	—
A.	A description of the type and general location of the proposed line, including:	—
(1)	Design voltage	
(2)	Number, sizes and types of conductors	

Authority	Required Information	Location in Application
(3)	Expected losses under projected maximum loading and under projected average loading in the length of the line and at terminals or substations	
(4)	Approximate length of the proposed line	
(5)	Approximate locations of DC terminals or AC substations on a map	
(6)	List of likely affected counties	
B.	Discussion of the available alternatives including:	
(1)	New generation	
(2)	Upgrading existing transmission lines	
(3)	Transmission lines with different voltages or conductor arrays	
(4)	Transmission lines with different terminals or substations	
(5)	Double circuiting of existing transmission lines	
(6)	If facility for DC (AC) transmission, an AC (DC) transmission line	
(7)	If proposed facility is for overhead (underground) transmission, an underground (overhead) transmission line	
(8)	Any reasonable combination of alternatives (1) – (7)	
C.	For the facility and for each alternative in B, a discussion of:	—
(1)	Total cost in current dollars	
(2)	Service life	

Authority	Required Information	Location in Application
(3)	Estimated average annual availability	
(4)	Estimated annual O&M costs in current dollars	
(5)	Estimate of its effect on rates system wide and in Minnesota	
(6)	Efficiency expressed for a transmission facility as the estimated losses under projected maximum loading and under projected average loading in the length of the transmission line and at the terminals or substations	
(7)	Major assumptions made in subitems (1) – (6)	
D.	A map (of appropriate scale) showing the applicant's system or load center to be served by the proposed LHVTL	
E.	Such other information about the proposed facility and each alternative as may be relevant to determination of need.	
Minn. R. 7849.0270	Content of Forecast	—
Minn. R. 7849.0270, Subp. 1	Peak demand and annual consumption data within the applicant's service area and system	EXEMPT provided alternative data is supplied
	ALTERNATIVE DATA –Minnesota Power's most recent Annual Electric Utility Forecast Report	
Minn. R. 7849.0270, Subp. 2	Minnesota forecast data; forecast demand data by customer class, peak period, and month; estimated system annual revenue per kilowatt hour; estimated average weekday system load factor by month.	EXEMPT except as noted below and provided alternative data is supplied
	ALTERNATIVE DATA –Minnesota Power's most recent Annual Electric Utility Forecast Report	
	Subp. 2 (E) – Alternative explanation of how wholesale electricity costs are	

Authority	Required Information	Location in Application
	spread and general financial effect on Minnesota Power customers.	
Minn. R. 7849.0270, Subp. 3	Detail of the forecast methodology used in subp. 2.	EXEMPT provided alternative data is supplied
Minn. R. 7849.0270, Subp. 4	Discussion of database used in current forecasting.	EXEMPT provided alternative data is supplied
Minn. R. 7849.0270, Subp. 5	Discussion of each essential assumption made in forecast preparation and sensitivity to variations in assumptions.	EXEMPT provided alternative data is supplied
Minn. R. 7849.0270, Subp. 6	Coordination of forecasts.	EXEMPT provided alternative data is supplied
	ALTERNATIVE DATA FOR SUBPS. 3-6 – Minnesota Power’s most recent Annual Electric Utility Forecast Report	
Minn. R. 7849.0280	System Capacity	—
	Description of ability of existing system to meet demand forecast including:	—
A.	Power planning programs	EXEMPT
B.	Seasonal firm purchases and sales	EXEMPT
C.	Seasonal participation purchases and sales	EXEMPT
D.	Load and generation capacity data requested in subitems 1-13 for summer and winter seasons for each forecast year, including anticipated purchases, sales, and capacity retirements and additions except those that depend on a not yet issued certificate of need.	EXEMPT
E.	Summer and winter season load generation and capacity in years subsequent to application contingent on proposed facility	EXEMPT

Authority	Required Information	Location in Application
F.	Summer and winter season load generation and capacity including all projected purchases, sales and generation in years subsequent to application	EXEMPT
G.	List of proposed additions and retirements in generating capacity for each forecast year subsequent to application	EXEMPT
H.	Graph of monthly adjusted net demand and capability with difference between capability and maintenance outages plotted	EXEMPT
I.	Appropriateness and method of determining system reserve margins	EXEMPT
Minn. R. 7849.0290	Conservation Programs	—
A.	Persons responsible for energy conservation and efficiency programs	EXEMPT provided alternative data is supplied
B.	List of energy conservation and efficiency goals and objectives	EXEMPT provided alternative data is supplied
C.	Description of programs considered, implemented and rejected	EXEMPT provided alternative data is supplied
D.	Description of major accomplishments in conservation and efficiency	EXEMPT provided alternative data is supplied
E.	Description of future plans with respect to conservation and efficiency	EXEMPT provided alternative data is supplied
F.	Quantification of the manner by which these programs impact the forecast	EXEMPT provided alternative data is supplied
	ALTERNATIVE DATA FOR A-F – Minnesota Power will provide a summary of its 2021 Integrated Resource Plan and Conservation Improvement Program filings.	
Minn. R. 7849.0300	Consequence of Delay	EXEMPT from three levels of demand

Authority	Required Information	Location in Application
Minn. R. 7849.0310	Required Environmental Information	
Minn. R. 7849.0330	Transmission Facilities	—
	Data for each alternative that would require LHVTL construction including:	—
A.	For overhead transmission lines	—
(1)	Schematics showing dimensions of support structures	
(2)	Discussion of electric fields	
(3)	Discussion of ozone and nitrogen oxide emissions	
(4)	Discussion of radio and television interference	
(5)	Discussion of audible noise	
B.	For underground transmission facilities:	N/A
(1)	Types and dimensions of cable systems	N/A
(2)	Types and qualities of cable system materials	N/A
(3)	Heat released in kW per foot of cable	N/A
C.	Estimated right-of-way required for the facility	
D.	Description of construction practices	
E.	Description of O&M practices	

Authority	Required Information	Location in Application
F.	Estimated workforce required for construction and O&M	
G.	Description of region between endpoints in likely area for routes emphasizing a three mile radius of endpoints including:	—
(1)	Hydrological features	
(2)	Vegetation and wildlife	
(3)	Physiographic regions	
(4)	Land use types	
Minn. R. 7849.0340	No-Facility Alternative	EXEMPT from three levels of demand

IN THE MATTER OF THE APPLICATION OF
MINNESOTA POWER FOR THE HVDC
MODERNIZATION PROJECT

MPUC DOCKET NO. E015/CN-22-607

CERTIFICATE OF SERVICE

Roshelle L. Herstein certifies that on the 30th day of November, 2022, on behalf of Minnesota Power, she efiled a true and correct copy of **Request for Exemption from Certain Certificate of Need Application Content Requirements** via eDockets (www.edockets.state.mn.us) by uploading the same to Docket No. E015/CN-22-607. Said document was also served as designated on the attached service list on file with the Minnesota Public Utilities Commission, designated as "PPSA General List 7850.2100-1A Permit Filings."

/s/ Roshelle L. Herstein
Roshelle L. Herstein

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
James J.	Bertrand	james.bertrand@stinson.com	STINSON LLP	50 S 6th St Ste 2600 Minneapolis, MN 55402	Electronic Service	No	SPL_SL__PPSA General List
David	Birkholz	david.birkholz@state.mn.us	MN Department of Commerce	Suite 500 85 7th Place East St. Paul, MN 551012198	Electronic Service	No	SPL_SL__PPSA General List
Michelle F.	Bissonnette	michelle.bissonnette@hdrinc.com	HDR Engineering, Inc.	Golden Hills Office Center 701 Xenia Ave S Ste 600 Minneapolis, MN 55416	Electronic Service	No	SPL_SL__PPSA General List
B. Andrew	Brown	brown.andrew@dorsey.com	Dorsey & Whitney LLP	Suite 1500 50 South Sixth Street Minneapolis, MN 554021498	Electronic Service	No	SPL_SL__PPSA General List
Christina	Brusven	cbrusven@fredlaw.com	Fredrikson Byron	200 S 6th St Ste 4000 Minneapolis, MN 554021425	Electronic Service	No	SPL_SL__PPSA General List
PUC	CAO	consumer.puc@state.mn.us	Public Utilities Commission	Consumer Affairs Office 121 7th Place E Suite 350 St. Paul, MN 55101	Electronic Service	No	SPL_SL__PPSA General List
Bill	Cook	bcook@rpu.org	Rochester Public Utilities	4000 East River Road NE Rochester, MN 55906	Electronic Service	No	SPL_SL__PPSA General List
John	Crane	johncranefishing@gmail.com	Fishing	1250 Wee Gwaus DR SW Bemidji, MN 56601	Electronic Service	No	SPL_SL__PPSA General List
George	Crocker	gwillc@nawo.org	North American Water Office	PO Box 174 Lake Elmo, MN 55042	Electronic Service	No	SPL_SL__PPSA General List
Thomas	Davis	atdavis1972@outlook.com	-	1161 50th Ave Sherburn, MN 56171	Electronic Service	No	SPL_SL__PPSA General List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Patricia	DeBleeckere	tricia.debleeckere@state.mn.us	Public Utilities Commission	121 7th Pl E St 350 St. Paul, MN 55101	Electronic Service	No	SPL_SL__PPSA General List
John E.	Drawz	jdrawz@fredlaw.com	Fredrikson & Byron, P.A.	Suite 4000 200 South Sixth Street Minneapolis, MN 554021425	Electronic Service	No	SPL_SL__PPSA General List
Cory	Dutcher	cory.dutcher@ge.com	GE Power and Water	1 River Rd. Bldg. 37-413 Schenectady, NY 12345	Electronic Service	No	SPL_SL__PPSA General List
Kristen	Eide Tollefson	healingsystems69@gmail.com	R-CURE	28477 N Lake Ave Frontenac, MN 55026-1044	Electronic Service	No	SPL_SL__PPSA General List
Scott	Ek	scott.ek@state.mn.us	Public Utilities Commission	121 7th Place East Suite 350 St. Paul, MN 55101	Electronic Service	No	SPL_SL__PPSA General List
Karen A	Gebhardt	kageb1@gvtel.com		43901 253rd Ave Leonard, MN 56652-4026	Electronic Service	No	SPL_SL__PPSA General List
Larry	Hartman	Larry.Hartman@state.mn.us	Department of Commerce	85 7th Place East, Suite 280 St. Paul, MN 55101	Electronic Service	No	SPL_SL__PPSA General List
Valerie	Herring	vherring@taftlaw.com	Taft Stettinius & Hollister LLP	2200 IDS Center 80 S. Eighth Street Minneapolis, MN 55402	Electronic Service	No	SPL_SL__PPSA General List
Scott	Johnson	Scott.Johnson@ci.medina.mn.us	City of Medina	2052 County Road 24 Medina, MN 55340-9790	Electronic Service	No	SPL_SL__PPSA General List
Michael	Kaluzniak	mike.kaluzniak@state.mn.us	Public Utilities Commission	Suite 350 121 Seventh Place East St. Paul, MN 55101	Electronic Service	No	SPL_SL__PPSA General List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Tom	Karas	tomskaras@gmail.com		3171 309th Ave NW Cambridge, MN 55008	Electronic Service	No	SPL_SL__PPSA General List
Bruce	King	bruce@ranww.org	Realtors, Association of Northwestern WI	Suite 3 1903 Keith Street Eau Claire, WI 54701	Electronic Service	No	SPL_SL__PPSA General List
Chris	Kopel	chrisk@CMPASgroup.org	Central Minnesota Municipal Power Agency	459 S Grove St Blue Earth, MN 56013-2629	Paper Service	No	SPL_SL__PPSA General List
Stacy	Kotch Egstad	Stacy.Kotch@state.mn.us	MINNESOTA DEPARTMENT OF TRANSPORTATION	395 John Ireland Blvd. St. Paul, MN 55155	Electronic Service	No	SPL_SL__PPSA General List
Karen	Kromar	karen.kromar@state.mn.us	MN Pollution Control Agency	520 Lafayette Rd Saint Paul, MN 55155	Electronic Service	No	SPL_SL__PPSA General List
Brian	Meloy	brian.meloy@stinson.com	STINSON LLP	50 S 6th St Ste 2600 Minneapolis, MN 55402	Electronic Service	No	SPL_SL__PPSA General List
Andrew	Moratzka	andrew.moratzka@stoel.com	Stoel Rives LLP	33 South Sixth St Ste 4200 Minneapolis, MN 55402	Electronic Service	No	SPL_SL__PPSA General List
Colleen	Mueller	N/A		22186 State Hwy 4 Paynesville, MN 56362	Paper Service	No	SPL_SL__PPSA General List
Dan	Nelson	Dan.Nelson@ISGinc.com	I&S Group	115 E Hickory St Ste 300 Mankato, MN 56001	Electronic Service	No	SPL_SL__PPSA General List
Carol A.	Overland	overland@legalectric.org	Legalectric - Overland Law Office	1110 West Avenue Red Wing, MN 55066	Electronic Service	No	SPL_SL__PPSA General List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Kevin	Peterson	kjp@ibew160.org	IBEW Local 160	1109 Northway Lane NE Rochester, MN 55906	Electronic Service	No	SPL_SL__PPSA General List
Angela	Piner	angela.piner@hdrinc.com	HDR, Inc.	Suite 600 701 Xenia Avenue South Suite 600 Minneapolis, MN 55416	Electronic Service	No	SPL_SL__PPSA General List
Larry	Rebman	larryemls@hotmail.com	EMLS, Inc	PO Box 122 Appleton, MN 56208	Electronic Service	No	SPL_SL__PPSA General List
Margaret	Rheude	Margaret_Rheude@fws.gov	U.S. Fish and Wildlife Service	Twin Cities Ecological Services Field Office 4101 American Blvd. E. Bloomington, MN 55425	Electronic Service	No	SPL_SL__PPSA General List
Christine	Schwartz	Regulatory.records@xcelenergy.com	Xcel Energy	414 Nicollet Mall FL 7 Minneapolis, MN 554011993	Electronic Service	No	SPL_SL__PPSA General List
Tom	Slukich	tom@nationalconductor.com	National Conductor Constructors	18119 Hwy 371 North Brainderd, MN 56401	Electronic Service	No	SPL_SL__PPSA General List
Adam	Sokolski	adam.sokolski@edf-re.com	EDF Renewable Energy	10 Second Street NE Ste 400 Minneapolis, MN 55410	Electronic Service	No	SPL_SL__PPSA General List
Mark	Strohfus	mstrohfus@grenergy.com	Great River Energy	12300 Elm Creek Boulevard Maple Grove, MN 553694718	Electronic Service	No	SPL_SL__PPSA General List
Carl	Strohm	cjsmg@sbcglobal.net	SBC Global	105 East Edgewood Ave Indianapolis, IN 46227	Electronic Service	No	SPL_SL__PPSA General List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Tom	Swafford	tswafford@umsi.us	Utility Mapping Services, Inc	3947 E Calvary Rd Suite 103 Duluth, MN 55803	Electronic Service	No	SPL_SL__PPSA General List
Eric	Swanson	eswanson@winthrop.com	Winthrop & Weinstine	225 S 6th St Ste 3500 Capella Tower Minneapolis, MN 554024629	Electronic Service	No	SPL_SL__PPSA General List
Todd	Tadych	ttadych@atcllc.com	American Transmission Company LLC	5303 Fen Oak Dr Madison, WI 53718	Electronic Service	No	SPL_SL__PPSA General List
Caren	Warner	caren.warner@state.mn.us	Department of Commerce	85 7th Place East Suite 280 St. Paul, MN 55101-2198	Electronic Service	No	SPL_SL__PPSA General List
Cynthia	Warzecha	cynthia.warzecha@state.mn.us	Minnesota Department of Natural Resources	500 Lafayette Road Box 25 St. Paul, Minnesota 55155-4040	Electronic Service	No	SPL_SL__PPSA General List
Elizabeth	Wefel	eawefel@flaherty-hood.com	Flaherty & Hood, P.A.	525 Park St Ste 470 Saint Paul, MN 55103	Electronic Service	No	SPL_SL__PPSA General List
Deanna	White	mncwa@cleanwater.org	Clean Water Action & Water Fund of MN	330 S 2nd Ave Ste 420 Minneapolis, MN 55401	Electronic Service	No	SPL_SL__PPSA General List

Appendix D

Applicant’s Notice Plan Petition

minnesota power
AN ALLETE COMPANY

30 West Superior Street
Duluth, MN 55802-2093
www.mnpower.com

November 30, 2022

VIA E-FILING

Mr. Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101

Re: *In the Matter of the Application of Minnesota Power for the HVDC Modernization Project*
MPUC Docket No. E015/CN-22-___

Dear Mr. Seuffert:

Minnesota Power respectfully submits this Notice Plan for approval by the Minnesota Public Utilities Commission ("Commission") pursuant to Minnesota Rule 7829.2550. In accordance with Minnesota Rule 7829.2550, Subp. 1, copies of this Notice Plan have been provided to the Minnesota Department of Commerce, the Minnesota Office of Attorney General Residential Utilities and Antitrust Division, and to persons listed on the "General List of Persons Interested in Power Plans and Transmission Lines" as maintained by the Commission under Minnesota Rule 7850.2100, Subp. 1(A). If you have any questions regarding this filing, please contact me at (218) 723-3963 or dmoeller@allete.com.

Yours truly,

David R. Moeller

David R. Moeller
Senior Regulatory Counsel

Enclosure
cc: Service List

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

Katie Sieben	Chair
Valerie Means	Commissioner
Matthew Schuerger	Commissioner
Joseph K. Sullivan	Commissioner
John A. Tuma	Commissioner

IN THE MATTER OF THE APPLICATION OF MINNESOTA POWER FOR A CERTIFICATE OF NEED FOR THE HVDC MODERNIZATION PROJECT

MPUC Docket No. E015/CN-22-___

NOTICE PLAN PETITION

Public Comments on this Notice Plan Petition can be submitted to the Minnesota Public Utilities Commission until 4:30 p.m. on December 20, 2022.

Replies to Comments can be submitted to the Minnesota Public Utilities Commission until 4:30 p.m. on January 9, 2023.

The Minnesota Public Utilities Commission's address is: Minnesota Public Utilities Commission, 121 7th Place East, Suite 350, St. Paul, MN 55101-2147

I. INTRODUCTION

Minnesota Power (or the “Company”) submits this Notice Plan for approval by the Minnesota Public Utilities Commission (“Commission”) pursuant to Minn. R. 7829.2550.

Minnesota Power intends to submit a combined application for a Certificate of Need and a Route Permit to modernize and upgrade its existing High-Voltage Direct-Current (“HVDC”) terminal near the Arrowhead Substation located in Hermantown Minnesota (the HVDC Modernization Project” or “Project”). The Project would require modernizing and upgrading both HVDC terminals for the 465-mile-long HVDC transmission line (“HVDC Line”) and interconnecting the upgraded HVDC terminals to the existing alternating-current (“AC”) transmission system. These HVDC terminals are currently located near the Arrowhead Substation in Hermantown, Minnesota and the Center Substation in Center, North Dakota. In order to modernize the HVDC terminals and implement the latest technology, new buildings and electrical infrastructure need to be constructed on a new site near the existing HVDC terminals. In Minnesota, to connect the new HVDC terminal to the existing AC system, the Project would require the construction of a new St Louis County 345 kilovolt (“kV”)/230 kV substation located less than one mile west of the current Arrowhead Substation. The new HVDC terminal would be connected to the St Louis County Substation by less than one mile of 345 kV large high-voltage transmission line (“LHVTL”)[1] and the new St Louis County Substation would be connected to the existing Arrowhead Substation by two parallel 230 kV LHVTLs less than one mile in length. Additionally, a short portion of the existing ±250 kV HVDC Line in Minnesota will need to be reconfigured to terminate at the new HVDC terminal. The Project is currently scheduled to be in service in 2027.

The HVDC Modernization Project is needed to modernize aging HVDC assets, continue to position the transmission grid for clean energy transition, and improve the reliability of the transmission system in Minnesota and North Dakota. The existing HVDC terminal has operated for 45 years, 15 years in excess of its 30-year design life. In recent years Minnesota Power has experienced HVDC terminal outages due to failures in the control system, power electronics, transformers, and other components. Based on experience with other electric system components, the failure rate is expected to increase in both frequency and duration, which is of particular concern for the existing HVDC system because of limited parts availability. The orderly replacement of the HVDC terminal equipment is prudent to ensure continuous efficient delivery (and potential expansion) of Minnesota Power’s renewable, carbon-free energy resources into the future.

In addition to the replacement of the existing HVDC terminals, the new HVDC technology implemented for the Project will be designed to provide voltage regulation, frequency response, blackstart capability, and bidirectional power transfer capability; all of which will

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[1] As defined by Minn. Stat. § 216B.2421, subd. 2(2); Minn. R. 7849.0010, subp. 14. The exemption found in Minn. Stat. 216B.243, subd. 8(a)(4) for “a high-voltage transmission line of one mile or less required to connect a new or upgraded substation to an existing, new, or upgraded high-voltage transmission line” does not apply because the proposed LHVTL in Minnesota is greater than one mile in length.

enable Minnesota Power and the region to continue to support our clean energy transition.

The proposed Project area and the existing transmission system are shown in **Attachment A.**

A Certificate of Need is required to be granted under Minn. Stat. § 216B.243 before a high voltage transmission line of the voltage and length proposed for the Project is constructed. Minn. R. 7829.2550 requires a Notice Plan to be submitted for review by the Commission at least three months before filing a Certificate of Need application under Minn. Stat. § 216B.243. Minnesota Power, therefore, submits this Notice Plan for the Commission's approval.

II. NOTICE PLAN PROPOSAL

This Notice Plan is prepared as an initial step in the Certificate of Need regulatory process. Preparation of a Notice Plan, and its review and approval by the Commission, will ensure that interested persons are aware of the proceeding and have the opportunity to participate. The area proposed to be included in notices under this plan ("Notice Area") is depicted in **Attachment A**.

The Notice Area is approximately one to 1.5 miles wide. In general, the Notice Area is a one square mile area with a quarter-mile buffer on each side, centered on the existing Arrowhead and proposed St. Louis County Substations within the Project area.

While the Notice Plan is the first step in the regulatory process, Minnesota Power has already begun gathering stakeholder, agency, tribal, and public input on possible route alternatives. This outreach has included:

- a meeting with the City of Hermantown (11/09/22),
- a meeting with Solway Township (11/15/22),
- a meeting with Fond du Lac Band of Chippewa (11/17/22),
- a public open house on (11/22/22),
- direct mailing to all landowners within a ¼ mile of the project area, and
- Project information available on the Company's website.[2]

With this proposed Notice Plan, the Company will continue public outreach and provide the notices listed below in compliance with Minn. R. 7829.2550.

A. Direct Mail Notice

Attachment A includes a letter that will be mailed to landowners, residents, local units of government, elected officials, tribal government contacts, and agencies within the Notice Area.

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[2] *See* mnpower.com/EnergyForward.

1. Landowners

Minn. R. 7829.2550, subp. 3(A), requires an applicant for a Certificate of Need to provide direct mail notice to all landowners likely to be affected by the proposed transmission lines. Minnesota Power proposes to provide direct mail notice to all landowners who own property within the Notice Area. Minnesota Power has obtained landowner names and addresses within the Notice Area using tax records from the St. Louis County geospatial ("GIS") data hub.

2. Mailing Addresses

Minn. R. 7829.2550, subp. 3(B), requires an applicant for a Certificate of Need to provide direct mail notice to all mailing addresses in the area that are likely to be affected by the proposed transmission line. Minnesota Power proposes to provide direct mail notice to all residential and commercial mailing addresses within the Notice Area. Minnesota Power has obtained a list of mailing addresses in the Notice Area from the St. Louis County GIS data hub.

3. Tribal Government Officials

Minn. R. 7829.2550, subp. 3(C) requires an applicant for a Certificate of Need for a high voltage transmission line to provide direct mail notice to tribal governments whose jurisdictions are reasonably likely to be affected by the proposed transmission line. Minnesota Power has assembled a list of tribal organizations and other tribal government officials and administrators in Northern Minnesota and this list is included in **Attachment B**. Minnesota Power will provide direct mail notice to the tribal organizations and other tribal government officials and administrators listed in **Attachment B**.

4. Local Governments

Minn. R. 7829.2550, subp. 3(C), requires an applicant to provide direct mail notice to governments of towns, cities, home rule charter cities, and counties whose jurisdictions are reasonably likely to be affected by the proposed transmission line. Minnesota Power proposes to provide direct mail notice to lead administration personnel in the towns, cities, and counties. The notice will also be provided to the elected officials of those local units of government and to those State Senators and State Representatives whose districts are within the Notice Area. A complete list of these government recipients is included in **Attachment B**.

B. Newspaper Notice.

Minn. R. 7829.2550, subp. 3(D), requires an applicant to publish notice in newspapers in the areas that may be affected by the transmission line. Minnesota Power proposes to place notice advertisements in the following newspapers in St. Louis County:

Duluth News Tribune
Hermantown Star
Proctor Journal

In addition to the Notice Plan newspaper notice requirement, Minn. R. 7829.2500, subp. 5 requires that after a Certificate of Need application is filed that an applicant publish newspaper notice of the filing in a newspaper of general circulation throughout the state. Minnesota Power proposes to publish a notice in the StarTribune, which is newspaper of general circulation throughout the state.

C. Notice Content

Minn. R. 7829.2550, subp. 4 sets forth the information that must be incorporated into the notice letter including: a map showing the end points of the line and existing transmission facilities in the area; right-of-way requirements for the proposed line and a statement of intent to acquire property rights for the right-of-way; notice that the transmission upgrade cannot be constructed unless the Commission certifies that it is needed; Commission contact information; utility website information that includes its biennial transmission projects report; a statement that the Minnesota Department of Commerce, Energy Environmental Review and Analysis ("EERA") will prepare an environmental report; an explanation of how to get on the Project's mailing list; and a list of applicable regulatory laws and rules that govern the request for Project approval. Minnesota Power's proposed notice mailing meets these requirements.

The map (**Attachment A**) that will be included with the notice letter will depict the entire transmission line corridor area including end points, existing transmission lines and substations, counties, townships, and notable landmarks to aid in orientation. The map that will be sent with the notice letter will be updated from the enclosed figure in Attachment A to show the routes the Company is likely to propose in its Route Permit application. The Company will provide a copy of this updated map to Commission and Department of Commerce staff for review prior to mailing.

D. Distribution of Notice Plan Filing

As required under Minn. R. 7829.2550, subp. 1, this Notice Plan filing has been sent to the EERA, the Office of the Attorney General – Residential Utilities Division, and to those parties listed on the "General List of Persons Interested in Power Plants and Transmission Lines" as maintained on eDockets.

E. Notice Timing

Minn. R. 7829.2550, subp. 6, requires the applicant to implement the Notice Plan within 30 days of its approval by the Commission. Minnesota Power requests that the Commission vary the Notice Plan implementation rule requirement to allow notice to more closely coincide with the filing of the Certificate of Need application. Therefore, Minnesota Power requests that the Commission grant a variance and direct the notices identified in this Notice Plan to occur no more than 60 days and no less than two weeks prior to the filing of the Certificate of Need application.

The three requirements for a rule variance under Minn. R. 7829.3200, subp. 1 are: (1) enforcement of the rule would impose an excessive burden upon the applicant or others affected by the rule; (2) granting the variance would not adversely affect the public interest; and (3) granting the variance would not conflict with standards imposed by law. These three requirements are met here. The notice requirements would burden all parties by separating notice provided to interested stakeholders from the start of the proceeding. Further, granting a variance would neither adversely affect the public interest nor conflict with standards imposed by law. The Commission has approved similar variance requests in other Certificate of Need dockets.[3]

F. Project Service List

Pursuant to Minn. R. 7829.0700, subp. 1, the Company requests that the following persons be placed on the Commission's Official Service List for this matter, and requests electronic service for these persons:

Dan McCourtney
Environmental and Land Manager
Minnesota Power
30 West Superior Street
Duluth, MN 55802
218.355.3515
dmccourtney@mnpower.com

David R. Moeller
Senior Regulatory Counsel
Minnesota Power
30 West Superior Street
Duluth, MN 55802
(218) 723-3963
dmoeller@allete.com

Kodi Jean Verhalen
Taft Stettinius & Hollister LLP
2200 IDS Center
80 South 8th Street
Minneapolis, MN 55402-2157
(612) 977-8591
kverhalen@taftlaw.com

Valerie T. Herring
Taft Stettinius & Hollister LLP
2200 IDS Center
80 South 8th Street
Minneapolis, MN 55402-2157
(612) 977-8501
vherring@taftlaw.com

Peter Madsen
Taft Stettinius & Hollister LLP
2200 IDS Center
80 South 8th Street
Minneapolis, MN 55402-2157
(612) 977-8355
pmadsen@taftlaw.com

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[3] *In re Application of Minnesota Power for a Certificate of Need for the Duluth Loop Reliability Project in St. Louis Cnty.*, Docket No. E015/CN-21-140, Order Approving Notice Plan and Granting Variances and Exemptions at 3, 6 (May 17, 2021); (In *the Matter of the Application of Byron Solar Project, LLC for a Certificate of Need for the up to 200 MW Byron Solar Project and 345 kV Transmission Line in Olmstead and Dodge Counties, Minnesota*, Docket No. IP-7041/CN-20-764, ORDER APPROVING NOTICE PLAN, APPROVING EXEMPTION REQUESTS, AND GRANTING VARIANCES (Jan. 15, 2021).

III. CONCLUSION

Minnesota Power respectfully requests that the Commission: (1) approve this Notice Plan prepared in advance of the filing of a Certificate of Need application to construct the Project; and (2) grant the variance from the 30-day implementation notice contemplated in Minn. R. 7829.2550, subp. 6, and modify the time for implementation of the Notice Plan to no more than 60 days and no less than two weeks prior to the filing of the Certificate of Need application.

November 30, 2022

Respectfully submitted,

MINNESOTA POWER

David R Moeller

David R. Moeller
Senior Regulatory Counsel
30 West Superior Street
Duluth, MN 55802
dmoeller@allete.com
(218) 723-3963

Kodi Jean Verhalen
Valerie T. Herring
Peter Madsen
Taft Stettinius & Hollister LLP
2200 IDS Center
80 South 8th Street
Minneapolis, MN 55402-2157
(612) 977-8400
kverhalen@taftlaw.com
vherring@taftlaw.com
pmadsen@taftlaw.com

ATTORNEYS FOR MINNESOTA POWER

Example Notice Letter

____, 2023

NOTICE OF PROPOSED TRANSMISSION LINE PROJECT

Re: In the Matter of the Application for a Certificate of Need and Route Permit for the HVDC Modernization Project
MPUC Docket Nos. E015/CN-22-___; E015/TL-22-___

PLEASE TAKE NOTICE that Minnesota Power (also the "Company") is applying to the Minnesota Public Utilities Commission (also "Commission") for a Certificate of Need and Route Permit to modernize and upgrade its existing High-Voltage Direct-Current ("HVDC") terminal near the Arrowhead Substation in Hermantown Minnesota (the HVDC Modernization Project" or "Project").

Project Description

Minnesota Power intends to submit a combined application for a Certificate of Need and a Route Permit to modernize and upgrade its existing High-Voltage Direct-Current ("HVDC") terminal near the Arrowhead Substation located in Hermantown Minnesota (the HVDC Modernization Project" or "Project"). The Project would require modernizing and upgrading both HVDC terminals for the 465-mile-long HVDC transmission line ("HVDC Line") and interconnecting the upgraded HVDC terminals to the existing alternating-current ("AC") transmission system. These HVDC terminals are currently located near the Arrowhead Substation in Hermantown, Minnesota and the Center Substation in Center, North Dakota. In order to modernize the HVDC terminals and implement the latest technology, new buildings and electrical infrastructure need to be constructed on a new site near the existing HVDC terminals. In Minnesota, to connect the new HVDC terminal to the existing AC system, the Project would require the construction of a new St Louis County 345 kilovolt ("kV")/230 kV substation located less than one mile west of the current Arrowhead Substation. The new HVDC terminal would be connected to the St Louis County Substation by less than one mile of 345 kV large high-voltage transmission line ("LHVTL")[4] and the new St Louis County Substation would be connected to the existing Arrowhead Substation by two parallel 230 kV LHVTLs less than one mile in length. Additionally, a short portion of the existing ±250 kV HVDC Line in Minnesota will need to be reconfigured to terminate at the new HVDC terminal.

The Project will be designed to provide voltage regulation, frequency response, blackstart capability, and bidirectional power transfer capability; all of which will enable

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[4] As defined by Minn. Stat. § 216B.2421, subd. 2(2); Minn. R. 7849.0010, subp. 14. The exemption found in Minn. Stat. 216B.243, subd. 8(a)(4) for "a high-voltage transmission line of one mile or less required to connect a new or upgraded substation to an existing, new, or upgraded high-voltage transmission line" does not apply because the proposed LHVTL in Minnesota is greater than one mile in length.

Minnesota Power and the region to continue to support our clean energy transition. The Project is currently scheduled to be in service in 2027.

A map of the area under consideration for the proposed Project is attached to this letter as **Figure 1**.

Project Need

The HVDC Modernization Project is needed to modernize aging HVDC assets, continue to position the transmission grid for clean energy transition, and improve the reliability of the transmission system in Minnesota and North Dakota. The existing HVDC terminal has operated for 45 years, 15 years in excess of its 30-year design life. In recent years Minnesota Power has experienced HVDC terminal outages due to failures in the control system, power electronics, transformers, and other components. Based on experience with other electric system components, the failure rate is expected to increase in both frequency and duration, which is of particular concern for the existing HVDC system because of limited parts availability. The orderly replacement of the HVDC terminal equipment is prudent to ensure continuous efficient delivery (and potential expansion) of Minnesota Power's renewable, carbon-free energy resources into the future.

Further information on the Project need is available on the Minesota Power's website: www. mnpower.com/EnergyForward.com.

Regulatory Review Process

Before Minnesota Power can construct the Project, the Commission must determine whether the Project is needed (Certificate of Need) and if so, will determine the route along which the Project will be built (Route Permit).

The Certificate of Need process is governed by Minnesota law, including Minnesota Statutes section 216B.243, and Minnesota Rules Chapter 7849, specifically Rules 7849.0010 to 7849.0400 and 7849.1000 to 7849.2100. A copy of the Certificate of Need application, once submitted, can be obtained by visiting the Commission's website at https://mn.gov/puc/ in Docket No. E015/CN-22-___.

In addition to certifying the need for the Project, the Commission must also grant a Route Permit for the Project. The routing of the Project is governed by Minnesota law, including Minnesota Statutes Chapter 216E and Minnesota Rules Chapters 4410 and 7850. A copy of the Route Permit application, once submitted, can be obtained by visiting the Commission's website in Docket No. E015/TL-22-___.

The Commission will not make these determinations until it has completed a thorough review process that encourages public involvement and analyzes the impacts of the Project and various route alternatives. This process includes preparation of an Environmental Assessment ("EA") on the Project by the Minnesota Department of Commerce's Energy Environmental Review and Analysis ("EERA") staff.

Minnesota Power will submit an application for a Route Permit with one proposed route for the associated transmission lines. Other routes can be proposed to be evaluated during the scoping process. The Commission and the EERA staff will decide which routes get studied and considered for approval. Routes that have been shown at public meetings are preliminary and subject to change. In addition, other, new routes may also be studied and considered for approval.

The Commission will review all of the data from the public process and will decide if the Project is needed and which route should be approved. Selection of a final route by the Commission will be based on an evaluation of the routes guided by the factors identified in Minnesota Statutes section 216E.03, Minnesota Rules part 7850.4100, and stakeholder input received during the regulatory process.

The table below provides a high-level summary of the major steps in the regulatory process.

Summary of Regulatory Schedule Following Minnesota Law

Action	Approximate Date
Pre-Application study and public meetings and stakeholder outreach	Fall/Winter 2022-2023
Certificate of Need and Route Permit Applications submitted to Commission	Winter 2023
Informational and Scoping Meetings (public meeting and comment)	Spring 2023
Draft Environmental Assessment Issued (public meeting and comment period)	Summer 2023
Public Hearings (public meeting and comment period)	Summer 2023
Commission Decision	Fall 2023

Right-of-Way for the Project

Before beginning construction, Minnesota Power will acquire property rights for the right-of-way, through either fee acquisition of property or an easement that will be negotiated with the landowner for each parcel. Minnesota Power anticipates acquiring easements with a typical right-of-way of approximately 150 feet wide for the 345kV transmission line, 130 feet wide for each 230 kV transmission line, and 150 feet wide for the ±250 kV HVDC Line. Where these transmission lines parallel existing lines, less new right-of-way may be required because the new transmission line may share a portion of the existing right-of-way.

Additional Information and Mailing Lists

To subscribe to the Project's Certificate of Need docket and to receive email notifications when information is filed in that docket, please visit https://mn.gov/puc/, click on "eDockets," then click on "Go to eDockets Project Database," and then click on "eFiling Home/Login" in the left menu. Then, click on the "Subscribe to Dockets" button, enter your email address and select "Docket Number" from the Type of Subscriptions dropdown box, then select "[22]" from the first Docket number drop down box and enter "[___]" 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 (22-___).

If you would like to have your name added to the Project Route Permit proceeding mailing list (MPUC Docket No. E015/TL-22-___) you 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 (regular mail or email) and 2) your complete mailing or email address. You may also find information about the Project on the Department of Commerce's webpage at https://mn.gov/eera/web/page/home/ by clicking "Transmission Lines" and locating the Project in the list. Please be aware that the Project may not be listed at this location until the Route Permit application is submitted.

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. E015/CN-22-___), mail, fax, or email Robin Benson at Minnesota Public Utilities Commission, 121 7th Place E., Suite 350, St. Paul, MN 55101-2147, Fax: 651-297-7073 or robin.benson@state.mn.us.

If you have questions about the state regulatory process, you may contact the Minnesota state regulatory staff listed below:

Minnesota Public Utilities Commission
Bret Eknes
121 7th Place East, Suite 350
St. Paul, Minnesota 55101
(651) 296-7124
1-800-657-3782
bret.eknes@state.mn.us
https://mn.gov/puc/

Minnesota Department of Commerce EERA
Bill Storm
85 7th Place East, Suite 280
St. Paul, Minnesota 55101
(651) 539-1844
1-800-657-3710
bill.storm@state.mn.us
https://mn.gov/eera/

Please visit the Minnesota Power's website at: www.mnpower.com/EnergyForward.com for more information.

Project phone and e-mail addresses are:

Project Phone Number – (218) 355-3515

Project E-mail Address – askus@mnpower.com

Transmission Planning Process in Minnesota

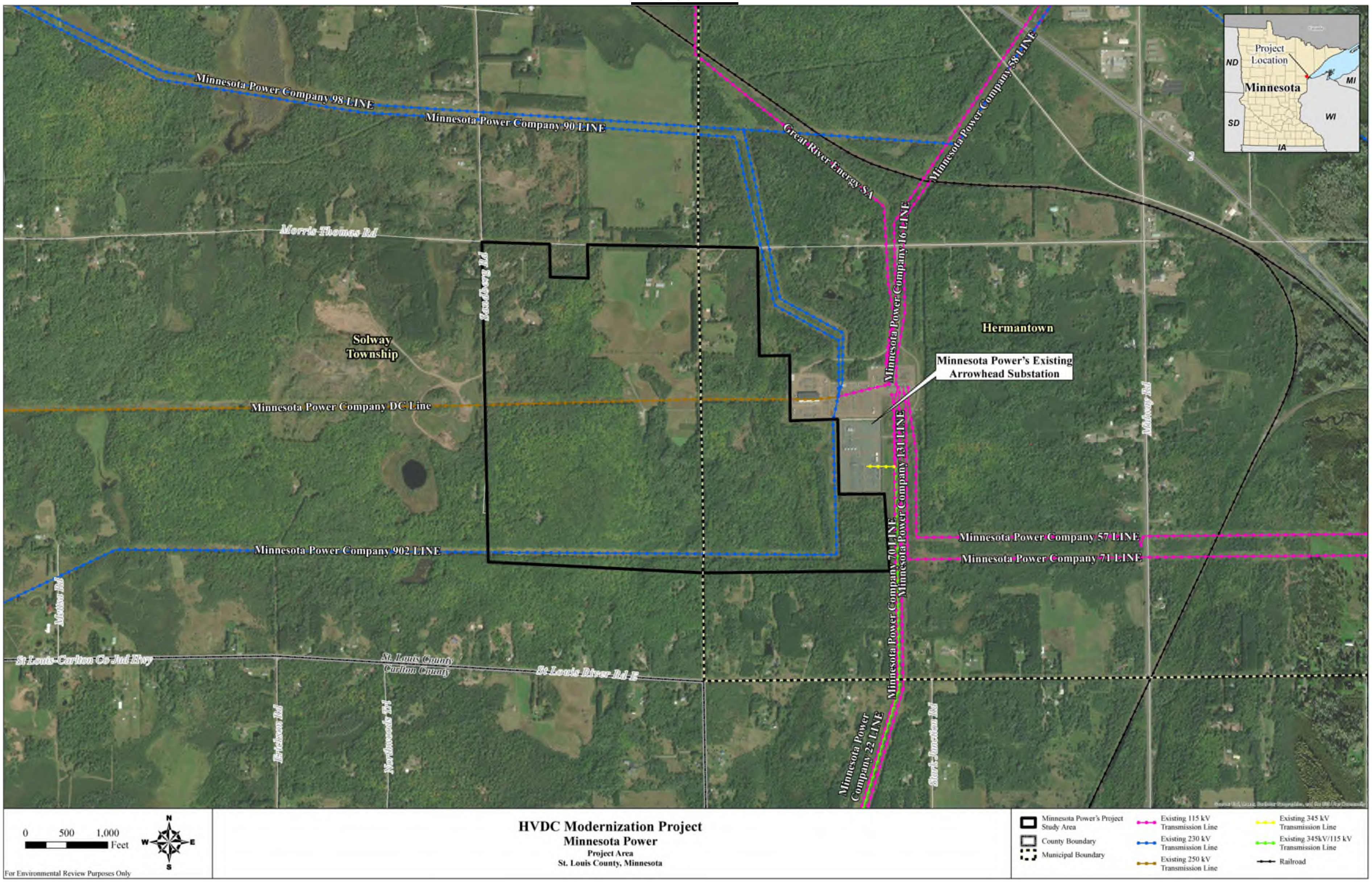
Minnesota Statutes section 216B.2425 requires that each electric transmission-owning utility in the state file a biennial transmission planning report with the Commission in the fall of odd-numbered years. These reports provide information on the transmission planning process used by utilities in the state of Minnesota and information about other transmission line projects. The 2021 Biennial Transmission Planning Report is available at: www.minnelectrans.com. The 2021 Biennial Transmission Planning Report was submitted on October 29, 2021.

Sincerely,

Dan McCourtney
Environmental & Land Manager
Minnesota Power

Attachment A

FIGURE 1



Attachment B

HVDC MODERNIZATION PROJECT CERTIFICATE OF NEED NOTICE PLAN STAKEHOLDER CONTACT LIST

ORGANIZATION	NAME	TITLE	ADDRESS	CITY	STATE	ZIP CODE
Federal Agencies						
Federal Aviation Administration	Jacob Martin	Program Manager for the District	6020 28th Avenue South, Suite 102	Minneapolis	MN	55450-2700
U.S. Army Corps of Engineers	Kris Laman	Project Manager - Regulatory Office	600 South Lake Avenue, Suite 211	Duluth	MN	55802
U.S. Bureau of Indian Affairs	Alan Fogarty	Acting Superintendent	5600 American Blvd West, Suite 500	Bloomington	MN	55437
U.S. Fish and Wildlife Service	Shauna Marquardt	Ecological Services Field Office	4101 American Blvd East	Bloomington	MN	55425
Tribal Organizations						
1854 Treaty Authority	Marne Kaeske	Cultural Preservation Specialist	4428 Haines Road	Duluth	MN	55811
1854 Treaty Authority	Sonny Myers	Executive Director	4428 Haines Road	Duluth	MN	55811
Duluth Indigenous Commission	Susanne Kelly	Senior Planner	411 West First Street, Room 160	Duluth	MN	55802
Bois Forte Band of Chippewa	Cathy Chavers	Chairwoman	5344 Lakeshore Drive	Nett Lake	MN	55772
Bois Forte Band of Chippewa	Jaylen Strong	Tribate Historic Preservation Officer	206 West 4th Street #204	Duluth	MN	55806
Fond du Lac Band of Lake Superior Chippewa	Kevin Dupuis	Chairman	1720 Big Lake Road	Cloquet	MN	55720
Fond du Lac Band of Lake Superior Chippewa	Jill Hoppe	Tribate Historic Preservation Officer	1720 Big Lake Road	Cloquet	MN	55720
Grand Portage Band of Lake Superior Chippewa	Robert Deschampe	Chairman	PO Box 428	Grand Portage	MN	55605
Grand Portage Band of Lake Superior Chippewa	Mary Ann Gagnon	Tribate Historic Preservation Officer	PO Box 428	Grand Portage	MN	55605
Leech Lake Band of Ojibwe	Faron Jackson	Chairman	190 Sailstar Drive NW	Cass Lake	MN	56633
Leech Lake Band of Ojibwe	Amy Burnette	Tribate Historic Preservation Officer	115 6th Street NW, Suite E	Cass Lake	MN	56633
Mille Lacs Band of Ojibwe	Melanie Benjamin	Chief Executive	43408 Oodena Drive	Onamia	MN	56359
Mille Lacs Band of Ojibwe	Terry Kemper	THPO	43408 Oodena Drive	Onamia	MN	56359
Mille Lacs Band of Ojibwe	Terry Kemper	Interim Tribate Historic Preservation Officer	43408 Oodena Drive	Onamia	MN	56359
Red Lake Nation	Kade Ferris	Archaeologist	PO Box 274	Red Lake	MN	56671
Red Lake Nation	Darrell Seki	Chairman	PO Box 550	Red Lake	MN	56671
White Earth Nation	Michael Fairbanks	Chairman	35500 Eagle View Road	Ogema	MN	56569
White Earth Nation	Jaime Arsenault	Tribate Historic Preservation Officer	PO Box 418	White Earth	MN	56591
State Agencies						
Minnesota Board of Water and Soil Resources	David Demmer	Wetland Specialist	394 South Lake Avenue, Room 403	Duluth	MN	55802
Minnesota Board of Water and Soil Resources	Ryan Hughes	Northern Region Manager	394 South Lake Avenue, Room 403	Duluth	MN	55802
Minnesota Department of Commerce	Bill Storm	Project Manager	85 7th Place, Suite 500	St. Paul	MN	55101-2198
Minnesota Department of Natural Resources	Margi Coyle	Regional Environmental Assessment Ecologists	500 Lafayette Road	St. Paul	MN	55155
Minnesota Department of Natural Resources	Cynthia Warzecha	Energy Projects Review	500 Lafayette Road	St. Paul	MN	55155
Minnesota Department of Transportation	Don Berre	Office of Aeronautics	395 John Ireland Blvd	St. Paul	MN	55155
Minnesota Department of Transportation	Stacy Kotch-Egstad	Utility Routing and Siting Coordinator	395 John Ireland Blvd	St. Paul	MN	55155
Minnesota Indian Affairs Council	Melissa Cerda	Sr Cultural Resources Specialist	1819 Bemidji Avenue North, Suite 2	Bemidji	MN	56601
Minnesota Office of State Archaeologist	David Mather	National Register Archaeologist	State Historic Preservation Office Administration Building #203 50 Sherburne Avenue	St. Paul	MN	55155
Minnesota Pollution Control Agency	Jeff Udd	Duluth Region Manager	525 Lake Avenue South, Suite 400	Duluth	MN	55802
Minnesota Pollution Control Agency	Hans Neve	Pollution Control Program Adminstrator	520 Lafayette Road North	St. Paul	MN	55155
Minnesota Public Utilities Commission	Mike Kaluzniak	Energy Facilities Permitting	121 7th Place East, Suite 350	St. Paul	MN	55101
Minnesota Public Utilities Commission	Scott Ek	Energy Facilities Permitting	121 7th Place East, Suite 350	St. Paul	MN	55101
Minnesota Public Utilities Commission	Bret Eknes	Energy Facilities Supervisor	121 7th Place East, Suite 350	St. Paul	MN	55101
Minnesota State Historic Preservation Office	Sarah Beimers	Environmental Review Manager	50 Sherburne Avenue #203	St. Paul	MN	55155
Office of Attorney General	Keith Ellison	Attorney General	445 Minnesota Street, Suite 1400	St. Paul	MN	55101
Office of the State Archaeologist	Amanda Gronhovd	State Archaeologist	328 West Kellogg Blvd	St. Paul	MN	55102
County Commissioners						
St. Louis County	Annie Harala	Commissioner (1st District)	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County	Patrick Boyle	Commissioner (2nd District)	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County	Ashley Grimm	Commissioner (3rd District)	100 North 5th Avenue West, Room 202	Duluth	MN	55802
St. Louis County	Paul McDonald	Commissioner (4th District)	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County	Keith Musolf	Commissioner (5th District)	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County	Keith Nelson	Commissioner (6th District)	100 North 5th Avenue West	Duluth	MN	55802
County Agencies						
St. Louis County	Kevin Gray	Administrator	100 North 5th Avenue West, Room 202	Duluth	MN	55802
St. Louis County	Matthew Johnson	Planning & Community Development Director	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County	Jim Foldesi	Public Works Director/Highway Engineer	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County	Matthew Johnson	Economic Development Director	320 West 2nd Street, Suite 301	Duluth	MN	55802
St. Louis County Historical Society	JoAnne Coombe	Executive Director	506 West Michigan Street	Duluth	MN	55802
South St. Louis County Soil and Water Conservation District	Tim Beaster	Conservation Specialist	100 North 5th Avenue West	Duluth	MN	55802
South St. Louis County Soil and Water Conservation District	R.C. Boheim	District Manager	215 North 1st Avenue East, Room 301	Duluth	MN	55802
Cities						
City of Hermantown	Wayne Boucher	Mayor	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	John Geiessler	Council Member	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	Gloria Nelson	Council Members	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	Bonnie Engseth	City Clerk	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	John Mulder	City Manager / Administrator	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	Joe Wicklund	Communications & Community Engagement Mgr.	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	Eric Johnson	Community Development Director	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	Paul Senst	Public Works Director	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	Josh Bergstad	Wetland LGU	5105 Maple Grove Road	Hermantown	MN	55811
Townships						
Solway Township	Scott Welsh	Town Board Chair	4029 Munger Shaw Road	Cloquet	MN	55720
Solway Township	Tami McGregor	Township Clerk	4029 Munger Shaw Road	Cloquet	MN	55720
State and Federal Legislators						
State Representative	Natalie Zeleznikar	House District 03B	343 State Office Building	St. Paul	MN	55155
State Senator	Grant Hauschild	Senate District 03	Minnesota Senate Bldg, Room 2221 95 University Avenue West	St. Paul	MN	55155
US House of Representatives	Pete Stauber	Representative - MN 8th District	5094 Miller Trunk Hwy, Suite 900	Hermantown	MN	55811
US Senate	Amy Klobuchar	US Senator	Olcott Plaza, Room 105 820 9th Street North	Virginia	MN	55792
US Senate	Tina Smith	US Senator	60 Plato Blvd, Suite #220	St. Paul	MN	55107

IN THE MATTER OF THE APPLICATION OF
MINNESOTA POWER FOR THE HVDC
MODERNIZATION PROJECT

MPUC DOCKET NO. E015/CN-22-___

CERTIFICATE OF SERVICE

Roshelle L. Herstein certifies that on the 30th day of November, 2022, she filed and served a true and correct copy of Minnesota Power's **Notice Plan Petition** via eDockets (www.edockets.state.mn.us) by uploading the same to Docket No. E015/CN-22-___. Said document was also served as designated on the attached list on file with the Minnesota Public Utilities Commission, designated as "PPSA General List 7850.2100-1A Permit Filings" and was sent to the Office of Attorney General – Residential Utilities Division via email at residential.utilities@ag.state.mn.us.

/s/ Roshelle L. Herstein
Roshelle L. Herstein

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
James J.	Bertrand	james.bertrand@stinson.com	STINSON LLP	50 S 6th St Ste 2600 Minneapolis, MN 55402	Electronic Service	No	SPL_SL__PPSA General List
David	Birkholz	david.birkholz@state.mn.us	MN Department of Commerce	Suite 500 85 7th Place East St. Paul, MN 551012198	Electronic Service	No	SPL_SL__PPSA General List
Michelle F.	Bissonnette	michelle.bissonnette@hdrinc.com	HDR Engineering, Inc.	Golden Hills Office Center 701 Xenia Ave S Ste 600 Minneapolis, MN 55416	Electronic Service	No	SPL_SL__PPSA General List
B. Andrew	Brown	brown.andrew@dorsey.com	Dorsey & Whitney LLP	Suite 1500 50 South Sixth Street Minneapolis, MN 554021498	Electronic Service	No	SPL_SL__PPSA General List
Christina	Brusven	cbrusven@fredlaw.com	Fredrikson Byron	200 S 6th St Ste 4000 Minneapolis, MN 554021425	Electronic Service	No	SPL_SL__PPSA General List
PUC	CAO	consumer.puc@state.mn.us	Public Utilities Commission	Consumer Affairs Office 121 7th Place E Suite 350 St. Paul, MN 55101	Electronic Service	No	SPL_SL__PPSA General List
Bill	Cook	bcook@rpu.org	Rochester Public Utilities	4000 East River Road NE Rochester, MN 55906	Electronic Service	No	SPL_SL__PPSA General List
John	Crane	johncranefishing@gmail.com	Fishing	1250 Wee Gwaus DR SW Bemidji, MN 56601	Electronic Service	No	SPL_SL__PPSA General List
George	Crocker	gwillc@nawo.org	North American Water Office	PO Box 174 Lake Elmo, MN 55042	Electronic Service	No	SPL_SL__PPSA General List
Thomas	Davis	atdavis1972@outlook.com	-	1161 50th Ave Sherburn, MN 56171	Electronic Service	No	SPL_SL__PPSA General List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Patricia	DeBleeckere	tricia.debleeckere@state.mn.us	Public Utilities Commission	121 7th Pl E St 350 St. Paul, MN 55101	Electronic Service	No	SPL_SL__PPSA General List
John E.	Drawz	jdrawz@fredlaw.com	Fredrikson & Byron, P.A.	Suite 4000 200 South Sixth Street Minneapolis, MN 554021425	Electronic Service	No	SPL_SL__PPSA General List
Cory	Dutcher	cory.dutcher@ge.com	GE Power and Water	1 River Rd. Bldg. 37-413 Schenectady, NY 12345	Electronic Service	No	SPL_SL__PPSA General List
Kristen	Eide Tollefson	healingsystems69@gmail.com	R-CURE	28477 N Lake Ave Frontenac, MN 55026-1044	Electronic Service	No	SPL_SL__PPSA General List
Scott	Ek	scott.ek@state.mn.us	Public Utilities Commission	121 7th Place East Suite 350 St. Paul, MN 55101	Electronic Service	No	SPL_SL__PPSA General List
Karen A	Gebhardt	kageb1@gvtel.com		43901 253rd Ave Leonard, MN 56652-4026	Electronic Service	No	SPL_SL__PPSA General List
Larry	Hartman	Larry.Hartman@state.mn.us	Department of Commerce	85 7th Place East, Suite 280 St. Paul, MN 55101	Electronic Service	No	SPL_SL__PPSA General List
Valerie	Herring	vherring@taftlaw.com	Taft Stettinius & Hollister LLP	2200 IDS Center 80 S. Eighth Street Minneapolis, MN 55402	Electronic Service	No	SPL_SL__PPSA General List
Scott	Johnson	Scott.Johnson@ci.medina.mn.us	City of Medina	2052 County Road 24 Medina, MN 55340-9790	Electronic Service	No	SPL_SL__PPSA General List
Michael	Kaluzniak	mike.kaluzniak@state.mn.us	Public Utilities Commission	Suite 350 121 Seventh Place East St. Paul, MN 55101	Electronic Service	No	SPL_SL__PPSA General List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Tom	Karas	tomskaras@gmail.com		3171 309th Ave NW Cambridge, MN 55008	Electronic Service	No	SPL_SL__PPSA General List
Bruce	King	bruce@ranww.org	Realtors, Association of Northwestern WI	Suite 3 1903 Keith Street Eau Claire, WI 54701	Electronic Service	No	SPL_SL__PPSA General List
Chris	Kopel	chrisk@CMPASgroup.org	Central Minnesota Municipal Power Agency	459 S Grove St Blue Earth, MN 56013-2629	Paper Service	No	SPL_SL__PPSA General List
Stacy	Kotch Egstad	Stacy.Kotch@state.mn.us	MINNESOTA DEPARTMENT OF TRANSPORTATION	395 John Ireland Blvd. St. Paul, MN 55155	Electronic Service	No	SPL_SL__PPSA General List
Karen	Kromar	karen.kromar@state.mn.us	MN Pollution Control Agency	520 Lafayette Rd Saint Paul, MN 55155	Electronic Service	No	SPL_SL__PPSA General List
Brian	Meloy	brian.meloy@stinson.com	STINSON LLP	50 S 6th St Ste 2600 Minneapolis, MN 55402	Electronic Service	No	SPL_SL__PPSA General List
Andrew	Moratzka	andrew.moratzka@stoel.com	Stoel Rives LLP	33 South Sixth St Ste 4200 Minneapolis, MN 55402	Electronic Service	No	SPL_SL__PPSA General List
Colleen	Mueller	N/A		22186 State Hwy 4 Paynesville, MN 56362	Paper Service	No	SPL_SL__PPSA General List
Dan	Nelson	Dan.Nelson@ISGinc.com	I&S Group	115 E Hickory St Ste 300 Mankato, MN 56001	Electronic Service	No	SPL_SL__PPSA General List
Carol A.	Overland	overland@legalectric.org	Legalectric - Overland Law Office	1110 West Avenue Red Wing, MN 55066	Electronic Service	No	SPL_SL__PPSA General List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Kevin	Peterson	kjp@ibew160.org	IBEW Local 160	1109 Northway Lane NE Rochester, MN 55906	Electronic Service	No	SPL_SL__PPSA General List
Angela	Piner	angela.piner@hdrinc.com	HDR, Inc.	Suite 600 701 Xenia Avenue South Suite 600 Minneapolis, MN 55416	Electronic Service	No	SPL_SL__PPSA General List
Larry	Rebman	larryemls@hotmail.com	EMLS, Inc	PO Box 122 Appleton, MN 56208	Electronic Service	No	SPL_SL__PPSA General List
Margaret	Rheude	Margaret_Rheude@fws.gov	U.S. Fish and Wildlife Service	Twin Cities Ecological Services Field Office 4101 American Blvd. E. Bloomington, MN 55425	Electronic Service	No	SPL_SL__PPSA General List
Christine	Schwartz	Regulatory.records@xcelenergy.com	Xcel Energy	414 Nicollet Mall FL 7 Minneapolis, MN 554011993	Electronic Service	No	SPL_SL__PPSA General List
Tom	Slukich	tom@nationalconductor.com	National Conductor Constructors	18119 Hwy 371 North Brainderd, MN 56401	Electronic Service	No	SPL_SL__PPSA General List
Adam	Sokolski	adam.sokolski@edf-re.com	EDF Renewable Energy	10 Second Street NE Ste 400 Minneapolis, MN 55410	Electronic Service	No	SPL_SL__PPSA General List
Mark	Strohfus	mstrohfus@grenergy.com	Great River Energy	12300 Elm Creek Boulevard Maple Grove, MN 553694718	Electronic Service	No	SPL_SL__PPSA General List
Carl	Strohm	cjsmg@sbcglobal.net	SBC Global	105 East Edgewood Ave Indianapolis, IN 46227	Electronic Service	No	SPL_SL__PPSA General List

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Tom	Swafford	tswafford@umsi.us	Utility Mapping Services, Inc	3947 E Calvary Rd Suite 103 Duluth, MN 55803	Electronic Service	No	SPL_SL__PPSA General List
Eric	Swanson	eswanson@winthrop.com	Winthrop & Weinstine	225 S 6th St Ste 3500 Capella Tower Minneapolis, MN 554024629	Electronic Service	No	SPL_SL__PPSA General List
Todd	Tadych	ttadych@atcllc.com	American Transmission Company LLC	5303 Fen Oak Dr Madison, WI 53718	Electronic Service	No	SPL_SL__PPSA General List
Caren	Warner	caren.warner@state.mn.us	Department of Commerce	85 7th Place East Suite 280 St. Paul, MN 55101-2198	Electronic Service	No	SPL_SL__PPSA General List
Cynthia	Warzecha	cynthia.warzecha@state.mn.us	Minnesota Department of Natural Resources	500 Lafayette Road Box 25 St. Paul, Minnesota 55155-4040	Electronic Service	No	SPL_SL__PPSA General List
Elizabeth	Wefel	eawefel@flaherty-hood.com	Flaherty & Hood, P.A.	525 Park St Ste 470 Saint Paul, MN 55103	Electronic Service	No	SPL_SL__PPSA General List
Deanna	White	mncwa@cleanwater.org	Clean Water Action & Water Fund of MN	330 S 2nd Ave Ste 420 Minneapolis, MN 55401	Electronic Service	No	SPL_SL__PPSA General List

Appendix E

Commission Orders on Exemption Request and Notice Plan

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Katie J. Sieben	Chair
Valerie Means	Commissioner
Matthew Schuerger	Commissioner
Joseph K. Sullivan	Commissioner
John A. Tuma	Commissioner

David R. Moeller
Senior Regulatory Counsel
Minnesota Power
30 West Superior Street
Duluth, MN, 55802

SERVICE DATE: February 1, 2023

DOCKET NO. E-015/CN-22-607

In the Matter of the Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project

The above entitled matter has been considered by the Commission and the following disposition made:

> **Approved the Applicant's requests for exemption from the required data conditioned upon the provision of the proposed alternative data, with the exceptions of requiring the Applicant to provide data for Minnesota Rules 7849.0280 subpart A for the applicable load area and for Minnesota Rules 7849.0270, subp 2(C) and 2(D), for which the Department requests that the Applicant further explain what kinds of data Minnesota Power proposes to provide when it references "data actually utilized in studying and planning the Project."**

This decision is issued by the Commission's consent calendar subcommittee, under a delegation of authority granted under Minn. Stat. § 216A.03, subd. 8 (a). Unless a party, a participant, or a Commissioner files an objection to this decision within ten days of receiving it, it will become the Order of the full Commission under Minn. Stat. § 216A.03, subd. 8 (b).

The Commission agrees with and adopts the recommendations of the Department of Commerce, which are attached and hereby incorporated into the Order.

BY ORDER OF THE COMMISSION

Will Seuffert
Executive Secretary

To request this document in another format such as large print or audio, call 651.296.0406 (voice). Persons with a hearing or speech impairment may call using their preferred Telecommunications Relay Service or email consumer.puc@state.mn.us for assistance.

COMMERCE
DEPARTMENT

December 12, 2022

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, Minnesota 55101-2147

RE: **Comments of the Minnesota Department of Commerce, Division of Energy Resources**
Docket No. E015/CN-22-607

Dear Mr. Seuffert:

Attached are the comments of the Minnesota Department of Commerce, Division of Energy Resources (Department) in the following matter:

> Exemption Request Petition for the Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project.

The Petition was filed on behalf of Minnesota Power on November 30, 2022 by:

David R. Moeller
Senior Regulatory Counsel
Minnesota Power
30 West Superior Street
Duluth, MN, 55802

The Department recommends that the Minnesota Public Utilities Commission (Commission) **approve the most of the Applicant's proposed exemption requests, with modification, and requests the Applicant provide further explanation regarding some of the proposed alternative data.** The Department is available to answer any questions the Commission may have.

Sincerely,

/s/ MICHAEL N. ZAJICEK
Rates Analyst

MNZ/ja
Attachment

Before the Minnesota Public Utilities Commission

Comments of the Minnesota Department of Commerce
Division of Energy Resources

Docket No. E015/CN-22-607

I. INTRODUCTION

On November 30, 2022, Minnesota Power (MP or the Applicant) filed a *Notice Plan Petition for the Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project* (Notice Petition). The Notice Petition provided the Applicant's proposed Notice Plan to communicate its intent to modernize the High-Voltage Direct-Current (HVDC) terminals by construct new buildings and electrical infrastructure on a new site near the existing terminals. This would additionally require the construction of a new 345/230 kV substation less than one mile from the existing Arrowhead Substation, which would be connected by a less than one mile 345 kV large high-voltage transmission line (LHVTL) and two parallel 230 kV LHVTL less than one mile in length. Finally, a small portion of existing line would need to be reconfigured to terminate at the new HVDC terminal. The Minnesota Public Utilities Commission (Commission) has not yet ruled on the Notice Petition.

Also, on November 30, 2022, MP filed an *Exemption Request Petition for the Application of Minnesota Power for a Certificate of Need for HVDC Modernization Project* (Exemption Petition) in order to obtain exemptions from certain data requirements of Minnesota Rules part 7849. Below are the Comments of the Minnesota Department of Commerce, Division of Energy Resources, Energy Regulation and Planning (Department) on the Exemption Petition.

II. DEPARTMENT ANALYSIS

A. BACKGROUND

The Applicant proposes to modernize the existing HVDC system that extends for 465 miles from Arrowhead Substation in Hermantown, Minnesota, to Center Substation in Center, North Dakota. This project involves replacing the HVDC substation infrastructure in Minnesota as the current facilities are 15 years passed their 30-year design life. MP states that due to the age of the facilities more outages are occurring, and failure rates of components are increasing in frequency and duration. Additionally, MP states replacement components are becoming increasing limited due to age. As listed in the Exemption petition, the proposed project includes:

- Construction of new buildings and electrical infrastructure near the existing HVDC terminals;
- Construction of a new St Louis County 345 kV/230 kV substation located less than one mile from the current Arrowhead Substation;
- Less than one mile of 345 kV large high-voltage transmission line (LHVTL) connecting the new St Louis County Substation to the new HVDC terminal buildings;

- Two parallel 230 kV LHVTLs less than on mile in length connecting the new St Louis County Substation and the Arrowhead Substation; and
- Reconfiguring a small portion of the existing HVDC line in Minnesota so that it will terminate at the new HVDC terminal.

Minnesota Statutes §216B.2421, subd. 2 (2) defines a large energy facility (LEF) as "any high-voltage transmission line with a capacity of 200 kilovolts or more and greater than 1,500 feet in length." In turn, Minnesota Statutes §216B.243, subd. 2 states "[n]o large energy facility shall be sited or constructed in Minnesota without the issuance of a certificate of need by the Commission." Since the project calls for almost a mile of 345 kV of transmission line construction and almost a mile of two parallel 230 kv, the Department concludes that the proposed project qualifies as a LEF and a Certificate of Need (CN) is required. The Department notes that Minnesota Statutes §216B.243, subd. 8(a)(4) discussing cases where this statue does not apply states "a high voltage transmission line of one mile or less required to connect a new or upgraded substation to an existing, new, or upgraded high-voltage transmission line" does not apply as the total amount of LHVTL is greater than one mile in length. Minnesota Rules part 7849 includes the filing requirements for a CN for an electric transmission facility.

The Exemption Petition states that the project will:

- Reduce the frequency of unplanned outages;
- Improve grid support functionality; and
- Accommodate future expansion of the HVDC system;

B. APPLICANT'S REQUEST

In the Exemption Petition, the Applicant requests exemption from providing data relevant to the following portions of Minnesota Rules:

- 7849.0270, subps. 1, System Wide Data;
- 7849.0270, subps. 2(A) and 2(B), Customer Class Information;
- 7849.0270, subp. 2(C) and 2(D), System Demand and Peak Demand;
- 7849.0270, subp. 2(E), System Revenue Requirements;
- 7849.0270, subp. 2(F), Weekly Load Factor;
- 7849.0270, subps. 3-6, Forecast Methodology, Data Base Assumptions, and Coordination of Forecasts;
- 7849.0280, System Capacity;
- 7849.0290, Conservation; and
- 7849.0300, Consequences of Delay and 7849.0340, Alternative of No Facility.

Minnesota Rules 7849.0200, subp. 6 states:

> Before submitting an application, a person is exempted from any data requirement of this chapter if the person (1) requests an exemption from specified rules, in writing to the commission and
> (2) shows that the data requirement is unnecessary to determine the need for the proposed facility or may be satisfied by submitting another document.

The Department examines each specific exemption request separately. The required criterion is whether the Applicant has shown that "the data requirement is unnecessary to determine the need for the proposed facility or may be satisfied by submitting another document" as noted above.

C. ANALYSIS OF EXEMPTION REQUESTS

1. Minnesota Rules 7849.0270, subp. 1

This rule requires an applicant to provide information regarding peak demand and annual consumption for the applicant's entire system. The Applicant requests an exemption from this requirement as the project is designed to upgrade and modernize the existing infrastructure to assure reliability due to the increasing failure rates of components, rather than address peak demand or annual consumption. Instead, the Applicant proposes to provide forecast information from its most recent annual forecast report.

The Department agrees that the data the Applicant proposes to provide is appropriate, and that peak demand and annual consumption data will not be useful as neither is causing the need for the Project.

In summary, the Department recommends that the Commission approve the Applicant's proposed exemption to Minnesota Rules 7849.0270, subp. 1 conditioned upon the provision of the proposed alternative data.

2. Minnesota Rules 7849.0270, subps. 2(A) and 2(B)

These rules require an applicant to predict the number of customers and the amount of energy consumed annually by nine classes of customers. These requirements were crafted to examine the construction of new transmission lines to connect new sources of electricity to new sources of demand. MP states that energy consumption data is not relevant to establishing the need for the proposed transmission line, as it must be sized for the peak energy demand, not annual demand. The Applicant requested an exemption to Minnesota Rules 7849.0270, subps. 2(a) and 2(b), proposing to instead provide data from its most recent annual forecast report.

The Department agrees that the methodology that the Applicant proposes to use is appropriate and that the annual customer and energy consumption information is not relevant in this case. The Department agrees that the Applicant's proposed substitute data is reasonable.

In summary, the Department recommends that the Commission approve the Applicant's proposed exemption to Minnesota Rules 7849.0270, subps. 2(A) and 2(B), conditioned upon the provision of local substation load data and annual forecast report information.

3. Minnesota Rules 7849.0270, subp. 2(C) and 2(D)

Minnesota Rule 7849.0270, subp. 2(C) requires an applicant to estimate the demand for power in the applicant's system at the time of the annual system peak demand, provided by customer class, while Minnesota Rule 7849.0270, subp. 2(D) calls for monthly system peak demand data. The Department notes that, as discussed above, the applicant has already requested exemptions from the customer class data requirement. The Applicant proposed to provide data used in studying and planning the Project and annual forecast report information.

The Department agrees that data from the annual forecast report is relevant, however it is unclear what data the Company intends to provide when it references the "data actually utilized in studying and planning the Project." In the past the Department has generally agreed that local load data, typically the actual historical load for local substations and annual forecast information is appropriate.

The Department requests that the Applicant explain further in reply comments what data it proposes to provide as an alternative to the required data on demand for system and peak demand.

4. Minnesota Rules 7849.0270, subp. 2(E), System Revenue Requirements

This rule requires "the estimated annual revenue requirement per kilowatt hour for the system in current dollars" for each forecast year. The Applicant proposed to provide information on the general rate impact of the Project on MP customers.

The Department agrees that the data the Applicant proposes to provide is a reasonable substitute to the system revenue data requirements. As this project is needed for reliability concerns, it is not particularly necessary for the Department's analysis. However, as the Department has noted in previous exemption request comments,[1] this information is useful to show the impact of the project to non-technical audiences, and thus the Department apricates the alternative information proposed by the Applicant.

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[1] See Docket Nos. ET-2,E002/CN-06-1115, E017,E015/CN-07-1222, and ET2,E015/CN-10-973

In summary, the Department recommends that the Commission approve the Applicant's proposed exemption to Minnesota Rules 7849.0270, subp. 2(E) conditioned upon the provision of the proposed alternative data.

5. Minnesota Rules 7849.0270, subp. 2(F), Weekday Load Factor

This rule requires the Applicant to provide its average system weekday load factor for each month. The Applicant requested this exemption because they concluded that load factor is not a relevant measure when evaluating the need for a transmission facility.

The Department agrees with the Applicant that load factor is not relevant in assessing the need for the proposed project and thus recommends that the Commission approve the Applicant's proposed exemption to Minnesota Rules 7849.0270, subp. 2(F).

6. Minnesota Rules 7849.0270, subps. 3-6, Forecast Methodology

These rules require the Applicant to provide detailed information on the forecast methodology employed, identification of databases, details on the assumptions made in preparing the forecasts provided under Subpart 2 of the same rule, and a description of load forecast coordination efforts with other systems. The Applicant requested this exemption because the Project is not prompted by electrical consumption, but rather by demand during peak times. The Applicant proposed to instead provide data from its most recent annual forecast report, which discusses forecast methodology, databases, forecast assumptions, and coordination of forecasts with other systems.

The Department agrees that the data the Applicant's proposed to provide would allow the evaluation of the claimed need in the proposed load area. The proposed data is more relevant given the Applicant's stated reasons for the need for the proposed Project.

In summary, the Department recommends that the Commission approve the Applicant's proposed exemption to Minnesota Rules 7849.0270, subps. 3-6 conditioned upon the provision of the proposed alternative data.

7. Minnesota Rules 7849.0280, System Capacity Information

This rule requires the applicant to provide information that describes the ability of its existing system to meet forecasted demand; in essence, load and capability information. The Commission has noted in the past that much of Minn. Rule 7849.0280 pertains to electric generators.[2] The Applicant notes that

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[2] Id.

subparts A through I of the rule apply to generators and not transmission proposals. The Applicant requests an exemption from Rule 7849.0280.

The Department agrees that information relating to the affected load area for the Project is more relevant and that aspects of the rule relating to generators are not applicable. However, the Applicant requests an exemption from the entire rule, rather than just the portions that do not apply. For instance in Docket No. ET2,E015/CN-10-973 the Commission did not grant an exemption to subpart's A, although the Commission allowed data on the "applicable load area" instead, and H. The Applicant does not provide any reason why those specific requirements should be exempted in this case, however the Department agrees that the data for subpart H appears to be more focused for generators, and does not appear applicable to the analysis of the certificate of need in this case. Therefore, the Department recommends that the Commission approve the Applicant's proposed exemption to Minnesota Rules 7849.0280 for parts B though G and I, but require the Applicant to provide data on subpart A for the applicable load area.

8. Minnesota Rules 7849.0290, Conservation Programs

This rule requires the applicant to provide conservation program information and quantification of the impact of conservation programs on forecast data. The Applicant notes that all of MP's conservation efficiency information is examined in detail in the resource planning process and all of the information requested is already contained in MP's Integrated Resource Plan and Conservation Improvement Plan filings.[3] MP proposes to present a summary of those filings rather than replicate the data in the instant docket.

The Department agrees that a summary of the relevant information is sufficient and notes the Commission has granted a similar exemption for MP in the past.[4] Thus, the Department recommends that the Commission approve the Applicant's proposed exemption to Minnesota Rules 7849.0290 conditioned upon the provision of the proposed alternative data.

9. Minnesota Rules 7849.0300, Consequences of Delay, and 7849.0340, No-Facility Alternative

Minnesota Rule 7849.0300 requires detailed information regarding the consequences of delay on three specific statistically based levels of demand and energy consumption. Minnesota Rule 7849.0340 requires a discussion of what the impact would be on existing generation and transmission facilities at the three levels of demand specified in part 7849.0300 for the no-build alternative. As the project is

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[3] Docket Nos. E015/RP-21-33 and E015/CIP-20-476.

[4] Docket No. E015/CN-12-1163.

needed specifically due to peak demand issues, the Applicant requests an exemption so as to only provide data at the peak demand level.

The Department agrees with the Applicant that the proposed data, focusing on peak demand is relevant to the claimed need and that the other data is extraneous. Therefore, the Department recommends that the Commission grant the exemption to Minnesota Rules 7849.0300 and 7849.0340 requiring the Applicant to only provide the required information for the peak demand level.

III. DEPARTMENT RECOMMENDATION

The Department recommends that the Commission approve the Applicant's requests for exemption from the required data conditioned upon the provision of the proposed alternative data, with the exceptions of requiring the Applicant to provide data for Minnesota Rules 7849.0280 subpart A for the applicable load area and for Minnesota Rules 7849.0270, subp 2(C) and 2(D), for which the Department requests that the Applicant further explain what kinds of data MP proposes to provide when it references "data actually utilized in studying and planning the Project."

COMMERCE
DEPARTMENT

December 12, 2022

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, Minnesota 55101-2147

RE: **Comments of the Minnesota Department of Commerce, Division of Energy Resources**
Docket No. E015/CN-22-607

Dear Mr. Seuffert:

Attached are the comments of the Minnesota Department of Commerce, Division of Energy Resources (Department) in the following matter:

> Notice Plan Petition for the Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project.

The Petition was filed on behalf of Minnesota Power on November 30, 2022 by:

David R. Moeller
Senior Regulatory Counsel
30 West Superior Street
Duluth, MN, 55802

The Department recommends that the Minnesota Public Utilities Commission (Commission) **approve the Company's proposed notice plan.** The Department is available to answer any questions the Commission may have.

Sincerely,

/s/ MICHAEL N. ZAJICEK
Rates Analyst

MNZ/ja
Attachment

85 7th Place East - Suite 280 - Saint Paul, MN 55101 | P: 651-539-1500 | F: 651-539-1547
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Before the Minnesota Public Utilities Commission

Comments of the Minnesota Department of Commerce
Division of Energy Resources

Docket No. E015/CN-22-607

I. INTRODUCTION

On November 30, 2022, Minnesota Power (MP or the Applicant) filed a *Notice Plan Petition for the Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project* (Notice Petition). The Notice Petition provided the Applicant's proposed Notice Plan to communicate its intent to modernize the High-Voltage Direct-Current (HVDC) terminals by construct new buildings and electrical infrastructure on a new site near the existing terminals. This would additionally require the constructure of a new 345/230 kV substation less than one mile from the existing Arrowhead Substation, which would be connected by a less than one mile 345 kV large high-voltage transmission line (LHVTL) and two parallel 230 kV LHVTL less than one mile in length. Finally, a small portion of existing line would need to be reconfigured to terminate at the new HVDC terminal.

According to MP, the project is needed to modernize aging HVDC assets that are 15 years past their 30-year design life. Modernizing the HVDC system by replacing the terminals will improve reliability, reduce the frequency of outages, and the new facility will be designed to provide further services such as additional voltage regulations, frequency response, blackstart capability, and bidirectional power transfer capability. The Notice Petition includes a draft notice for landowners and residents, elected officials, tribal government contacts, and agencies within the Notice Area.

Below are the Comments of the Minnesota Department of Commerce, Division of Energy Resources, Energy Regulation and Planning (Department) on the Notice Petition.

II. DEPARTMENT ANALYSIS

The Department's Energy Environmental Review and Analysis Staff (EERA) may provide its own recommendations regarding the content of the notice letter; the following comments are the Department's Division of Energy Resources, Energy Regulation and Planning analysis on whether the Applicant's notice plan meets the statutory requirements.

A. TYPES OF NOTICE

Minnesota Rules 7829.2550, subp. 3 requires the following types of notice:

- direct mail notice, based on county tax assessment rolls, to landowners reasonably likely to be affected by the proposed transmission line;

- direct mail notice to all mailing addresses within the area reasonably likely to be affected by the proposed transmission line;
- direct mail notice to tribal governments and to the governments of towns, statutory cities, home rule charter cities, and counties whose jurisdictions are reasonably likely to be affected by the proposed transmission line; and
- newspaper notice to members of the public in areas reasonably likely to be affected by the proposed transmission line.

Regarding landowner and resident notice, the Applicant proposed to provide notice to landowners in the notice area via names and addresses obtained using County GIS data, which includes tax record information. The Department concludes that this is reasonable.

Regarding newspaper notice, the Applicant listed and selected three local newspapers to the newspaper notice list, and for the requirement for notice of the project in a newspaper of general circulation throughout the state Minnesota Power proposes to publish a notice in the StarTribune. The Department concludes that the Applicant's proposed plan for newspaper notice is reasonable.

Regarding governmental notice, the Department's review of the Applicant's list of governments proposed to receive notice complies with the requirements of the rule.

Regarding tribal governments, the Department's review of the Applicant's list of tribal governments proposed to receive notice complies with the requirements of the rule.

In summary, the Department concludes that the Applicant's Notice Plan for residents, landowners, newspapers, and governmental entities is reasonable after any recommended additions by EERA staff.

B. CONTENT OF NOTICE

Minnesota Rules 7829.2550, subp. 4 requires the notices to provide the following information:

- a map showing the end points of the line and existing transmission facilities in the area;
- a description of general right-of-way requirements for a line of the size and voltage proposed and a statement that the applicant intends to acquire property rights for the right-of-way that the proposed line will require;
- a notice that the line cannot be constructed unless the Minnesota Public Utilities Commission (Commission) certifies that it is needed;
- the Commission's mailing address, telephone number, and website;
- if the applicant is a utility subject to chapter 7848, the address of the website on which the utility applicant will post or has posted its biennial transmission projects report required under that chapter;

- a statement that the Environmental Quality Board[1] will be preparing an environmental report on each high-voltage transmission line for which certification is requested;
- a brief explanation of how to get on the mailing list for the Environmental Quality Board's proceeding; and
- a statement that requests for certification of high-voltage transmission lines are governed by Minnesota law, including specifically chapters 4410 and 7849, and Minnesota Statutes, section 216B.243.

The Department reviewed the cover letters and maps provided by the Applicant and concludes that the Applicant's proposal for the resident/landowner notice, governmental notice, and newspaper notice generally contains the required information and is acceptable after any edits recommended by EERA staff.

C. NOTICE TIMING

Minnesota Rules 7829.2550, subp. 6, requires the applicant to implement the Notice Plan within 30 days of its approval by the Commission. Regarding the timing of the implementation of the proposed Notice Plan, the Applicant requested that the Commission modify the notice implementation rule in order to allow implementation no more than 60 days and no less than two weeks prior to the filing of the Certificate of Need (CN) petition. The Commission has ordered a similar approach, in several dockets.[2]

Minnesota Rules 7829.3200 governs such variance requests and establishes the following criteria:

1. enforcement of the rule would impose an excessive burden upon the applicant or others affected by the rule;
2. granting the variance would not adversely affect the public interest; and
3. granting the variance would not conflict with standards imposed by law.

---

[1] The Department notes that while the statutes have changed regarding routing authority and location of the staff preparing the environmental report, Minnesota Rules have not yet been updated to reflect these changes.

[2] Examples include:
- November 3, 2006 in Docket No. E002, ET2, et al/CN-08-1115;
- November 29, 2007 in Docket No. E017, E015, ET6/CN-07-1222;
- November 12, 2008 in Docket No. E002/CN-08-992;
- January 26, 2010 in Docket No. E002/CN-09-1390; and
- August 17, 2010 in Docket No. E002/CN-10-694.
- February 4, 2013 in Docket No. E002/CN-12-1235
- January 15, 2021 in Docket No. IP-7041/CN-20-764

The Department concludes that enforcement of the rule would burden all parties involved by separating the provision of notice from the start of the proceeding. Granting the variance would not adversely affect the public interest since the Applicant's proposal would more closely tie the implementation of notice to the beginning of the CN proceeding. The Department is not aware that the variance would conflict with standards imposed by law. Therefore, the Department recommends that the Commission approve the Applicant's request to implement the notice plan no more than 60 days and no less than two weeks prior to the filing of the CN petition.

III. DEPARTMENT RECOMMENDATIONS

As discussed above, the Department recommends that the Commission approve the Applicant's proposed Notice Plan with any modifications recommended by EERA staff.

Further, the Department recommends that the Commission grant the Applicant a variance to Minnesota Rules 7829.2550, subp. 6 to allow implementation of the Notice Plan no more than 60 days prior to the filing of the CN petition.

CERTIFICATE OF SERVICE

I, Robin Benson, hereby certify that I have this day, served a true and correct copy of the following document to all persons at the addresses indicated below or on the attached list by electronic filing, electronic mail, courier, interoffice mail or by depositing the same enveloped with postage paid in the United States mail at St. Paul, Minnesota.

Minnesota Public Utilities Commission
ORDER

Docket Number: **E-015/CN-22-607**

Dated this **1st** day of **February, 2023**

/s/ Robin Benson

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Sarah	Beimers	sarah.beimers@state.mn.us	Department of Administration - State Historic Preservation Office	50 Sherburne Avenue Suite 203 St. Paul, MN 55155	Electronic Service	No	OFF_SL_22-607_CN-22-607
David	Bell	david.bell@state.mn.us	Department of Health	POB 64975 St. Paul, MN 55164	Electronic Service	No	OFF_SL_22-607_CN-22-607
James J.	Bertrand	james.bertrand@stinson.com	STINSON LLP	50 S 6th St Ste 2600 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_22-607_CN-22-607
David	Birkholz	david.birkholz@state.mn.us	MN Department of Commerce	Suite 500 85 7th Place East St. Paul, MN 551012198	Electronic Service	No	OFF_SL_22-607_CN-22-607
Michelle F.	Bissonnette	michelle.bissonnette@hdrinc.com	HDR Engineering, Inc.	Golden Hills Office Center 701 Xenia Ave S Ste 600 Minneapolis, MN 55416	Electronic Service	No	OFF_SL_22-607_CN-22-607
B. Andrew	Brown	brown.andrew@dorsey.com	Dorsey & Whitney LLP	Suite 1500 50 South Sixth Street Minneapolis, MN 554021498	Electronic Service	No	OFF_SL_22-607_CN-22-607
Christina	Brusven	cbrusven@fredlaw.com	Fredrikson Byron	200 S 6th St Ste 4000 Minneapolis, MN 554021425	Electronic Service	No	OFF_SL_22-607_CN-22-607
PUC	CAO	consumer.puc@state.mn.us	Public Utilities Commission	Consumer Affairs Office 121 7th Place E Suite 350 St. Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607
Generic Notice	Commerce Attorneys	commerce.attorneys@ag.state.mn.us	Office of the Attorney General-DOC	445 Minnesota Street Suite 1400 St. Paul, MN 55101	Electronic Service	Yes	OFF_SL_22-607_CN-22-607
Bill	Cook	bcook@rpu.org	Rochester Public Utilities	4000 East River Road NE Rochester, MN 55906	Electronic Service	No	OFF_SL_22-607_CN-22-607

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
John	Crane	johncranefishing@gmail.com	Fishing	1250 Wee Gwaus DR SW Bemidji, MN 56601	Electronic Service	No	OFF_SL_22-607_CN-22-607
George	Crocker	gwillc@nawo.org	North American Water Office	PO Box 174 Lake Elmo, MN 55042	Electronic Service	No	OFF_SL_22-607_CN-22-607
Thomas	Davis	atdavis1972@outlook.com	-	1161 50th Ave Sherburn, MN 56171	Electronic Service	No	OFF_SL_22-607_CN-22-607
Patricia	DeBleeckere	tricia.debleeckere@state.mn.us	Public Utilities Commission	121 7th Pl E St 350 St. Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607
Randall	Doneen	randall.doneen@state.mn.us	Department of Natural Resources	500 Lafayette Rd, PO Box 25 Saint Paul, MN 55155	Electronic Service	No	OFF_SL_22-607_CN-22-607
John E.	Drawz	jdrawz@fredlaw.com	Fredrikson & Byron, P.A.	Suite 4000 200 South Sixth Street Minneapolis, MN 554021425	Electronic Service	No	OFF_SL_22-607_CN-22-607
Cory	Dutcher	cory.dutcher@ge.com	GE Power and Water	1 River Rd. Bldg. 37-413 Schenectady, NY 12345	Electronic Service	No	OFF_SL_22-607_CN-22-607
Kristen	Eide Tollefson	healingsystems69@gmail.com	R-CURE	28477 N Lake Ave Frontenac, MN 55026-1044	Electronic Service	No	OFF_SL_22-607_CN-22-607
Scott	Ek	scott.ek@state.mn.us	Public Utilities Commission	121 7th Place East Suite 350 St. Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607
Kate	Fairman	kate.frantz@state.mn.us	Department of Natural Resources	Box 32 500 Lafayette Rd St. Paul, MN 551554032	Electronic Service	No	OFF_SL_22-607_CN-22-607

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Annie	Felix Gerth	annie.felix-gerth@state.mn.us		Board of Water & Soil Resources 520 Lafayette Rd Saint Paul, MN 55155	Electronic Service	No	OFF_SL_22-607_CN-22-607
Sharon	Ferguson	sharon.ferguson@state.mn.us	Department of Commerce	85 7th Place E Ste 280 Saint Paul, MN 551012198	Electronic Service	No	OFF_SL_22-607_CN-22-607
Karen A	Gebhardt	kageb1@gvtel.com		43901 253rd Ave Leonard, MN 56652-4026	Electronic Service	No	OFF_SL_22-607_CN-22-607
Todd	Green	Todd.A.Green@state.mn.us	Minnesota Department of Labor & Industry	443 Lafayette Rd N St. Paul, MN 55155-4341	Electronic Service	No	OFF_SL_22-607_CN-22-607
Larry	Hartman	Larry.Hartman@state.mn.us	Department of Commerce	85 7th Place East, Suite 280 St. Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607
Valerie	Herring	vherring@taftlaw.com	Taft Stettinius & Hollister LLP	2200 IDS Center 80 S. Eighth Street Minneapolis, MN 55402	Electronic Service	No	OFF_SL_22-607_CN-22-607
Kari	Howe	kari.howe@state.mn.us	DEED	332 Minnesota St, #E200 1ST National Bank Bldg St. Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607
Scott	Johnson	Scott.Johnson@ci.medina.mn.us	City of Medina	2052 County Road 24 Medina, MN 55340-9790	Electronic Service	No	OFF_SL_22-607_CN-22-607
Michael	Kaluzniak	mike.kaluzniak@state.mn.us	Public Utilities Commission	Suite 350 121 Seventh Place East St. Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Tom	Karas	tomskaras@gmail.com		3171 309th Ave NW Cambridge, MN 55008	Electronic Service	No	OFF_SL_22-607_CN-22-607
Bruce	King	Brenda@ranww.org	Realtors, Association of Northwestern WI	Suite 3 1903 Keith Street Eau Claire, WI 54701	Electronic Service	No	OFF_SL_22-607_CN-22-607
Ray	Kirsch	Raymond.Kirsch@state.mn.us	Department of Commerce	85 7th Place E Ste 500 St. Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607
Chad	Konickson	chad.konickson@usace.army.mil	U.S.Army Corps of Engineers	180 5th St # 700 Saint Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607
Chris	Kopel	chrisk@CMPASgroup.org	Central Minnesota Municipal Power Agency	459 S Grove St Blue Earth, MN 56013-2629	Paper Service	No	OFF_SL_22-607_CN-22-607
Stacy	Kotch Egstad	Stacy.Kotch@state.mn.us	MINNESOTA DEPARTMENT OF TRANSPORTATION	395 John Ireland Blvd. St. Paul, MN 55155	Electronic Service	No	OFF_SL_22-607_CN-22-607
Karen	Kromar	karen.kromar@state.mn.us	MN Pollution Control Agency	520 Lafayette Rd Saint Paul, MN 55155	Electronic Service	No	OFF_SL_22-607_CN-22-607
Peter E.	Madsen	pmadsen@taftlaw.com	Taft Stettinius & Hollister LLP	2200 IDS Center 80 South 8th Street Minneapolis, MN 55402	Electronic Service	No	OFF_SL_22-607_CN-22-607
Dawn S	Marsh	dawn_marsh@fws.gov	U.S. Fish & Wildlife Service	Minnesota-Wisconsin Field Offices 4101 American Blvd E Bloomington, MN 55425	Electronic Service	No	OFF_SL_22-607_CN-22-607
Dan	McCourtney	dmccourtney@mnpower.com	Minnesota Power	30 West Superior St Duluth, MN 55802	Electronic Service	No	OFF_SL_22-607_CN-22-607

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
David	Moeller	dmoeller@allete.com	Minnesota Power	30 W Superior St Duluth, MN 558022093	Electronic Service	No	OFF_SL_22-607_CN-22-607
Andrew	Moratzka	andrew.moratzka@stoel.com	Stoel Rives LLP	33 South Sixth St Ste 4200 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_22-607_CN-22-607
Colleen	Mueller	N/A		22186 State Hwy 4 Paynesville, MN 56362	Paper Service	No	OFF_SL_22-607_CN-22-607
Dan	Nelson	Dan.Nelson@ISGinc.com	I&S Group	115 E Hickory St Ste 300 Mankato, MN 56001	Electronic Service	No	OFF_SL_22-607_CN-22-607
Carol A.	Overland	overland@legalectric.org	Legalectric - Overland Law Office	1110 West Avenue Red Wing, MN 55066	Electronic Service	No	OFF_SL_22-607_CN-22-607
Kevin	Peterson	kjp@ibew160.org	IBEW Local 160	1109 Northway Lane NE Rochester, MN 55906	Electronic Service	No	OFF_SL_22-607_CN-22-607
Angela	Piner	angela.piner@hdrinc.com	HDR, Inc.	Suite 600 701 Xenia Avenue South Suite 600 Minneapolis, MN 55416	Electronic Service	No	OFF_SL_22-607_CN-22-607
Larry	Rebman	larryemls@hotmail.com	EMLS, Inc	PO Box 122 Appleton, MN 56208	Electronic Service	No	OFF_SL_22-607_CN-22-607
Generic Notice	Residential Utilities Division	residential.utilities@ag.state.mn.us	Office of the Attorney General-RUD	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012131	Electronic Service	Yes	OFF_SL_22-607_CN-22-607

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Margaret	Rheude	Margaret_Rheude@fws.gov	U.S. Fish and Wildlife Service	Twin Cities Ecological Services Field Office 4101 American Blvd. E. Bloomington, MN 55425	Electronic Service	No	OFF_SL_22-607_CN-22-607
Stephan	Roos	stephan.roos@state.mn.us	MN Department of Agriculture	625 Robert St N Saint Paul, MN 55155-2538	Electronic Service	No	OFF_SL_22-607_CN-22-607
Christine	Schwartz	Regulatory.records@xcelenergy.com	Xcel Energy	414 Nicollet Mall FL 7 Minneapolis, MN 554011993	Electronic Service	No	OFF_SL_22-607_CN-22-607
Will	Seuffert	Will.Seuffert@state.mn.us	Public Utilities Commission	121 7th Pl E Ste 350 Saint Paul, MN 55101	Electronic Service	Yes	OFF_SL_22-607_CN-22-607
Tom	Slukich	tom@nationalconductor.com	National Conductor Constructors	18119 Hwy 371 North Brainderd, MN 56401	Electronic Service	No	OFF_SL_22-607_CN-22-607
Adam	Sokolski	adam.sokolski@edf-re.com	EDF Renewable Energy	10 Second Street NE Ste 400 Minneapolis, MN 55410	Electronic Service	No	OFF_SL_22-607_CN-22-607
Mark	Strohfus	mstrohfus@grenergy.com	Great River Energy	12300 Elm Creek Boulevard Maple Grove, MN 553694718	Electronic Service	No	OFF_SL_22-607_CN-22-607
Carl	Strohm	cjsmg@sbcglobal.net	SBC Global	105 East Edgewood Ave Indianapolis, IN 46227	Electronic Service	No	OFF_SL_22-607_CN-22-607
Tom	Swafford	tswafford@umsi.us	Utility Mapping Services, Inc	3947 E Calvary Rd Suite 103 Duluth, MN 55803	Electronic Service	No	OFF_SL_22-607_CN-22-607

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Eric	Swanson	eswanson@winthrop.com	Winthrop & Weinstine	225 S 6th St Ste 3500 Capella Tower Minneapolis, MN 554024629	Electronic Service	No	OFF_SL_22-607_CN-22-607
Todd	Tadych	ttadych@atcllc.com	American Transmission Company LLC	5303 Fen Oak Dr Madison, WI 53718	Electronic Service	No	OFF_SL_22-607_CN-22-607
Jayme	Trusty	execdir@swrdc.org	SWRDC	2401 Broadway Ave #1 Slayton, MN 56172	Electronic Service	No	OFF_SL_22-607_CN-22-607
Jen	Tyler	tyler.jennifer@epa.gov	US Environmental Protection Agency	Environmental Planning & Evaluation Unit 77 W Jackson Blvd. Mailstop B-19J Chicago, IL 60604-3590	Electronic Service	No	OFF_SL_22-607_CN-22-607
Kodi	Verhalen	kverhalen@taftlaw.com	Taft Stettinius & Hollister LLP	80 S 8th St Ste 2200 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_22-607_CN-22-607
Caren	Warner	caren.warner@state.mn.us	Department of Commerce	85 7th Place East Suite 280 St. Paul, MN 55101-2198	Electronic Service	No	OFF_SL_22-607_CN-22-607
Cynthia	Warzecha	cynthia.warzecha@state.mn.us	Minnesota Department of Natural Resources	500 Lafayette Road Box 25 St. Paul, Minnesota 55155-4040	Electronic Service	No	OFF_SL_22-607_CN-22-607
Elizabeth	Wefel	eawefel@flaherty-hood.com	Flaherty & Hood, P.A.	525 Park St Ste 470 Saint Paul, MN 55103	Electronic Service	No	OFF_SL_22-607_CN-22-607
Alan	Whipple	sa.property@state.mn.us	Minnesota Department Of Revenue	Property Tax Division 600 N. Robert Street St. Paul, MN 551463340	Electronic Service	No	OFF_SL_22-607_CN-22-607

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Deanna	White	mncwa@cleanwater.org	Clean Water Action & Water Fund of MN	330 S 2nd Ave Ste 420 Minneapolis, MN 55401	Electronic Service	No	OFF_SL_22-607_CN-22-607
Jonathan	Wolfgram	Jonathan.Wolfgram@state.mn.us	Office of Pipeline Safety	445 Minnesota St Ste 147 Woodbury, MN 55125	Electronic Service	No	OFF_SL_22-607_CN-22-607

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Katie J. Sieben	Chair
Valerie Means	Commissioner
Matthew Schuerger	Commissioner
Joseph K. Sullivan	Commissioner
John A. Tuma	Commissioner

David R. Moeller
Senior Regulatory Counsel
Minnesota Power
30 West Superior Street Duluth, MN, 55802

SERVICE DATE: February 14, 2023

DOCKET NO. E-015/CN-22-607

In the Matter of the Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project

The above-entitled matter has been considered by the Commission and the following disposition made:

1. **Approved the Applicant's proposed Notice Plan with modifications recommended by EERA staff.**

2. **Granted the Applicant a variance to Minnesota Rules 7829.2550, subp. 6 to allow implementation of the Notice Plan no more than 60 days prior to the filing of the Certificate of Need petition.**

This decision is issued by the Commission's consent calendar subcommittee, under a delegation of authority granted under Minn. Stat. § 216A.03, subd. 8 (a). Unless a party, a participant, or a Commissioner files an objection to this decision within ten days of receiving it, it will become the Order of the full Commission under Minn. Stat. § 216A.03, subd. 8 (b).

The Commission agrees with and adopts the recommendations of the Department of Commerce, which are attached and hereby incorporated into the Order.

BY ORDER OF THE COMMISSION

1858

Will Seuffert
Executive Secretary

To request this document in another format such as large print or audio, call 651.296.0406 (voice). Persons with a hearing or speech impairment may call using their preferred Telecommunications Relay Service or email consumer.puc@state.mn.us for assistance.

COMMERCE
DEPARTMENT

December 12, 2022

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, Minnesota 55101-2147

RE: **Comments of the Minnesota Department of Commerce, Division of Energy Resources**
Docket No. E015/CN-22-607

Dear Mr. Seuffert:

Attached are the comments of the Minnesota Department of Commerce, Division of Energy Resources (Department) in the following matter:

> Notice Plan Petition for the Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project.

The Petition was filed on behalf of Minnesota Power on November 30, 2022 by:

David R. Moeller
Senior Regulatory Counsel
30 West Superior Street
Duluth, MN, 55802

The Department recommends that the Minnesota Public Utilities Commission (Commission) **approve the Company's proposed notice plan.** The Department is available to answer any questions the Commission may have.

Sincerely,

/s/ MICHAEL N. ZAJICEK
Rates Analyst

MNZ/ja
Attachment

85 7th Place East - Suite 280 - Saint Paul, MN 55101 | P: 651-539-1500 | F: 651-539-1547
mn.gov/commerce
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COMMERCE
DEPARTMENT

Before the Minnesota Public Utilities Commission

Comments of the Minnesota Department of Commerce
Division of Energy Resources

Docket No. E015/CN-22-607

I. INTRODUCTION

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Regarding tribal governments, the Department's review of the Applicant's list of tribal governments proposed to receive notice complies with the requirements of the rule.

In summary, the Department concludes that the Applicant's Notice Plan for residents, landowners, newspapers, and governmental entities is reasonable after any recommended additions by EERA staff.

B. CONTENT OF NOTICE

Minnesota Rules 7829.2550, subp. 4 requires the notices to provide the following information:

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- a description of general right-of-way requirements for a line of the size and voltage proposed and a statement that the applicant intends to acquire property rights for the right-of-way that the proposed line will require;
- a notice that the line cannot be constructed unless the Minnesota Public Utilities Commission (Commission) certifies that it is needed;
- the Commission's mailing address, telephone number, and website;
- if the applicant is a utility subject to chapter 7848, the address of the website on which the utility applicant will post or has posted its biennial transmission projects report required under that chapter;

- a statement that the Environmental Quality Board[1] will be preparing an environmental report on each high-voltage transmission line for which certification is requested;
- a brief explanation of how to get on the mailing list for the Environmental Quality Board's proceeding; and
- a statement that requests for certification of high-voltage transmission lines are governed by Minnesota law, including specifically chapters 4410 and 7849, and Minnesota Statutes, section 216B.243.

The Department reviewed the cover letters and maps provided by the Applicant and concludes that the Applicant's proposal for the resident/landowner notice, governmental notice, and newspaper notice generally contains the required information and is acceptable after any edits recommended by EERA staff.

C. NOTICE TIMING

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1. enforcement of the rule would impose an excessive burden upon the applicant or others affected by the rule;
2. granting the variance would not adversely affect the public interest; and
3. granting the variance would not conflict with standards imposed by law.

---

[1] The Department notes that while the statutes have changed regarding routing authority and location of the staff preparing the environmental report, Minnesota Rules have not yet been updated to reflect these changes.

[2] Examples include:

- November 3, 2006 in Docket No. E002, ET2, et al/CN-08-1115;
- November 29, 2007 in Docket No. E017, E015, ET6/CN-07-1222;
- November 12, 2008 in Docket No. E002/CN-08-992;
- January 26, 2010 in Docket No. E002/CN-09-1390; and
- August 17, 2010 in Docket No. E002/CN-10-694.
- February 4, 2013 in Docket No. E002/CN-12-1235
- January 15, 2021 in Docket No. IP-7041/CN-20-764

The Department concludes that enforcement of the rule would burden all parties involved by separating the provision of notice from the start of the proceeding. Granting the variance would not adversely affect the public interest since the Applicant's proposal would more closely tie the implementation of notice to the beginning of the CN proceeding. The Department is not aware that the variance would conflict with standards imposed by law. Therefore, the Department recommends that the Commission approve the Applicant's request to implement the notice plan no more than 60 days and no less than two weeks prior to the filing of the CN petition.

III. DEPARTMENT RECOMMENDATIONS

As discussed above, the Department recommends that the Commission approve the Applicant's proposed Notice Plan with any modifications recommended by EERA staff.

Further, the Department recommends that the Commission grant the Applicant a variance to Minnesota Rules 7829.2550, subp. 6 to allow implementation of the Notice Plan no more than 60 days prior to the filing of the CN petition.

CERTIFICATE OF SERVICE

I, Leesa Norton, hereby certify that I have this day, served a true and correct copy of the following document to all persons at the addresses indicated below or on the attached list by electronic filing, electronic mail, courier, interoffice mail or by depositing the same enveloped with postage paid in the United States mail at St. Paul, Minnesota.

Minnesota Public Utilities Commission
ORDER

Docket Number E-015/CN-22-607

Dated this 14th day of February, 2023

/s/ Leesa Norton

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Sarah	Beimers	sarah.beimers@state.mn.us	Department of Administration - State Historic Preservation Office	50 Sherburne Avenue Suite 203 St. Paul, MN 55155	Electronic Service	No	OFF_SL_22-607_CN-22-607
David	Bell	david.bell@state.mn.us	Department of Health	POB 64975 St. Paul, MN 55164	Electronic Service	No	OFF_SL_22-607_CN-22-607
James J.	Bertrand	james.bertrand@stinson.com	STINSON LLP	50 S 6th St Ste 2600 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_22-607_CN-22-607
David	Birkholz	david.birkholz@state.mn.us	MN Department of Commerce	Suite 500 85 7th Place East St. Paul, MN 551012198	Electronic Service	No	OFF_SL_22-607_CN-22-607
Michelle F.	Bissonnette	michelle.bissonnette@hdrinc.com	HDR Engineering, Inc.	Golden Hills Office Center 701 Xenia Ave S Ste 600 Minneapolis, MN 55416	Electronic Service	No	OFF_SL_22-607_CN-22-607
B. Andrew	Brown	brown.andrew@dorsey.com	Dorsey & Whitney LLP	Suite 1500 50 South Sixth Street Minneapolis, MN 554021498	Electronic Service	No	OFF_SL_22-607_CN-22-607
Christina	Brusven	cbrusven@fredlaw.com	Fredrikson Byron	200 S 6th St Ste 4000 Minneapolis, MN 554021425	Electronic Service	No	OFF_SL_22-607_CN-22-607
PUC	CAO	consumer.puc@state.mn.us	Public Utilities Commission	Consumer Affairs Office 121 7th Place E Suite 350 St. Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607
Generic Notice	Commerce Attorneys	commerce.attorneys@ag.state.mn.us	Office of the Attorney General-DOC	445 Minnesota Street Suite 1400 St. Paul, MN 55101	Electronic Service	Yes	OFF_SL_22-607_CN-22-607
Bill	Cook	bcook@rpu.org	Rochester Public Utilities	4000 East River Road NE Rochester, MN 55906	Electronic Service	No	OFF_SL_22-607_CN-22-607

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
John	Crane	johncranefishing@gmail.com	Fishing	1250 Wee Gwaus DR SW Bemidji, MN 56601	Electronic Service	No	OFF_SL_22-607_CN-22-607
George	Crocker	gwillc@nawo.org	North American Water Office	PO Box 174 Lake Elmo, MN 55042	Electronic Service	No	OFF_SL_22-607_CN-22-607
Thomas	Davis	atdavis1972@outlook.com	-	1161 50th Ave Sherburn, MN 56171	Electronic Service	No	OFF_SL_22-607_CN-22-607
Patricia	DeBleeckere	tricia.debleeckere@state.mn.us	Public Utilities Commission	121 7th Pl E St 350 St. Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607
Randall	Doneen	randall.doneen@state.mn.us	Department of Natural Resources	500 Lafayette Rd, PO Box 25 Saint Paul, MN 55155	Electronic Service	No	OFF_SL_22-607_CN-22-607
John E.	Drawz	jdrawz@fredlaw.com	Fredrikson & Byron, P.A.	Suite 4000 200 South Sixth Street Minneapolis, MN 554021425	Electronic Service	No	OFF_SL_22-607_CN-22-607
Cory	Dutcher	cory.dutcher@ge.com	GE Power and Water	1 River Rd. Bldg. 37-413 Schenectady, NY 12345	Electronic Service	No	OFF_SL_22-607_CN-22-607
Kristen	Eide Tollefson	healingsystems69@gmail.com	R-CURE	28477 N Lake Ave Frontenac, MN 55026-1044	Electronic Service	No	OFF_SL_22-607_CN-22-607
Scott	Ek	scott.ek@state.mn.us	Public Utilities Commission	121 7th Place East Suite 350 St. Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607
Kate	Fairman	kate.frantz@state.mn.us	Department of Natural Resources	Box 32 500 Lafayette Rd St. Paul, MN 551554032	Electronic Service	No	OFF_SL_22-607_CN-22-607

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Annie	Felix Gerth	annie.felix-gerth@state.mn.us		Board of Water & Soil Resources 520 Lafayette Rd Saint Paul, MN 55155	Electronic Service	No	OFF_SL_22-607_CN-22-607
Sharon	Ferguson	sharon.ferguson@state.mn.us	Department of Commerce	85 7th Place E Ste 280 Saint Paul, MN 551012198	Electronic Service	No	OFF_SL_22-607_CN-22-607
Karen A	Gebhardt	kageb1@gvtel.com		43901 253rd Ave Leonard, MN 56652-4026	Electronic Service	No	OFF_SL_22-607_CN-22-607
Todd	Green	Todd.A.Green@state.mn.us	Minnesota Department of Labor & Industry	443 Lafayette Rd N St. Paul, MN 55155-4341	Electronic Service	No	OFF_SL_22-607_CN-22-607
Larry	Hartman	Larry.Hartman@state.mn.us	Department of Commerce	85 7th Place East, Suite 280 St. Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607
Valerie	Herring	vherring@taftlaw.com	Taft Stettinius & Hollister LLP	2200 IDS Center 80 S. Eighth Street Minneapolis, MN 55402	Electronic Service	No	OFF_SL_22-607_CN-22-607
Kari	Howe	kari.howe@state.mn.us	DEED	332 Minnesota St, #E200 1ST National Bank Bldg St. Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607
Scott	Johnson	Scott.Johnson@ci.medina.mn.us	City of Medina	2052 County Road 24 Medina, MN 55340-9790	Electronic Service	No	OFF_SL_22-607_CN-22-607
Michael	Kaluzniak	mike.kaluzniak@state.mn.us	Public Utilities Commission	Suite 350 121 Seventh Place East St. Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Tom	Karas	tomskaras@gmail.com		3171 309th Ave NW Cambridge, MN 55008	Electronic Service	No	OFF_SL_22-607_CN-22-607
Bruce	King	Brenda@ranww.org	Realtors, Association of Northwestern WI	Suite 3 1903 Keith Street Eau Claire, WI 54701	Electronic Service	No	OFF_SL_22-607_CN-22-607
Ray	Kirsch	Raymond.Kirsch@state.mn.us	Department of Commerce	85 7th Place E Ste 500 St. Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607
Chad	Konickson	chad.konickson@usace.army.mil	U.S.Army Corps of Engineers	180 5th St # 700 Saint Paul, MN 55101	Electronic Service	No	OFF_SL_22-607_CN-22-607
Chris	Kopel	chrisk@CMPASgroup.org	Central Minnesota Municipal Power Agency	459 S Grove St Blue Earth, MN 56013-2629	Paper Service	No	OFF_SL_22-607_CN-22-607
Stacy	Kotch Egstad	Stacy.Kotch@state.mn.us	MINNESOTA DEPARTMENT OF TRANSPORTATION	395 John Ireland Blvd. St. Paul, MN 55155	Electronic Service	No	OFF_SL_22-607_CN-22-607
Karen	Kromar	karen.kromar@state.mn.us	MN Pollution Control Agency	520 Lafayette Rd Saint Paul, MN 55155	Electronic Service	No	OFF_SL_22-607_CN-22-607
Peter E.	Madsen	pmadsen@taftlaw.com	Taft Stettinius & Hollister LLP	2200 IDS Center 80 South 8th Street Minneapolis, MN 55402	Electronic Service	No	OFF_SL_22-607_CN-22-607
Dawn S	Marsh	dawn_marsh@fws.gov	U.S. Fish & Wildlife Service	Minnesota-Wisconsin Field Offices 4101 American Blvd E Bloomington, MN 55425	Electronic Service	No	OFF_SL_22-607_CN-22-607
Dan	McCourtney	dmccourtney@mnpower.com	Minnesota Power	30 West Superior St Duluth, MN 55802	Electronic Service	No	OFF_SL_22-607_CN-22-607

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
David	Moeller	dmoeller@allete.com	Minnesota Power	30 W Superior St Duluth, MN 558022093	Electronic Service	No	OFF_SL_22-607_CN-22-607
Andrew	Moratzka	andrew.moratzka@stoel.com	Stoel Rives LLP	33 South Sixth St Ste 4200 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_22-607_CN-22-607
Colleen	Mueller	N/A		22186 State Hwy 4 Paynesville, MN 56362	Paper Service	No	OFF_SL_22-607_CN-22-607
Dan	Nelson	Dan.Nelson@ISGinc.com	I&S Group	115 E Hickory St Ste 300 Mankato, MN 56001	Electronic Service	No	OFF_SL_22-607_CN-22-607
Carol A.	Overland	overland@legalectric.org	Legalectric - Overland Law Office	1110 West Avenue Red Wing, MN 55066	Electronic Service	No	OFF_SL_22-607_CN-22-607
Kevin	Peterson	kjp@ibew160.org	IBEW Local 160	1109 Northway Lane NE Rochester, MN 55906	Electronic Service	No	OFF_SL_22-607_CN-22-607
Angela	Piner	angela.piner@hdrinc.com	HDR, Inc.	Suite 600 701 Xenia Avenue South Suite 600 Minneapolis, MN 55416	Electronic Service	No	OFF_SL_22-607_CN-22-607
Larry	Rebman	larryemls@hotmail.com	EMLS, Inc	PO Box 122 Appleton, MN 56208	Electronic Service	No	OFF_SL_22-607_CN-22-607
Generic Notice	Residential Utilities Division	residential.utilities@ag.state.mn.us	Office of the Attorney General-RUD	1400 BRM Tower 445 Minnesota St St. Paul, MN 551012131	Electronic Service	Yes	OFF_SL_22-607_CN-22-607

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Margaret	Rheude	Margaret_Rheude@fws.gov	U.S. Fish and Wildlife Service	Twin Cities Ecological Services Field Office 4101 American Blvd. E. Bloomington, MN 55425	Electronic Service	No	OFF_SL_22-607_CN-22-607
Stephan	Roos	stephan.roos@state.mn.us	MN Department of Agriculture	625 Robert St N Saint Paul, MN 55155-2538	Electronic Service	No	OFF_SL_22-607_CN-22-607
Christine	Schwartz	Regulatory.records@xcelenergy.com	Xcel Energy	414 Nicollet Mall FL 7 Minneapolis, MN 554011993	Electronic Service	No	OFF_SL_22-607_CN-22-607
Will	Seuffert	Will.Seuffert@state.mn.us	Public Utilities Commission	121 7th Pl E Ste 350 Saint Paul, MN 55101	Electronic Service	Yes	OFF_SL_22-607_CN-22-607
Tom	Slukich	tom@nationalconductor.com	National Conductor Constructors	18119 Hwy 371 North Brainderd, MN 56401	Electronic Service	No	OFF_SL_22-607_CN-22-607
Adam	Sokolski	adam.sokolski@edf-re.com	EDF Renewable Energy	10 Second Street NE Ste 400 Minneapolis, MN 55410	Electronic Service	No	OFF_SL_22-607_CN-22-607
Mark	Strohfus	mstrohfus@grenergy.com	Great River Energy	12300 Elm Creek Boulevard Maple Grove, MN 553694718	Electronic Service	No	OFF_SL_22-607_CN-22-607
Carl	Strohm	cjsmg@sbcglobal.net	SBC Global	105 East Edgewood Ave Indianapolis, IN 46227	Electronic Service	No	OFF_SL_22-607_CN-22-607
Tom	Swafford	tswafford@umsi.us	Utility Mapping Services, Inc	3947 E Calvary Rd Suite 103 Duluth, MN 55803	Electronic Service	No	OFF_SL_22-607_CN-22-607

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Eric	Swanson	eswanson@winthrop.com	Winthrop & Weinstine	225 S 6th St Ste 3500 Capella Tower Minneapolis, MN 554024629	Electronic Service	No	OFF_SL_22-607_CN-22-607
Todd	Tadych	ttadych@atcllc.com	American Transmission Company LLC	5303 Fen Oak Dr Madison, WI 53718	Electronic Service	No	OFF_SL_22-607_CN-22-607
Jayme	Trusty	execdir@swrdc.org	SWRDC	2401 Broadway Ave #1 Slayton, MN 56172	Electronic Service	No	OFF_SL_22-607_CN-22-607
Jen	Tyler	tyler.jennifer@epa.gov	US Environmental Protection Agency	Environmental Planning & Evaluation Unit 77 W Jackson Blvd. Mailstop B-19J Chicago, IL 60604-3590	Electronic Service	No	OFF_SL_22-607_CN-22-607
Kodi	Verhalen	kverhalen@taftlaw.com	Taft Stettinius & Hollister LLP	80 S 8th St Ste 2200 Minneapolis, MN 55402	Electronic Service	No	OFF_SL_22-607_CN-22-607
Caren	Warner	caren.warner@state.mn.us	Department of Commerce	85 7th Place East Suite 280 St. Paul, MN 55101-2198	Electronic Service	No	OFF_SL_22-607_CN-22-607
Cynthia	Warzecha	cynthia.warzecha@state.mn.us	Minnesota Department of Natural Resources	500 Lafayette Road Box 25 St. Paul, Minnesota 55155-4040	Electronic Service	No	OFF_SL_22-607_CN-22-607
Elizabeth	Wefel	eawefel@flaherty-hood.com	Flaherty & Hood, P.A.	525 Park St Ste 470 Saint Paul, MN 55103	Electronic Service	No	OFF_SL_22-607_CN-22-607
Alan	Whipple	sa.property@state.mn.us	Minnesota Department Of Revenue	Property Tax Division 600 N. Robert Street St. Paul, MN 551463340	Electronic Service	No	OFF_SL_22-607_CN-22-607

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Deanna	White	mncwa@cleanwater.org	Clean Water Action & Water Fund of MN	330 S 2nd Ave Ste 420 Minneapolis, MN 55401	Electronic Service	No	OFF_SL_22-607_CN-22-607
Jonathan	Wolfgram	Jonathan.Wolfgram@state.mn.us	Office of Pipeline Safety	445 Minnesota St Ste 147 Woodbury, MN 55125	Electronic Service	No	OFF_SL_22-607_CN-22-607

Appendix F

90-day Pre-Application Letter to Local Units of Government and Affidavits of Mailing

AFFIDAVIT OF MAILING

In the Matter of the Application for a Certificate of Need and Route Permit for the HVDC Modernization Project in St. Louis County

PUC Docket No. CN-22-607/TL-22-611

STATE OF MINNESOTA)
) SS.
COUNTY OF HENNEPIN)

I, Daniel S. Flo, hereby certify that on the 30th day of November 2022, I directed to be sent via U.S. Mail a true and correct copy of the 90-Day Pre-Application LGU Notice Letter attached hereto as Exhibit 1 to all Local Government Units on the mailing list attached hereto as Exhibit 2.

MELISSA ADELE DELLWO
NOTARY PUBLIC
MINNESOTA
My Commission Expires 1-31-24

Daniel S. Flo

Subscribed and sworn to before me
this 10th day of January 2023.

Notary Public

minnesota power
AN ALLETE COMPANY

November 30, 2022 **VIA U.S. Mail**

Re: Notice of Availability for Meeting: Meeting Minn. Stat § 216E.03, subd. 3a

In the Matter of the Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project.
MPUC Docket No. E015/CN-22-607

In the Matter of the Application of Minnesota Power for a Route Permit for the HVDC Modernization Project.
MPUC Docket No. E015/TL-22-611

Dear Local Government Official,

Minnesota Power (also the “Company”) is proposing to construct a project known as the HVDC Modernization Project (also the “Project”). The Project involves modernizing and upgrading the existing High Voltage Direct Current (“HVDC”) terminals for Minnesota Power’s HVDC Line, which are currently located near the Arrowhead Substation in Hermantown, Minnesota and the Center HVDC Substation in Center, North Dakota. This proposed modernization project will require the construction of new terminals and short transmission line segments in both States, near the existing stations. The Minnesota Portion of the HVDC Modernization Project is regulated by the Minnesota Public Utilities Commission (“Commission”).

The HVDC Modernization Project is needed to modernize aging HVDC assets, continue to position the transmission grid for clean energy transition, and improve the reliability of the transmission system in Minnesota and North Dakota. The existing HVDC terminal has operated for 45 years, 15 years in excess of its 30-year design life. In recent years Minnesota Power has experienced HVDC terminal outages due to failures in the control system, power electronics, transformers, and other components. The orderly replacement of the HVDC terminal equipment is prudent to ensure continuous efficient delivery (and potential expansion) of Minnesota Power’s renewable, carbon-free energy resources into the future.

In order to modernize the HVDC terminals and implement the latest technology, new buildings and electrical infrastructure need to be constructed on a new site near the existing HVDC terminals. In Minnesota, to connect the new HVDC terminal to the existing AC system, the Project would require the construction of a new St Louis County 345 kilovolt (“kV”)/230 kV substation located less than one mile west of the current Arrowhead Substation. The new HVDC terminal would be connected to the St Louis County Substation by less than one mile of 345 kV large high-voltage transmission line (“LHVTL”) and the new St Louis County Substation would be connected to the existing Arrowhead Substation by two parallel 230 kV LHVTLs less than one mile in length. Additionally, a short portion of the existing ±250 kV HVDC Line in Minnesota will need to be reconfigured to terminate at the new HVDC terminal. The Project is currently scheduled to be in service in 2027.

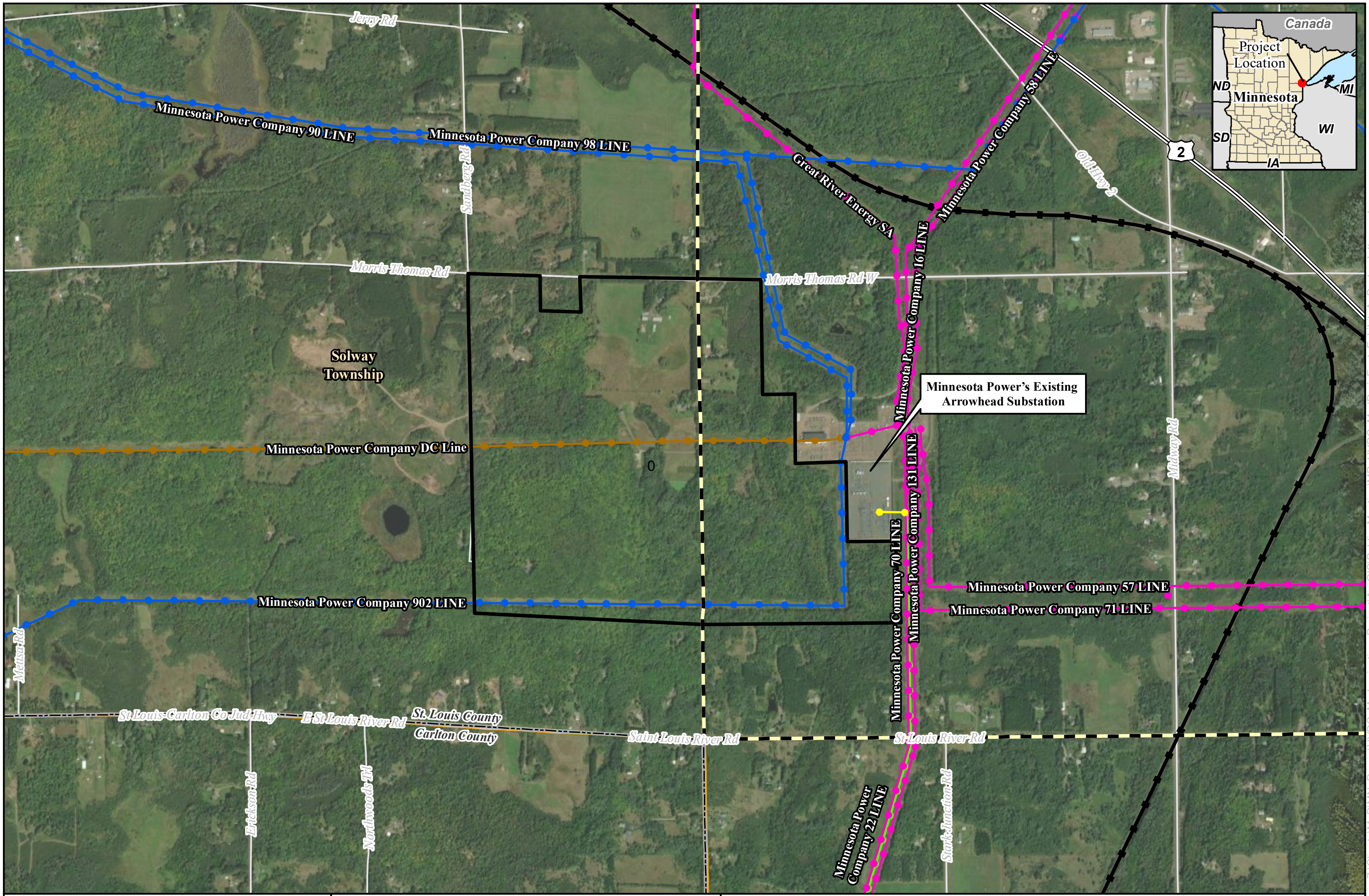
Two approvals must be obtained from the Commission before high voltage transmission lines and associated facilities like the proposed Project can be built: a Certificate of Need and a Route Permit. In the Certificate of Need proceeding, the Commission determines whether a proposed transmission line project is needed and the appropriate size, configuration, and timing. If the Commission determines that the Project is needed, the Commission will then determine the route for the proposed transmission lines. There are multiple opportunities for public and stakeholder input in these proceedings. Minnesota Power plans to submit a joint application for a Certificate of Need and Route Permit to the Commission in the first quarter of 2023.

Minnesota Power has started gathering stakeholder, agency, tribal, and public input on the Project through letters, meetings, and open houses. Minnesota Statute § 216E.03, subd. 3b provides local units of government the opportunity to request a consultation meeting regarding the proposed Project prior to the submission of an application to the Commission. If you would like to request a meeting, please contact me at (218) 355-3515 or dmccourtney@mnpower.com. I am happy to discuss any questions that you may have about the Project. Additional information about the Project can also be found on the Company's EnergyForward website at: https://www.mnpower.com/energyforward.

Sincerely,

Dan McCourtney
Environmental and Land Manager
ALLETE Inc.

Enclosures Project Overview Map



For Environmental Review Purposes Only

HVDC Modernization Project

Minnesota Power

Project Area
St. Louis County, Minnesota

▭	Minnesota Power's Project Study Area
▭	County Boundary
▭	Municipal Boundary
●	Existing 115 kV Transmission Line
●	Existing 230 kV Transmission Line
●	Existing 250 kV Transmission Line
●	Existing 345 kV Transmission Line
●	Existing 345kV/115 kV Transmission Line
▬	Railroad

Appendix F
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611
MPUC Docket No. E015/CN-22-607

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\ArcGIS\Public_Meeting\MP_HVDC_ModProj_East_Exhibit_A_Poster_letter.mxd

Date: (11/30/2022)

HVDC MODERNIZATION PROJECT CERTIFICATE OF NEED 90 LGU NOTICE CONTACT LIST

ORGANIZATION	NAME	TITLE	ADDRESS	CITY	STATE	ZIP CODE
County Commissioners						
St. Louis County	Annie Harala	Commissioner (1st District)	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County	Patrick Boyle	Commissioner (2nd District)	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County	Ashley Grimm	Commissioner (3rd District)	100 North 5th Avenue West, Room 202	Duluth	MN	55802
St. Louis County	Paul McDonald	Commissioner (4th District)	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County	Keith Musolf	Commissioner (5th District)	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County	Keith Nelson	Commissioner (6th District)	100 North 5th Avenue West	Duluth	MN	55802
County Agencies						
St. Louis County	Kevin Gray	Administrator	100 North 5th Avenue West, Room 202	Duluth	MN	55802
St. Louis County	Matthew Johnson	Planning & Community Development Director	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County	Jim Foldesi	Public Works Director/Highway Engineer	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County	Matthew Johnson	Economic Development Director	320 West 2nd Street, Suite 301	Duluth	MN	55802
St. Louis County Historical Society	JoAnne Coombe	Executive Director	506 West Michigan Street	Duluth	MN	55802
South St. Louis County Soil and Water Conservation District	Tim Beaster	Conservation Specialist	100 North 5th Avenue West	Duluth	MN	55802
South St. Louis County Soil and Water Conservation District	R.C. Boheim	District Manager	215 North 1st Avenue East, Room 301	Duluth	MN	55802
Cities						
City of Hermantown	Wayne Boucher	Mayor	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	John Geiessler	Council Member	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	Gloria Nelson	Council Members	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	Bonnie Engseth	City Clerk	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	John Mulder	City Manager / Administrator	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	Joe Wicklund	Communications & Community Engagement Mgr.	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	Eric Johnson	Community Development Director	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	Paul Senst	Public Works Director	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	Josh Bergstad	Wetland LGU	5105 Maple Grove Road	Hermantown	MN	55811
Townships						
Solway Township	Scott Welsh	Town Board Chair	4029 Munger Shaw Road	Cloquet	MN	55720
Solway Township	Tami McGregor	Township Clerk	4029 Munger Shaw Road	Cloquet	MN	55720
State and Federal Legislators						
State Representative	Natalie Zeleznikar	House District 03B	343 State Office Building	St. Paul	MN	55155
State Senator	Grant Hauschild	Senate District 03	Minnesota Senate Bldg, Room 2221 95 University Avenue West	St. Paul	MN	55155
US House of Representatives	Pete Stauber	Representative - MN 8th District	5094 Miller Trunk Hwy, Suite 900	Hermantown	MN	55811
US Senate	Amy Klobuchar	US Senator	Olcott Plaza, Room 105 820 9th Street North	Virginia	MN	55792
US Senate	Tina Smith	US Senator	60 Plato Blvd, Suite #220	St. Paul	MN	55107

Appendix G

Notice of Intent to File a Route Permit Application under the Alternative Route Permit Process

minnesota power
AN ALLETE COMPANY

November 30, 2022

VIA ELECTRONIC FILING

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
350 Metro Square Building
121 Seventh Place East
St. Paul, MN 55101

Re: *Notification of Intent to File a Route Permit Application for the HVDC Modernization Project Pursuant to the Alternative Permitting Process*
MPUC Docket No. E015/TL-22-___

Dear Mr. Seuffert:

In accordance with Minn. R. 7850.2800, subp. 2, Minnesota Power hereby notifies the Minnesota Public Utilities Commission ("Commission") of its intent to submit an application for a Route Permit to modernize and upgrade its existing High-Voltage Direct-Current ("HVDC") terminal near the Arrowhead Substation located in Hermantown Minnesota (the "HVDC Modernization Project" or "Project") following the alternative permitting proceedings set forth in Minn. R. 7850.2800 to 7850.3900.

The Project would require modernizing and upgrading both HVDC terminals for the 465-mile-long HVDC transmission line ("HVDC Line") and interconnecting the upgraded HVDC terminals to the existing alternating-current ("AC") transmission system. These HVDC terminals are currently located near the Arrowhead Substation in Hermantown, Minnesota and the Center Substation in Center, North Dakota. To modernize the HVDC terminals and implement the latest technology, new buildings and electrical infrastructure need to be constructed on a new site near the existing HVDC terminals. In Minnesota, to connect the new HVDC terminal to the existing AC system, the Project would require the construction of a new St Louis County 345 kilovolt ("kV")/230 kV substation located less than one mile west of the current Arrowhead Substation. The new HVDC terminal would be connected to the St Louis County Substation by less than one mile of 345 kV large high-voltage transmission line ("LHVTL")[1] and the new St Louis County Substation would be connected to the existing Arrowhead Substation by two parallel 230 kV LHVTLs less than one mile in length. Additionally, a short portion of the existing ±250 kV HVDC Line in Minnesota will need to be reconfigured to terminate at the new HVDC terminal.

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[1] As defined by Minn. Stat. § 216B.2421, subd. 2(2); Minn. R. 7849.0010, subp. 14. The exemption found in Minn. Stat. 216B.243, subd. 8(a)(4) for "a high-voltage transmission line of one mile or less required to connect a new or upgraded substation to an existing, new, or upgraded high-voltage transmission line" does not apply because the proposed LHVTL in Minnesota is greater than one mile in length.

Minnesota Power plans to file a combined Certificate of Need and Route Permit application in the winter of 2023. Minnesota Power will work with Commission and Minnesota Department of Commerce, Energy Environmental Review and Analysis ("EERA") staff to address any comments they may have in order to expedite application acceptance and completion of the environmental assessment.

If you have any questions, please feel free to contact me.

Sincerely,

Dan McCourtney
Environmental & Land Manager
Minnesota Power

cc: Bret Eknes, MPUC
Louise Miltich, DOC-EERA

IN THE MATTER OF THE APPLICATION OF
MINNESOTA POWER FOR A ROUTE PERMIT
FOR THE HVDC MODERNIZATION PROJECT
PURSUANT TO THE ALTERNATIVE
PERMITTING PROCESS

MPUC DOCKET NO. E015/TL-22-___

CERTIFICATE OF E-FILING

Roshelle L. Herstein certifies that on the 30th day of November, 2022, she filed a true and correct copy of Minnesota Power's **Notification of Intent to File a Route Permit Application for the HVDC Modernization Project Pursuant to the Alternative Permitting Process** via eDockets (www.edockets.state.mn.us). Said document is also sent via e-mail to the Minnesota Public Utilities Commission and the Minnesota Department of Commerce as follows:

Bret Eknes
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, Minnesota 55101
bret.eknes@state.mn.us

Louise Miltich
Minnesota Department of Commerce
Energy Environmental Review & Analysis
85 7th Place East, Suite 280
St. Paul, Minnesota 55101
louise.miltich@state.mn.us

/s/ Roshelle L. Herstein
Roshelle L. Herstein

Appendix H

EJ Screen Report

EJScreen Report (Version 2.0)

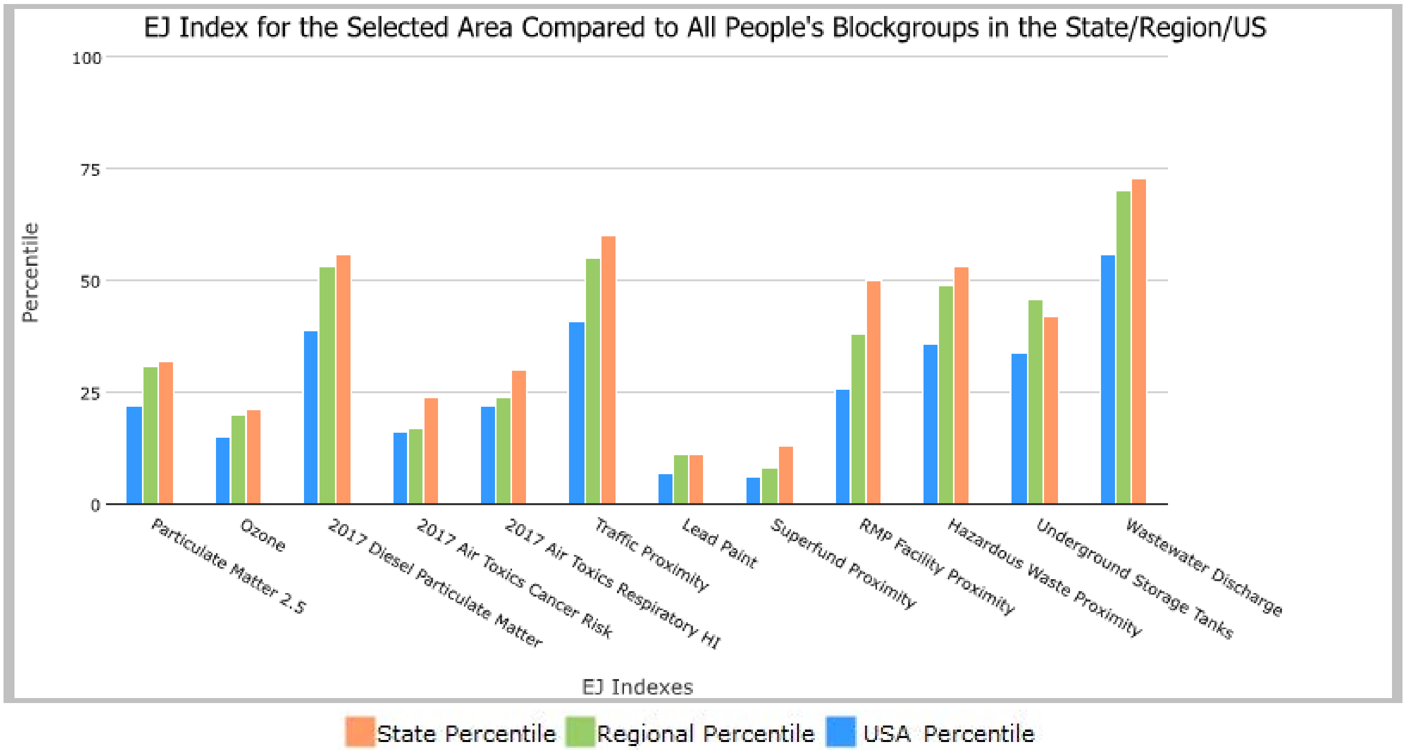
.25 miles Ring around the Area, MINNESOTA, EPA Region 5

Approximate Population: 79

Input Area (sq. miles): 1.49

UMEx Project

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
Environmental Justice Indexes			
EJ Index for Particulate Matter 2.5	32	31	22
EJ Index for Ozone	21	20	15
EJ Index for 2017 Diesel Particulate Matter*	56	53	39
EJ Index for 2017 Air Toxics Cancer Risk*	24	17	16
EJ Index for 2017 Air Toxics Respiratory HI*	30	24	22
EJ Index for Traffic Proximity	60	55	41
EJ Index for Lead Paint	11	11	7
EJ Index for Superfund Proximity	13	8	6
EJ Index for RMP Facility Proximity	50	38	26
EJ Index for Hazardous Waste Proximity	53	49	36
EJ Index for Underground Storage Tanks	42	46	34
EJ Index for Wastewater Discharge	73	70	56



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJScreen Report (Version 2.0)

.25 miles Ring around the Area, MINNESOTA, EPA Region 5

Approximate Population: 79

Input Area (sq. miles): 1.49

UMEx Project

Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0

EJScreen Report (Version 2.0)

.25 miles Ring around the Area, MINNESOTA, EPA Region 5

Approximate Population: 79

Input Area (sq. miles): 1.49

UMEx Project

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Pollution and Sources							
Particulate Matter 2.5 (μg/m^3)	5.16	7.54	0	8.96	0	8.74	1
Ozone (ppb)	34.2	37.8	3	43.5	0	42.6	9
2017 Diesel Particulate Matter* (μg/m^3)	0.0553	0.218	5	0.279	<50th	0.295	<50th
2017 Air Toxics Cancer Risk* (lifetime risk per million)	20	24	56	24	60-70th	29	<50th
2017 Air Toxics Respiratory HI*	0.2	0.29	36	0.3	<50th	0.36	<50th
Traffic Proximity (daily traffic count/distance to road)	18	470	15	610	11	710	12
Lead Paint (% Pre-1960 Housing)	0.26	0.31	53	0.37	44	0.28	59
Superfund Proximity (site count/km distance)	0.14	0.18	67	0.13	80	0.13	77
RMP Facility Proximity (facility count/km distance)	0.14	0.77	20	0.83	20	0.75	24
Hazardous Waste Proximity (facility count/km distance)	0.1	1.5	25	1.8	15	2.2	16
Underground Storage Tanks (count/km^2)	0.14	1.8	39	4.8	25	3.9	25
Wastewater Discharge (toxicity-weighted concentration/m distance)	8.1E-08	0.034	0	9	0	12	0
Socioeconomic Indicators							
Demographic Index	8%	22%	13	28%	8	36%	4
People of Color	2%	20%	5	26%	7	40%	3
Low Income	14%	24%	34	29%	25	31%	23
Unemployment Rate	2%	4%	35	5%	28	5%	24
Linguistically Isolated	0%	2%	55	2%	59	5%	45
Less Than High School Education	3%	7%	27	10%	18	12%	15
Under Age 5	4%	6%	20	6%	27	6%	27
Over Age 64	18%	15%	68	16%	66	16%	69

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

EJScreen is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJScreen documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJScreen outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

Appendix I

Wetland and Other Waters Delineation Report

WETLANDS AND OTHER WATERS DELINEATION REPORT

HVDC MODERNIZATION PROJECT
SAINT LOUIS COUNTY, MINNESOTA

Minnesota Power

An operating division of ALLETE, Inc.
30 W Superior Street
Duluth, Minnesota 55802

PREPARED BY:

Merjent, Inc.

1 Main Street SE, Suite 300
Minneapolis, Minnesota 55414

January 2023

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ABBREVIATIONS

ESRI	Environmental Systems Research Institute
GIS	Geographical Information Systems
GPS	Global Positioning System
MDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
NRCS	National Resource Conservation Service
OHWM	Ordinary High-Water Mark
PWI	Public Waters Inventory
ROW	Right-of-Way
USACE	United States Army Corps of Engineers
USDA	United States. Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WETS	NRCS Climate Analysis for Wetlands Tables

1.0 INTRODUCTION

Minnesota Power intends to submit a combined application for a Certificate of Need and a Route Permit to modernize and upgrade its existing High-Voltage Direct-Current (HVDC) terminal near the Arrowhead Substation located in Hermantown Minnesota (the HVDC Modernization Project" or Project). The Project would require modernizing and upgrading both HVDC terminals for the 465-mile-long HVDC transmission line (HVDC Line) and interconnecting the upgraded HVDC terminals to the existing alternating-current (AC) transmission system. These HVDC terminals are currently located near the Arrowhead Substation in Hermantown, Minnesota and the Center Substation in Center, North Dakota. In order to modernize the HVDC terminals and implement the latest technology, new buildings and electrical infrastructure need to be constructed on a new site near the existing HVDC terminals. In Minnesota, to connect the new HVDC terminal to the existing AC system, the Project would require the construction of a new St Louis County 345 kilovolt (kV)/230 kV substation located less than one mile west of the current Arrowhead Substation. The new HVDC terminal would be connected to the St Louis County Substation by less than one mile of 345 kV large high-voltage transmission line (LHVTL) and the new St Louis County Substation would be connected to the existing Arrowhead Substation by two parallel 230 kV LHVTLs less than one mile in length. Additionally, a short portion of the existing ±250 kV HVDC Line in Minnesota will need to be reconfigured to terminate at the new HVDC terminal. The Project is currently scheduled to be in service in 2027.

Merjent, Inc. (Merjent) performed a wetland and other waters delineation within Saint Louis County, Minnesota on behalf of Minnesota Power for the Project.

Minnesota Power is reviewing a 356.39-acre Project Study Area for the Project and provided Merjent a 141.45-acre Survey Area (Survey Area). The Survey Area (Figure 1) was defined based on landowner permissions. Surveys will be completed in 2023 for areas available at that time. Within the Survey Area, Merjent completed a wetland and other waters delineation (Figure 1). Other waters can include, but are not limited to, streams, ponds, and lakes. The field survey was conducted on August 22 - 24, 2022 and September 22 - 23, 2022. This wetland delineation report will be used to support Project planning and permitting.

This report outlines the wetland delineation investigation, methodology, and findings as completed by Merjent. This report has been compiled by the following staff that are trained and experienced in wetland delineation methodologies and applicable regulations:

- **Andy Kranz – Field Lead**

  Mr. Andy Kranz is a botanist specializing in threatened and endangered species surveys and wetland and waterbody delineation and determination. He has over 15 years of botanical experience in the Midwest, including rare plant survey, vegetation monitoring, and plant community classification and mapping, and is a Minnesota Department of Natural Resources (MDNR) qualified surveyor for endangered and threatened vascular plants. He has over six years of experience conducting wetland delineations and wildlife habitat assessments in the Midwest, Great Plains, and the Southern United States. Mr. Kranz also has over seven years of experience in prairie and woodland restoration consulting and implementation.

- **Jared Booms– Environmental Technician; Report Author**

  Mr. Jared Booms is a Wetland Specialist with 3 seasons of experience in wetland determinations and delineations. He has worked closely with the Wetland Conservation Act. His expertise includes botany, soils, and hydrology. Mr. Booms has worked in the county government sector as a wetland specialist and was also contracted through the Bureau of Land management using the AIM protocol on backcountry wetlands, establishing monitoring plots in the state of Nevada. Jared has worked in Minnesota, Wisconsin, Iowa, and Nevada.

- **Tom Errico – Senior Environmental Analyst; Field Manager**

  Mr. Tom Errico is a senior environmental analyst specializing in permitting and environmental field surveys in the New England and Upper Midwest regions for a variety of clients across the utility, transportation, and development sectors. Mr. Errico has over eight years of experience conducting wetland delineations, vernal pool surveys, invasive species surveys, habitat assessments, post-construction surveys, and construction compliance support. Mr. Errico supports clients through the lifecycle of a project, from the planning and coordination of environmental surveys to construction compliance and post-construction support.

- **Tim Flood – Environmental Analyst; GIS Analyst**

  Mr. Timothy Flood is an Environmental Analyst specializing in environmental field surveys in the Midwest. Tim has six years of experience serving Transmission and Transportation sectors. On behalf of his clients, Tim has experience with wetland delineations, vegetation surveys, rare species and habitat surveys, and erosion control monitoring. He conducts desktop reviews prior to fieldwork and prepares technical reports following field investigations.

2.0 METHODS

2.1 DESKTOP REVIEW

Desktop resources were used to identify potential wetlands within the Survey Area. Sources of information consulted to identify potential wetlands within the Survey Area prior to field investigation included:

- United States Geological Survey (USGS) Topographical Map (Figure 2; USGS, 2021)
- United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey Database for Saint Louis County, Minnesota (Figure 3; Soil Survey Staff, NRCS, USDA, 2019)
- National Wetlands Inventory (NWI; United States Fish and Wildlife Service [USFWS], 2021; Figure 4)
- Environmental Systems Research Institute (ESRI) Basemap 2016 Aerial Imagery (Figure 3-5)
- Google Earth™ Aerial Imagery (multiple years)

2.2 FIELD INVESTIGATION METHODS

Merjent performed a delineation of wetlands and other waters based on the methodology described in the United States Army Corps of Engineers (USACE) Wetland Delineation Manual (Environmental Laboratory, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral Northeast. Merjent identified other waters in accordance with the USACE Jurisdictional Determination Form Instructional Guidebook (USACE-Unites States Environmental Protection Agency, 2007).

Prior to the field work, Merjent reviewed background information to establish the potential location of wetlands and other waters within the Survey Area. On August 22 - 24, 2022 and September 22 - 23, 2022, surveyors walked the Survey Area with the specific intent of determining wetland boundaries. Surveyors sampled data points during this time at locations within and near the wetland areas to document soil characteristics, evidence of hydrology, and dominant vegetation. Surveyors identified vegetative community boundaries according to the Eggers & Reed (Eggers & Reed, 2015) and Circular 39 classification systems (Circular 39, 1956).

2.2.1 Naming Protocol

Features identified in associated figures and appendices are named in the following manner:

- Wetlands (w01, w02, etc.)
- Waterways (s01, s02, etc.)
- Data points (DP1, DP2, etc.)
- Open Water Bodies (o01, o02, etc.)
- Photo points (pp01, pp02, etc.)

2.2.2 Site Photographs

Photographs provided in Appendix A provide a visual representation of wetland communities and boundaries, as well as general site conditions, at the time of inspection. Photos are geospatially referenced by their associated photo point location and presented with direction taken (e.g., “pp01 view West,” “pp02 view Northeast”). Photo point locations are depicted on the wetland delineation figure (Figure 5).

2.2.3 Delineation Data Sheets

Wetland determination data forms are the written documentation of how representative data points meet or do not meet each of the wetland criteria (Appendix B). Plant species nomenclature follows the Regional Wetland Plant List (USACE, 2020). Hydric soils were identified using the methods outlined in Field Indicators of Hydric Soils in the United States, Version 8.2 (USDA-NRCS, 2018).

2.2.4 Survey of Wetland and Other Waters Boundary

Merjent surveyed all data point locations, wetland boundaries, and the ordinary high-water mark (OHWM) of other waters using Global Positioning System (GPS) technology capable of sub-meter accuracy. While these surveys provide reasonably accurate spatial data, they do not provide the same level of accuracy as a professional land survey. Wetland boundaries were not flagged during the field survey.

2.2.5 Previous Site Review

Merjent is not aware of previous wetland delineation mapping at this site.

3.0 RESULTS AND DISCUSSION

3.1 DESKTOP REVIEW

3.1.1 Topography

The USGS topographic map (Figure 2) shows a series of hills with the tallest located on the southwest side of the Survey Area. Multiple drainages run west to east leading water down to the waterway named West Rocky Run. West Rocky Run runs north to south and is a tributary to the Midway River, eventually flowing to the Saint Louis River and Lake Superior. On site, the stream is in a steep valley with a broad floodplain (USGS, 2022).

3.1.2 Soil Survey

The NRCS soil map of the Survey Area (Figure 3) identifies 11 soil types, three of which are hydric (Table 3-1; Soil Survey Staff, NRCS, USDA, 2019).

TABLE 3-1

Mapped Soil Units

Symbol	**Description**	**Hydric Soil Unit?**	**Acres**
1020A	Bowstring and Fluvaquents, loamy, 0 to 2 percent slopes, frequently flooded	Yes	16.42
F117D	Rollins sandy loam, 8 to 18 percent slopes	No	6.99
F121B	Aldenlake sandy loam, 2 to 8 percent slopes	No	29.29
F135A	Hermantown-Canosia-Giese, depressional, complex, 0 to 3 percent slopes	No	1.79
F136A	Hermantown silt loam, 1 to 3 percent slopes	No	0.22
F137B	Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes	No	28.78
F142A	Canosia loam, 0 to 2 percent slopes	Yes	5.09
F144D	Aldenlake-Ahmeek complex, 8 to 18 percent slopes	No	43.59
F145F	Ahmeek-Aldenlake complex, 18 to 45 percent slopes	No	4.52
F151A	Tacoosh mucky peat, dense substratum, 0 to 1 percent slopes	Yes	3.10
F154A	Urban land-Hermantown-Canosia complex, 0 to 3 percent slopes	<Null>	1.66
		Total	141.45 Acre

Note: Source: Soil Survey Staff, NRCS, USDA, 2019

3.1.3 Mapped Wetlands and Other Waters

The NWI/NHD map of the Survey Area (Figure 4) shows approximately 6.43 acres of wetlands within the Survey Area (Table 3-2). The freshwater emergent wetlands occur primarily in developed areas, where the tree cover has been removed. The freshwater forested/shrub wetlands constitute the most dominant NWI cover class and are generally in forested locations along waterbodies within the Survey Area. The shrub dominated communities exist directly parallel to stream edges, and quickly taper out with rise in slope and transfer into forested communities. This classification is mostly associated with the waterway and its floodplain. The freshwater pond is located within a drainage depression in the northwest section of the Survey Area.

West Rocky Run, along the eastern portion of the Survey Area and located in the Midway River watershed, is mapped as a Public Waters Inventory (PWI) waterway. West Rocky Run is an MDNR designated trout stream and is also classified as an impaired water due to an exceedance of Escherichia coli (E. coli) levels (MPCA, 2020). The NWI map depicts freshwater forested/shrub wetlands associated along the waterway.

TABLE 3-2

Mapped NWI/NHD Features

Symbol	Description	Acres
PEM1A	Freshwater Emergent Wetland	0.26
PEM1C	Freshwater Emergent Wetland	0.16
PEM1C	Freshwater Emergent Wetland	0.48
PSS1/EM1A	Freshwater Forested/Shrub Wetland	0.92
PSS1D	Freshwater Forested/Shrub Wetland	1.41
PSS1D	Freshwater Forested/Shrub Wetland	1.79
PUBGx	Freshwater Pond	0.20
R3UBH	Riverine	1.21
	Total:	**6.43**

Source: USFWS, 2022

3.1.4 Current, Historic, and High-Resolution Aerial Imagery

Merjent reviewed multiple sources of historic aerial imagery to evaluate the Survey Area for wetland signatures. Based on this review, wetland signatures are associated with mapped NWI wetlands, low lying areas avoided by hay production, drainages, hillside depressions and the 100-year floodplain along West Rocky Run.

3.1.5 Recent Climatic Conditions and Precipitation Data

The NRCS Climate Analysis for Wetlands (WETS) Tables define the normal range for monthly precipitation over a representative period of time (USDA, no date). Merjent compared recent precipitation data with historic precipitation data from a 30-year dataset (1993-2022) from a nearby WETS weather station (DULUTH INTL AP, MN) to determine if normal hydrologic and climatic conditions were present on-site during field delineations. When compared, the observed precipitation data from three months prior to the field delineations indicated normal precipitation conditions at the time of the field delineations (Table 3-3 and Table 3-4).

TABLE 3-3

WETS Analysis – August 2022

	Long-term rainfall records (1993-2022)								
DULUTH INTL AP, MN	**Month**	**<30%**	**Mean**	**>30%**	**Actual**	**Condition**	**Condition Value[a]**	**Weight**	**Value X Weight**
3rd Prior Month	May	2.48	3.32	3.89	4.79	Wet	3	1	3
2nd Prior Month	June	2.95	4.30	5.13	4.08	Normal	2	2	4
1st Prior Month	July	2.80	3..88	4.58	3.83	Normal	2	3	6

TABLE 3-3

WETS Analysis – August 2022

	Long-term rainfall records (1993-2022)								
DULUTH INTL AP, MN	**Month**	**<30%**	**Mean**	**>30%**	**Actual**	**Condition**	**Condition Value[a]**	**Weight**	**Value X Weight**
								Sum:	**13**
								Conditions on Site[b]:	**Normal**

---

[a] 1 = Dry; 2 = Normal; 3 = Wet

[b] If sum equals: 6 to 9 = prior period has been drier than normal; 10 to 14 = prior period has been normal; 15 to 18 = prior period has been wetter than normal

TABLE 3-4

WETS Analysis – September 2022

	Long-term rainfall records (1993-2022)								
DULUTH INTL AP, MN	**Month**	**<30%**	**Mean**	**>30%**	**Actual**	**Condition**	**Condition Value[a]**	**Weight**	**Value X Weight**
3rd Prior Month	June	2.95	4.30	5.13	4.08	Normal	2	1	2
2nd Prior Month	July	2.80	3.88	4.58	3.83	Normal	2	2	4
1st Prior Month	August	2.60	3.69	4.37	3.69	Normal	2	3	6
								Sum:	**12**
								Conditions on Site[b]:	**Normal**

---

[a] 1 = Dry; 2 = Normal; 3 = Wet

[b] If sum equals: 6 to 9 = prior period has been drier than normal; 10 to 14 = prior period has been normal; 15 to 18 = prior period has been wetter than normal

3.2 FIELD INVESTIGATION

Based on the field survey and review of desktop resources, it is our professional opinion that 17 wetlands totaling 33.84 acres, three waterways, and one open water resource exists within the Survey Area (Figure 5). Descriptions of the wetlands and other waters are provided below.

The survey area contains several types of land use. The southeastern portion of the Survey Area is mature natural forest with a mixed coniferous deciduous canopy. Multiple electric transmission line rights-of-way (ROW) bisect the forested area, ultimately connecting to a substation directly adject to the Survey Area. The northwestern portion of the Survey Area is developed and includes single family houses, hayfield, and horse pasture.

3.2.1 Uplands

Uplands within the Survey Area are forested slopes, open pasture hillsides, upland hayfields, and maintained residential lawns.

Forested slopes are the most common upland community within the Survey Area. This community commonly has lifted hillsides with bedrock and boulders protruding from the soil. It has a dense to interrupted natural forested canopy with a variety of tree covers. This stratum is often dominated by red maple (*Acer rubrum*), quaking aspen (*Populus tremuloides*), black ash (*Fraxinus nigra*), balsam fir (*Abies balsamea*), yellow birch (*Betula alleghaniensis*), and American basswood (*Tilia americana*). The sapling/shrub stratum consisted of dense to interrupted quaking aspen, glossy buckthorn (*Frangula alnus*), black ash, as well as sparse fly honeysuckle (*Lonicera canadensis*). Common species in the herb stratum include spreading dogbane (*Apocynum androsaemifolium*), Large-leaf aster (*Eurybia macrophylla*), wild sarsaparilla (*Aralia nudicaulis*), and Pennsylvania sedge (*Carex pensylvanica*). An assortment of fern species are present with the most dominant being bracken fern (*Pteridium aquilinum*).

Open pasture hillsides are found in both the electric transmission line ROWs and near the hayfield. Historically these areas were either pasture or forest but have since been fallowed or cut down providing space for the power line. The tree stratum, as well as the sapling/shrub stratum, is vacant and the land is covered in grasses, including a mixture of native and invasive herb species. Dominant herb species with a dense cover include Kentucky blue grass (P*oa pratensis*) and common tansy (*Tanacetum vulgare*). Tall goldenrod (*Solidago altissima*) is also present with an intermittent cover.

The upland hayfield community is located in the northwestern corner of the Survey Area. This area is routinely harvested. Kentucky blue grass, timothy (*Phleum pratense*), alsike clover (*Trifolum hybridum*), and meadow hawkweed (*Hieracium caespitosum*) are the dominant species. The shrub and the tree stratum are bare.

Managed residential lawn was also noted in the Survey Area. This cover class is located near houses and development. The herb stratum is dominated by Kentucky blue grass and lacks a tree and shrub stratum.

3.2.2 Wetlands

Merjent identified a total of 17 wetlands within the Survey Area according to Eggers and Reed Wetland Community Classification and Circular 39 wetland classifications (Figure 5 and Table 3-5). Summaries of these features are provided below. Representative photographs of the wetland resources are provided in Appendix A and more detailed information for associated data points may be found in the wetland determination data forms (Appendix B).

TABLE 3-5

Summary of Delineated Wetlands

Wetland ID	Eggers and Reed, 2015[1]	Cowardin[2]	Circular 39[3]	Size (sq. ft.)	Size (acres)
w01	Fresh wet meadow	PEM	Type 2	156,128	3.58
w01	Shrub-carr	PSS	Type 6	28,229	0.65
w01	Hardwood swamp	PFO	Type 7	6,564	0.15
w01	Shallow open water	PUB	Type 5	1,931	0.04
w02	Fresh wet meadow	PEM	Type 2	2,562	0.06

TABLE 3-5

Summary of Delineated Wetlands

Wetland ID	Eggers and Reed, 2015[1]	Cowardin[2]	Circular 39[3]	Size (sq. ft.)	Size (acres)
w03	Fresh wet meadow	PEM	Type 2	6,305	0.14
w03	Hardwood swamp	PFO	Type 7	1,994	0.05
w04	Fresh wet meadow	PEM	Type 2	1,953	0.04
w05	Sedge meadow	PEM	Type 2	39,816	0.91
w06	Sedge meadow	PEM	Type 2	8,745	0.20
w07	Shrub-carr	PSS	Type 6	12,262	0.28
w08	Fresh wet meadow	PEM	Type 2	1,792	0.04
w09	Hardwood swamp	PFO	Type 7	36,942	0.85
w09	Sedge meadow	PEM	Type 2	12,582	0.29
w10	Hardwood swamp	PFO	Type 7	126,876	2.91
w10	Fresh wet meadow	PEM	Type 2	12,596	0.29
w11	Conifer swamp	PFO	Type 7	97,768	2.24
w11	Alder thicket	PSS	Type 6	20,112	0.46
w12	Hardwood swamp	PFO	Type 7	476,038	10.93
w12	Fresh wet meadow	PEM	Type 2	65,334	1.50
w12	Shallow marsh	PEM	Type 3	5,805	0.13
w13	Hardwood swamp	PFO	Type 7	56,928	1.31
w14	Alder thicket	PSS	Type 6	3,939	0.09
w15	Hardwood swamp	PFO	Type 7	880	0.02
w16	Alder thicket	PSS	Type 6	66,037	1.52
w16	Fresh wet meadow	PEM	Type 2	7,448	0.17
w16	Hardwood swamp	PFO	Type 7	13,945	0.32
w17	Fresh wet meadow	PEM	Type 2	7,610	0.17
w17	Hardwood swamp	PFO	Type 7	35,406	0.81
w17	Alder thicket	PSS	Type 6	116,181	2.67
			Total:	**1430708 sq ft**	**32.82 acres**

[1] Eggers and Reed, 2015
[2] Cowardin, 1979
[3] Circular 39, 1956
PEM = palustrine emergent; PFO = palustrine forested, PSS = palustrine shrub-scrub; PUB = palustrine unconsolidated bottom

3.2.2.1 Wetland w01 (4.42 Acres)

Wetland w01 is a swale drainageway located between two hills in an area that broadens and contracts with the landscape. The drainageway runs west to east and holds four different wetland cover classes. The largest cover class is a fresh wet meadow. A hardwood swamp sits at the center of the meadow and holds a shallow open water community. The fourth cover class runs along the ditch line of the road and is classified as a shrub-car wetland. The cover classes in w01 are described below.

The fresh wet meadow (3.58 acres) sampled at data point DP1 is within the concave drainageway. This cover has a bare tree stratum. The shrub stratum consists of a few sparse meadow willows (*Salix petiolaris*). The herb stratum is diverse and holds multiple dominant species all with interrupted cover, the most common is woolgrass (*Scirpus cyperinus*) followed by Canada bluejoint (*Calamagrostis canadensis*) and reed canary grass (*Phalaris arundinacea*). This stratum also has sparse populations of retrorse sedge (*Carex retrorsa*), Harlequin blueflag (*Iris versicolor*), and soft rush (*Juncus effusus*). Soils met the hydric soil indicator for Loamy Mucky Mineral (F1). Wetland hydrology indicators observed included Saturation (A3), Inundation Visible on Aerial Imagery (B7), Geomorphic Position (D2), and FAC-Neutral Test (D5).

The hardwood swamp (0.15 acre) sampled at data point DP2 is within the center of the concave drainage. The tree stratum has an interrupted cover of balsam poplar (*Populus balsamifera*) followed by a sparse cover of paper birch (*Betula papyrifera*) and quaking aspen. The sapling/shrub stratum has a cover of Pagoda dogwood (*Cornus alternifolia*) and pussy willow (*Salix discolor*). A sparse cover of balsam poplar and speckled alder (*Alnus incana*) also exist within the stratum. The herb stratum is dominated by Canada bluejoint, woodland horsetail (*Equisetum sylvaticum*), and American mana grass (*Glyceria grandis*). Soils met the hydric soil indicator for Redox Dark Surface (F6). Hydrology indicators observed included Saturation (A3), Water Marks (B1), Water-stained Leaves (B9), Drainage Patterns (B10), Saturation (C9), Geomorphic Position (D2), and FAC-Neutral Test (D5).

The shallow open waterbody (0.04 acre) sampled at data point DP3 is less than six feet deep and is within the center of the hardwood swamp. The tree stratum and the sapling/shrub stratum are bare while the herb stratum consists of dense turion duckweed (*Lemna turionifera*). Soils were not sampled due to standing water and are assumed hydric based on hydrology and landscape position. Hydrology indicators observed included Surface Water (A1), High Water Table (A2), Saturation (A3), Water Marks (B1), Inundation Visible on Aerial Imagery (B7), Water-Stained Leaves (B9), Geomorphic Position (D2), and FAC-Neutral Test (D5).

The shrub-car (0.65 acre) sampled at data point DP16 is at the base of the drainage and along the road ditch. The tree stratum is bare and the sapling/shrub stratum consist of dense Missouri River willow (*Salix eriocephala*). The herb stratum consists of interrupted spreading dogbane, Canada bluejoint, spotted touch-me-not (*Impatiens capensis*), and common canary grass (*Phalaris canariensis*). Soils were not sampled due to the proximity to the roadway and potential for buried utilities. Soils were assumed hydric based on vegetation, landscape position and presence of hydrology. Hydrology indicators observed included Drainage Patterns (B10), Geomorphic Position (D2), and FAC-Neutral Test (D5).

3.2.2.2 Wetland w02 (0.06 Acre)

Wetland w02 sampled at data point DP04 is a fresh wet meadow located on a hiillside. It is a closed depression that lacks a tree stratum. The sapling/shrub stratum contained bog willow (*Salix pedicellaris*) and Bebb’s willow (*Salix bebbiana*). The herb stratum is diverse and consisted of intermittent woolgrass, Harlequin blueflag, Canada bluejoint, pointed broom sedge (*Carex scoparia*), fowl blue grass (*Poa palustris*), and common tansy. A rock restrictive layer was observed at eight inches and soils were assumed to be hydric based on hydrophytic vegetation, landscape position, and presence of hydrology. Hydrology indicators observed included Saturation Visible on Aerial Imagery (C9), Geomorphic Position (D2), and FAC-Neutral Test (D5).

3.2.2.3 Wetland w03 (0.19 Acre)

Wetland w03 sampled at data point DP5 is a fresh wet meadow with a small hardwood swamp component. The differentiating cover difference between the two is the presence of quaking aspen in the hardwood swamp. The fresh wet meadow component lacks a tree stratum but does have a sparse sapling/shrub stratum containing bog willow. The herb stratum contains dense woolgrass as well as a sparse cover of Canada bluejoint and American mana grass. Soils met hydric soil indicator Depleted Below Dark Surface (A11), Loamy Mucky Mineral (F1), and Depleted Dark Surface (F7). Hydrology indicators observed included Saturation Visible on Aerial Imagery (C9), Geomorphic Position (D2), Microtopogphary (D4), and FAC-Neutral Test (D5).

3.2.2.4 Wetland w04 (0.04 Acre)

Wetland w04 sampled at DP7 is a fresh wet meadow found in a closed depression. The tree stratum is bare while the sapling/shrub stratum contain sparse bog willow. The herb stratum has a higher diversity with multiple species being sub-dominant. These species include blister sedge (*Carex vesicaria*), Tuckerman's sedge (*Carex tuckermanii*), woolgrass, quackgrass (*Elymus repens*), fowl blue grass, and common tansy. Soils met the hydric soil indicator for Redox Dark Surface (F6). Hydrology indicators observed included Saturation Visible on Aerial Imagery (C9), Geomorphic Position (D2), Microtopography (D4), and FAC-Neutral Test (D5).

3.2.2.5 Wetland w05 (0.91 Acre)

Wetland w05 sampled at data point DP8 is a sedge meadow located in an elongated swale. The tree stratum has a sparse cover of black ash. The sapling/shrub layer is bare. The herb stratum contains dense woolgrass, with interrupted Canada bluejoint, reed canary grass and pointed broom sedge. Soils met the hydric soil indicator for Depleted Matrix (F3). Hydrology indicators observed included Saturation Visible on Aerial Imagery (C9), Geomorphic Position (D2), Microtopography (D4), and FAC-Neutral Test (D5).

3.2.2.6 Wetland w06 (0.20 Acre)

Wetland w06 sampled at DP10 is a sedge meadow located in a depression. The tree stratum contains sparse red maple and sugar maple (*Acer saccharinum*). The sapling/shrub layer contains sparse cover of speckled alder and Bebb's willow. The herb stratum contains a diverse selection of sedges and other species including dense Tuckerman's sedge and interrupted retrorse sedge, blister sedge, woolgrass, giant bur-reed (*Sparganium eurycarpum*), and Three-lobed beggarticks (*Bidens tripartite*). Soils met the hydric soils indicators for Loamy Mucky Mineral (F1) and Depleted Matrix (F3). Hydrology indicators observed included Saturation Visible on Aerial Imagery (C9), Geomorphic Position (D2), Microtopography (D4), and FAC-Neutral Test (D5).

3.2.2.7 Wetland w07(0.28 Acre)

Wetland w07 sampled at data point DP11 is a shrub-carr wetland within a slight depression. The tree stratum contains a sparse cover of paper birch. The sapling/shrub stratum contains dense bog willow, followed by sparse Bebb’s willow, Pagoda dogwood, and black ash. The herb stratum consists of a dense cover of sensitive fern (*Onoclea sensibilis*) and sparse Canada bluejoint, as well as dwarf raspberry (*Rubus pubescens*). Soils met the hydric soil indicator meets for Depleted Matrix (F3). Hydrology indicators observed included Water-Stained Leaves (B9), Geomorphic Position (D2), Microtopography (D4), and FAC-Neutral Test (D5).

3.2.2.8 Wetland w08 (0.04 Acre)

Wetland w08 sampled at data point DP13 is a fresh wet meadow located in a drainageway between a farmhouse and barn. The tree stratum contains sparse black willow (*Salix nigra*) and wild plum (*Prunus americana*). The sapling/shrub stratum is bare. The herb stratum contains reed canary grass, redtop (*Agrostis gigantea*), brittlestem hemp-nettle (*Galeopsis tetrahit*), fowl blue grass, stinging nettle (*Urtica dioica*), and giant goldenrod (*Solidago gigantea*). Soils were not sampled due to the presence of a driveway and building structures with the potential for buried utilities. Soils were assumed hydric based on vegetation, landscape position and presence of hydrology. Hydrology indicators observed included Saturation Visible on Aerial Imagery (C9), Geomorphic Position (D2), and FAC-Neutral Test (D5).

3.2.2.9 Wetland w09 (1.14 Acre)

Wetland w09 is a hardwood swamp with a power line ROW bisecting the forest creating an open sedge meadow.

The hardwood swamp (0.85 acre) sampled at data point DP20 is in a low swale that runs linearly across the landscape. The tree stratum consists of a dense black ash canopy followed by sparse balsam fir and red maple. The sapling/shrub stratum consists of speckled alder, glossy buckthorn and black ash. The herb stratum is dominated by dense lady fern (*Athyrium angustum*) and interrupted woodland horsetail. Soils met the hydric soil indicator for Loamy Mucky Mineral (F1). Hydrology indicators observed included Water-Stained Leaves (B9), Geomorphic Position (D2), Microtopographic Relief (D4) and FAC-Neutral Test (D5).

The sedge meadow component (0.29 acre) sampled at data point DP20 is also located in the low-lying swale. The sedge meadow cover lacks a tree stratum. The sapling/shrub stratum consists of sparse speckled alder. The herb stratum consists of dense woolgrass with interrupted lake sedge (*Carex lacustris*). Sparse communities of stalked bulrush (*Scirpus pedicellatus*) and spotted joe-pye weed (*Eutrochium maculatum*) are also present within the sedge meadow. Soils met the hydric soil indicator for Loamy Mucky Mineral (F1). Hydrology indicators observed included Aquatic Fauna (B13), Geomorphic Position (D2), and FAC-Neutral Test (D5).

3.2.2.10 Wetland w10 (3.20 Acres)

Wetland w10 is a hardwood swamp with a power line ROW bisecting the forest creating an open fresh wet meadow.

The hardwood swamp (2.91 acres) sampled at data point DP18 is in a small depression. The tree stratum is dominated by dense black ash. The sapling/shrub stratum contains interrupted glossy buckthorn, black ash, and balsam poplar. The herb stratum contains interrupted Tuckerman's sedge, dwarf raspberry, and sparse Canada bluejoint, swamp red currant (*Ribes triste*), greater bladder sedge (*Carex intumescens*), and pointed broom sedge. Soils met the hydric soil indicator for Depleted Matrix (F3). Hydrology indicators observed included Water-Stained Leaves (B9), Geomorphic Position (D2), Microtopography (D4), and FAC-Neutral Test (D5).

The fresh wet meadow (0.29 acre) sampled at data point DP23 is in a small depression. The tree stratum is bare while the shrub stratum contains sparse speckled alder, Bebb's willow and balsam willow (*Salix pyrifolia*). The herb stratum contains an interrupted cover of woolgrass, Canada bluejoint, and sensitive fern. Soils met the hydric soil indicator for Depleted Matrix (F3). Hydrology indicators observed included Geomorphic Position (D2), Microtopography (D4), and FAC-Neutral Test (D5).

3.2.2.11 Wetland w11 (2.70 Acres)

Wetland w11 is in a broad swale that contains a coniferous swamp and an alder thicket.

The coniferous swamp (2.24 Acres) sampled at data point DP26 is at the toe slope of a hill with sphagnum moss and a high-water table present. The tree stratum is dominated by dense tamarack (*Larix laricina*) and sparse balsam fir, black spruce (*Picea marina*), and yellow birch. The shrub stratum has sparse red maple. The herb stratum is dominated by dense Labrador tea (*Rhododendron groenlandicum*) as well as sparse wild calla (*Calla palustris*) and creeping snowberry (*Gaultheria hispidula*). Soils met the hydric soil indicator for Histosol (A1). Hydrology indicators observed included Water-stained leaves (B9), Geomorphic Position (D2), Microtopographic Relief (D4), and FAC-Neutral Test (D5).

The alder thicket (0.46 acre) sampled at data point DP24 is also located at the toe slope of a hill and densely covered in sphagnum moss. Tamarack, red maple, and quaking aspen populate the tree stratum with an interrupted cover. The dominant species in the sapling/shrub stratum is speckled alder. The herb stratum has an interrupted cover of cinnamon fern (*Osmundastrum cinnamomeum*) as well as a sparse cover of fowl mana grass. Soils met the hydric soil indicator for Histosol (A1). Hydrology indicators observed included High-Water Table (A2), Saturation (A3), Water-stained leaves (B9), Moss Trim Lines (B16), Geomorphic Position (D2), and FAC-Neutral Test (D5).

3.2.2.12 Wetland w12 (12.56 Acres)

Wetland w12 is comprised of three different wetland classes. The wetland is impacted by the stream hydrology and most of the wetland is located within its floodplain. Hardwood swamp is the dominant cover class for w12. The power line ROW bisects the PFO, converting the area to a fresh wet meadow. A small pocket of shallow marsh exists near the service station.

The hardwood swamp (10.93 acres) was sampled at data point DP36. It has a mixed canopy of interrupted black spruce, balsam fir, yellow birch, and black ash. The sapling/shrub stratum has interrupted cover of speckled alder and glossy buckthorn. The herb stratum is diverse and has interrupted cover of lake sedge, lady fern, Canada wood nettle (*Laportea canadensis*), and a sparse cover of woodland horsetail, ostrich fern (*Matteuccia struthiopteris*), and sensitive fern. Soils met the hydric soil indicator for Redox Dark Surface (F6). Hydrology indicators observed included High water table (A2), Saturation(A3), Water-Stained Leaves (B9), Geomorphic Position (D2), and FAC-Neutral Test (D5).

The fresh wet meadow (1.50 Acres) cover class was sampled at data points DP28, DP31, and DP32. The three data points are part of the same wetland and share very similar vegetation characteristics. All lack a tree cover. The shrub stratum contains sparse speckled alder, Bebb's willow, and quaking aspen. The herb layer consists of Canada bluejoint, spotted joe-pye weed, woolgrass, and sparse spotted touch-me-not, stinging nettle, and reed canary grass. Soils met the hydric soil indicator for Depleted Matrix (F3) and Redox Dark Surface (F6). Hydrology indicators observed included Geomorphic Position (D2), Microtopographic Relief (D4), and FAC-Neutral Test (D5).

The shallow marsh (0.13 acre) was sampled at data point DP29. This cover lacks a tree stratum. The shrub stratum does have limited cover near the fringes consisting of sparse speckled alder and choke cherry (*Prunus virginiana*). The herb stratum consists of dense hybrid cattail (*Typha X glauca*), turion duckweed, and water horsetail (*Equisetum fluviatile*). Soils met the hydric soil indicator for Loamy Mucky Mineral (F1). Hydrology indicators observed included Surface water (A1), Highwater Table (A2), Saturation (A3), Algal Mat or Crust (B4), Inundation Visible on Aerial Imagery (B7), Aquatic Fauna (B13), Hydrogen Sulfide Odor (C1), Geomorphic Position (D2), and FAC-Neutral Test (D5).

3.2.2.13 Wetland w13 (1.31 Acre)

Wetland w13 sampled at data point DP34 is a hardwood swamp located in a depression. The tree stratum consists of black ash, paper birch, and balsam fir. The sapling/shrub layer consists of interrupted speckled alder. The herb stratum consists of lady fern and spotted touch-me-not. Soils met the hydric soil indicator for Redox Dark Surface (F6). Hydrology indicators observed included Water-Stained Leaves (B9), Geomorphic Position (D2), Microtopographic Relief (D4), and FAC-Neutral Test (D5).

3.2.2.14 Wetland w14 (0.09 Acre)

Wetland w14 sampled at data point DP37 is an alder thicket located in a closed depression. The tree stratum consists of a sparse cover of black ash. The sapling/shrub stratum consists of interrupted speckled alder and sparse white dogwood (*Cornus alba*). The herb stratum consists of dense Tuckerman's sedge. Soils met the hydric soil indicator for Depleted Below Dark Surface (A11) and Loamy Mucky Mineral (F1). Hydrology indicators observed included Surface Water

(A1), High Water Table (A2), Saturation (A3), Water-Stained Leaves (B9), Geomorphic Position (D2), and FAC-Neutral Test (D5).

3.2.2.15 Wetland w15 (0.02 Acre)

Wetland w15 sampled at data point DP44 is a hardwood swamp located in a perched wetland depression on top of a forested hill. Interrupted quaking aspen dominate the tree stratum. The sapling/shrub stratum consists of sparse black ash. The herb stratum consists of sensitive fern and lady fern. Soils met the hydric soil indicator for Redox Dark Surface (F6). Hydrology indicators observed included Sparsely Vegetated Concave Surface (B8), Water-Stained Leaves (B9), Geomorphic Position (D2), Microtopographic Relief (D4), and FAC-Neutral Test (D5).

3.2.2.16 Wetland w16 (2.01 Acres)

Wetland w16 is a depressional drainageway composed of fresh wet meadow, hardwood swamp, and alder thicket cover classes.

The fresh wet meadow (0.17 acre) was sampled at data point DP39. This cover has a bare tree stratum but does contain sparse bog willow in the sapling/shrub stratum. The herb stratum consists of woolgrass, reed canary grass, and Canada bluejoint. Soils met the hydric soil indicator for Redox Dark Surface (F6). Hydrology indicators observed included Drainage Patterns (B10), Saturation Visible on Aerial Imagery (C9), Geomorphic Position (D2), Microtopographic Relief (D4), and FAC-Neutral Test (D5).

The hardwood swamp (0.32 acre) was sampled at data point DP42. The tree stratum cover consists of sugar maple, red maple, paper birch, as well as sparse tamarack. The sapling/shrub stratum consists of interrupted pussy willow, beaked hazelnut (*Corylus cornuta*), as well as sparse white dogwood, bog willow, and speckled alder. The herb stratum consists of dense Canada bluejoint, followed by interrupted lady fern and sensitive fern. Soils met the hydric soil indicator for Depleted Below Dark Surface (A11) and Redox Dark Surface (F6). Hydrology indicators observed included Water-Stained Leaves (B9), Drainage Patterns (B10), Geomorphic Position (D2), Microtopographic Relief (D4), and FAC-Neutral Test (D5).

The alder thicket (1.52 acre) sampled at data point DP41 is the dominant cover class for wetland w16.The tree stratum cover is bare. The sapling/shrub stratum consists of dense speckled alder and sparse bog willow. The herb stratum consists of interrupted pointed broom sedge, and sparse dwarf raspberry and greater bladder sedge. Soils met the hydric soil indicator for Depleted Matrix (F3) and Redox Dark Surface (F6). Hydrology indicators observed included Sparsely Vegetated Concave Surface (B8), Water-Stained Leaves (B9), Drainage Patterns (B10), Geomorphic Position (D2), Microtopographic Relief (D4), and FAC-Neutral Test (D5).

3.2.2.17 Wetland w17 (3.65 Acres)

Wetland w17 is a depressional drainageway composed of fresh wet meadow, hardwood swamp, and alder thicket cover classes.

The fresh wet meadow (0.17 acre) was sampled at data points DP46 and DP54. The tree stratum and shrub stratum covers are bare while the herb stratum is dominated by dense reed canary grass. Giant goldenrod and common tansy are also present in sparse amounts. Canada bluejoint can be found as a dense dominant herb cover in other parts of the fresh wet meadow. Soils were not sampled due to the proximity to the roadway and potential for buried utilizes. Soils were assumed hydric based on vegetation, landscape position and presence of hydrology. Hydrology indicators observed included Drainage Patterns (B10), Geomorphic Position (D2) and FAC-Neutral Test (D5).

The hardwood swamp (0.81 acre) was sampled at data point DP48 and DP51. The tree stratum cover consists of interrupted balsam poplar and sparse red pine (*Pinus resinosa*). The sapling/shrub stratum consists of interrupted speckled alder and sparse Bebb’s willow. The herb stratum consists of dense sensitive fern and interrupted drooping woodreed (*Cinna latifolia*). At data point DP51 soils met the hydric soil indicator for Histosol (A1). Soils at data point DP48 were not sampled due to the proximity to a roadway and septic system. Soils were not sampled due to the proximity to the roadway and potential for buried utilizes. Soils were assumed hydric based on vegetation, landscape position and presence of hydrology. Hydrology indicators observed included Surface Water (A1), High Water Table (A2), Saturation (A3), Water-Stained Leaves (B9), Geomorphic Position (D2), Microtopographic Relief (D4), and FAC-Neutral Test (D5).

The alder thicket (2.67 acres) was sampled at DP49 and DP53. The tree stratum cover is bare. The sapling/shrub stratum consists of dense speckled alder and a sparse cover of balsam poplar and Bebb’s willow. The herb stratum is diverse and has multiple species with even cover. Lake sedge and Canada bluejoint are the most common species. Tall meadow rue (*Thalictrum dasycarpum*), drooping woodreed and bittersweet nightshade (*Solanum dulcamara*) are also present in the herb stratum. Soils met the hydric soil indicator for Histosol (A1) and Histic Epipedon (A2). Hydrology indicators observed included Surface Water (A1), High Water Table (A2), Saturation (A3), Water-Stained Leaves (B9), Drainage Patterns (B10), Geomorphic Position (D2), Microtopographic Relief (D4), and FAC-Neutral Test (D5).

3.2.3 Naturally Problematic and Significantly Disturbed Data Points

Data points are determined disturbed when the landscape has been altered to the point of displacing or impacting wetland indicators for hydrology, hydric soils, or hydrophytic vegetation. Three data points were identified as significantly disturbed within the Survey Area. The upland data point DP31 and wetland data point DP30 for Wetland w12 exhibited significantly disturbed soil and hydrology. These data points were collected on a graded hill leading to the substation with a culvert draining run-off into the wetland. The disturbances did not conceal wetland indicators. The upland data point DP52 for Wetland w17 was identified has having significantly disturbed soil. DP52 was located close to a shed and the soil was a mixture of sand and clay loam, likely qualifying as unnatural fill material.

3.2.4 Waterways

Merjent determined that three waterways exist within the Survey Area (Table 3-6). Representative photographs of waterways are provided in Appendix A.

Waterway s01 and s03 are both segments of West Rocky Run , a tributary to the Midway River, eventually flowing to the Saint Louis River and ultimately to Lake Superior. s01 is a wider segment and has a different substrate than the s03 substrate. Water quality for s01 and s03 was observed to be clear. A variety of wetland cover classes are associated with s01 and s03 with hardwood swamp being the most common, followed by alder thicket, then fresh wet meadow.

Waterway s02 is a small ephemeral stream channel. It was dry at time of survey. It connects a shallow marsh and to a non-flowing open waterbody (o01). The substrate of s02 is predominately silt/clay/mud, though several cobble stones were present throughout the channel.

TABLE 3-6

Summary of Delineated Waterways

Field ID	**Name**	**OHWM Width (feet)**	**Substrate**	**Flow Regime**
s01	West Rocky Run	25	Gravel/Cobble	Perennial
s02	Unnamed	3	Silt/Clay/Mud	Ephemeral
s03	West Rocky Run	8	Silt/Clay/Mud	Perennial

Note OHWM = ordinary high water mark

3.2.5 Other Water Resources Identified

Merjent determined that one open water feature exists within the Survey Area. Representative photographs of the open water resource are provided in Appendix A.

Open waterbody o01 is in the southeast section of the Survey Area. Its geomorphic position is low lying within the floodplain of the West Rocky Run. It was speculated to either be an old oxbow of the river or a man-made depression ponding water. The western bank of the pond is elevated and is potentially an earthen dike. The water is stagnant but considered perennial as the area was sampled during normal climactic conditions. A small ephemeral waterway (s02) drains into o01 but no outlet was identified during the survey.

4.0 SUMMARY AND CONCLUSION

Merjent performed a wetland delineation for the Upper Midwest Express Project in Saint Louis County, Minnesota. Based on the field survey and review of desktop resources, it is our professional opinion that 17 wetlands totaling 32.82 acres, three waterways, and one open water feature exist within the 141.45-acre Survey Area. This report represents our best professional judgment based on our local knowledge and experience.

5.0 DISCLAIMER

The wetlands identified in this report may be subject to regulation by federal, state, and/or local jurisdiction. These authorities may require a professional land survey of the delineated boundaries to verify impacts for regulatory purposes.

The field survey results presented herein apply to the existing and reasonably foreseeable site conditions at the time of the assessment. They cannot apply to site changes of which Merjent is unaware and has not had the opportunity to review. Changes in the condition of a property may occur with time due to the natural processes or human impacts at the Project site or on adjacent properties. Changes in applicable standards may also occur as a result of legislation or the expansion of knowledge over time. Accordingly, the findings of this report may be invalidated, wholly or in part, by changes beyond the control of Merjent.

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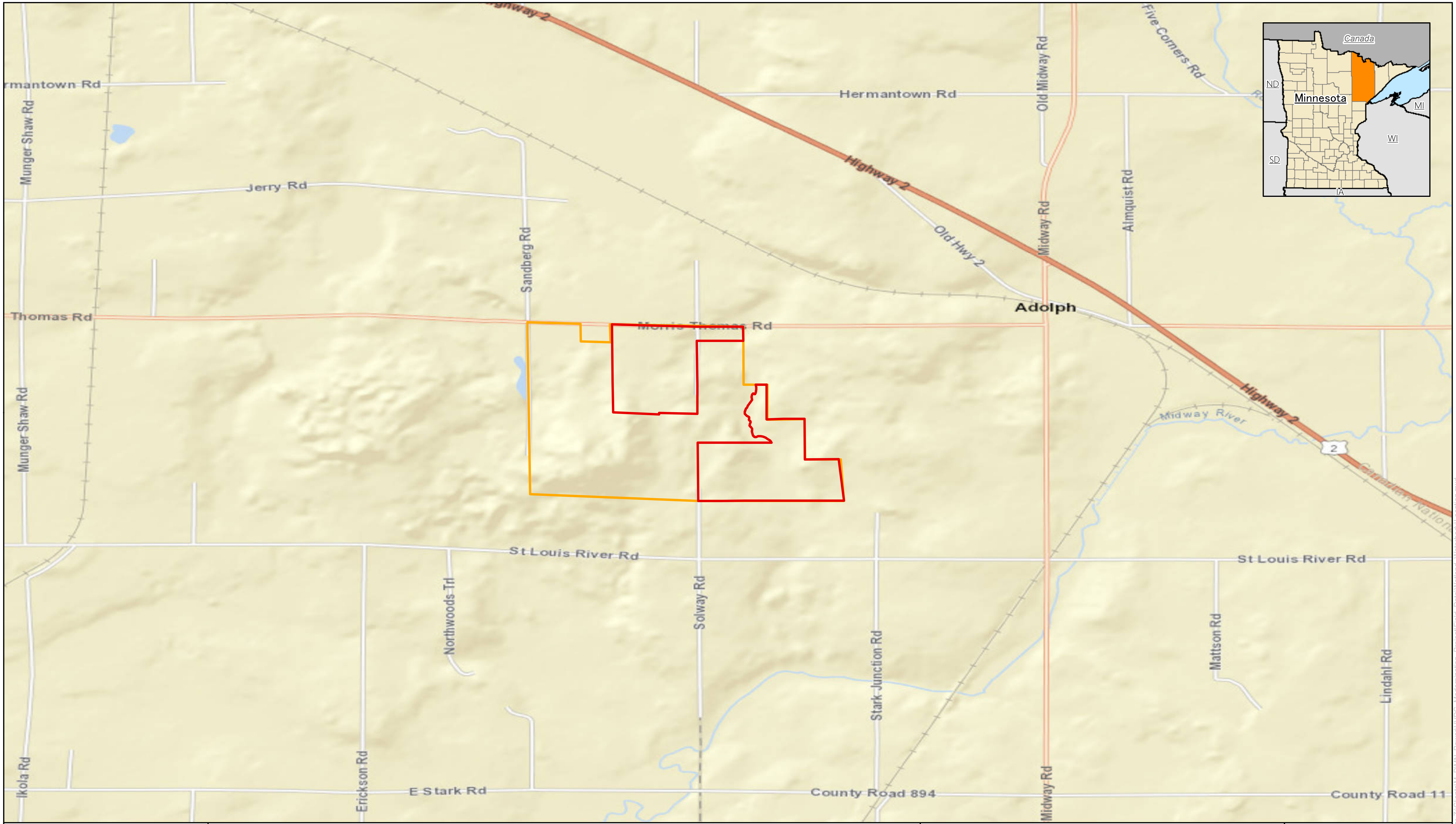
Figure 1

Project Location



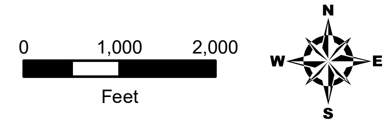


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Figure 1: Project Location
HVDC Modernization Project
Minnesota Power
St. Louis County, Minnesota

🟥 Survey Area (August & September 2022)

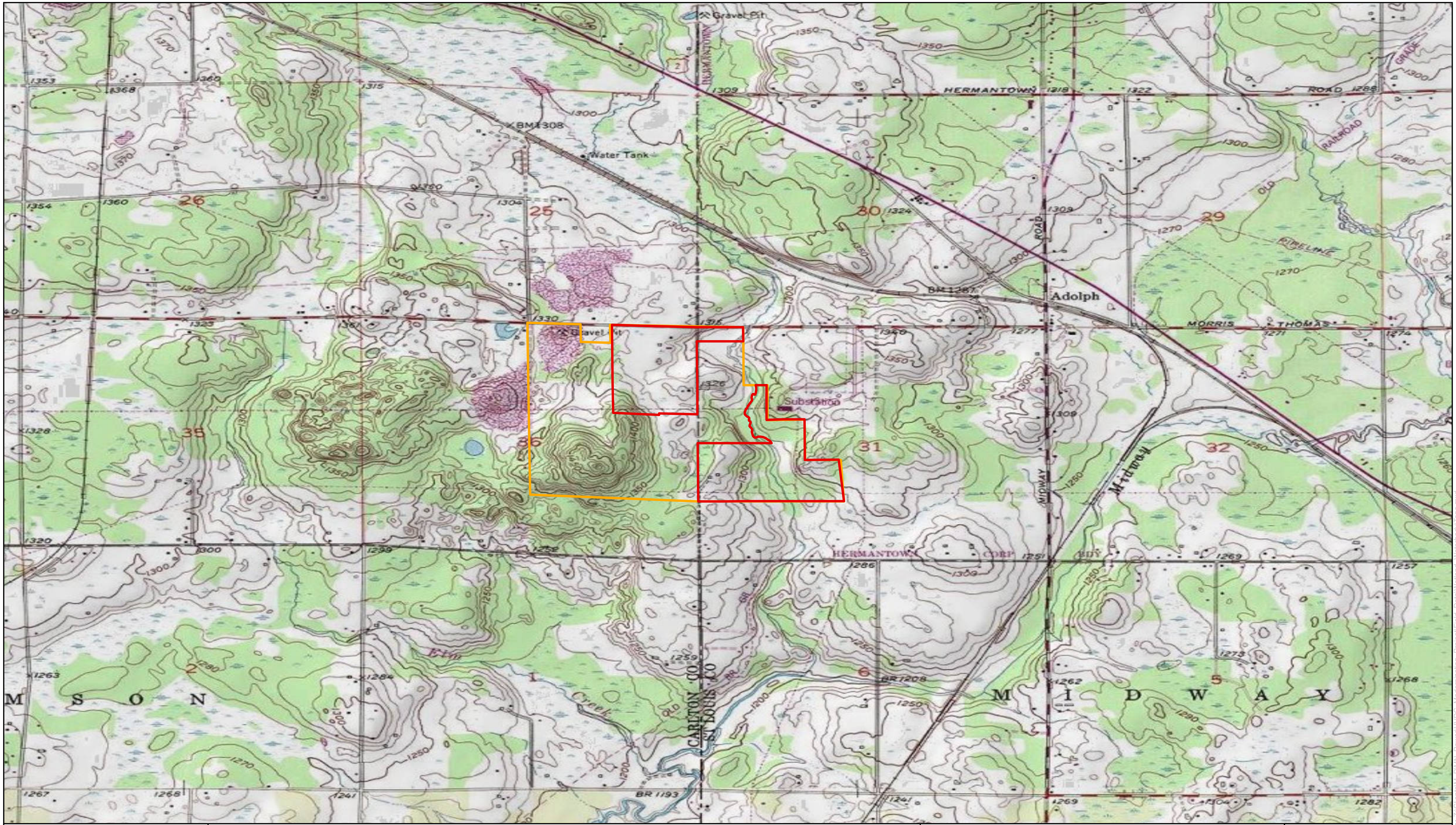
🟧 Project Study Area (January 2023)

merjent

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Field_Data\Wetland_Waterbody\Location.mxd
Date: (1/24/2023)

Figure 2

Topography



0 1,000 2,000
Feet

N
W E
S

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Figure 2: Topography
HVDC Modernization Project
Minnesota Power
St. Louis County, Minnesota

🟥 Survey Area (August & September 2022)

🟧 Project Study Area (January 2023)

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HVDC Modernization Project
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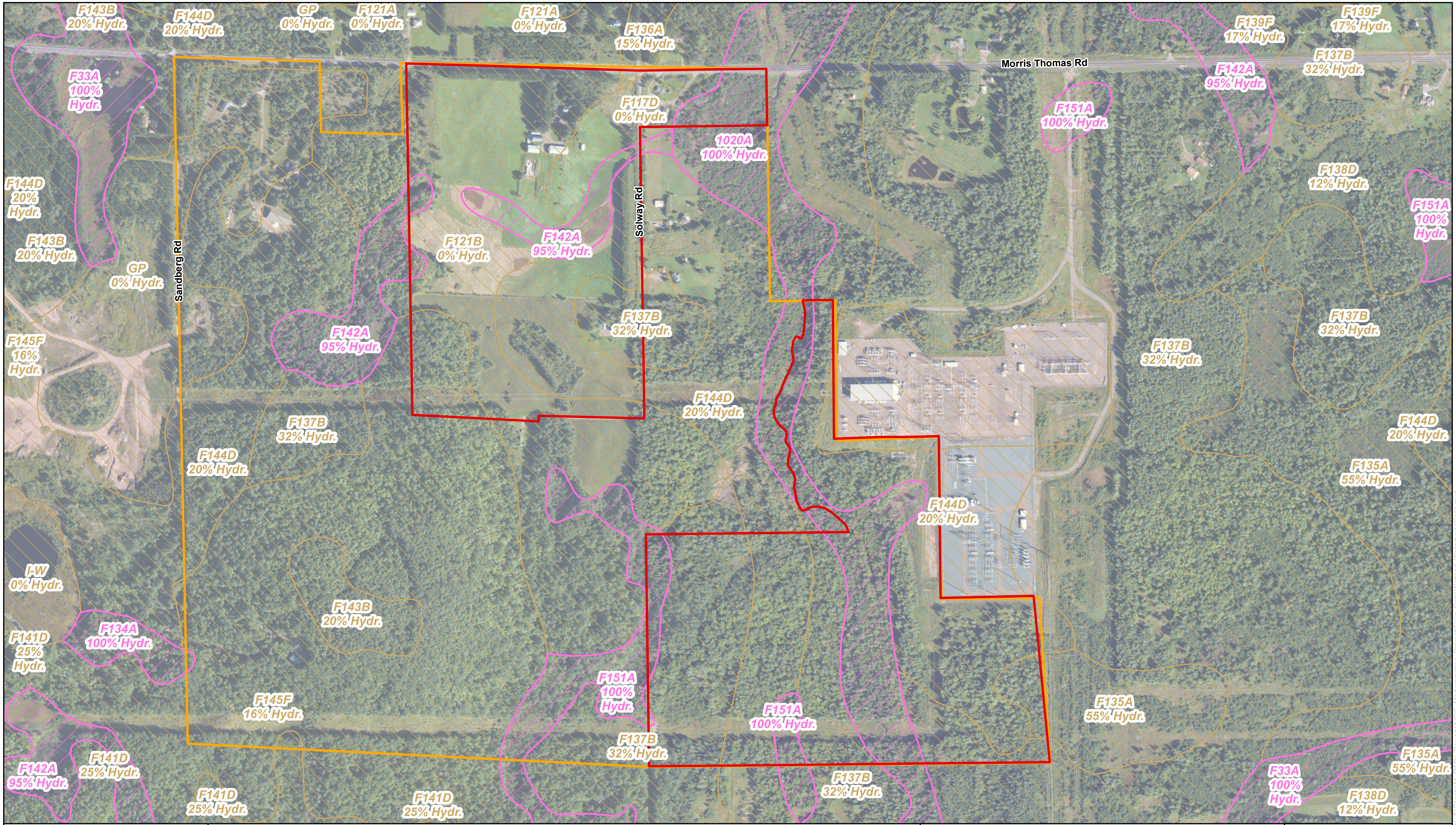
MPUC Docket No. E015/CN-22-607

Date: (1/24/2023) **Source:** Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Field_Data\Wetland_Waterbody\Topo.mxd

Figure 3

Soils



0 250 500
Feet

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Figure 3: SSURGO Soil Type
HVDC Modernization Project
Minnesota Power
St. Louis County, Minnesota

🟥	Survey Area (August & September 2022)
🟧	Project Study Area (January 2023)
▨	Non-Hydric Soil
▨	Hydric Soil

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Date: (1/24/2023) Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Field_Data\Wetland_Waterbody\Soils.mxd

Figure 4

Hydrology

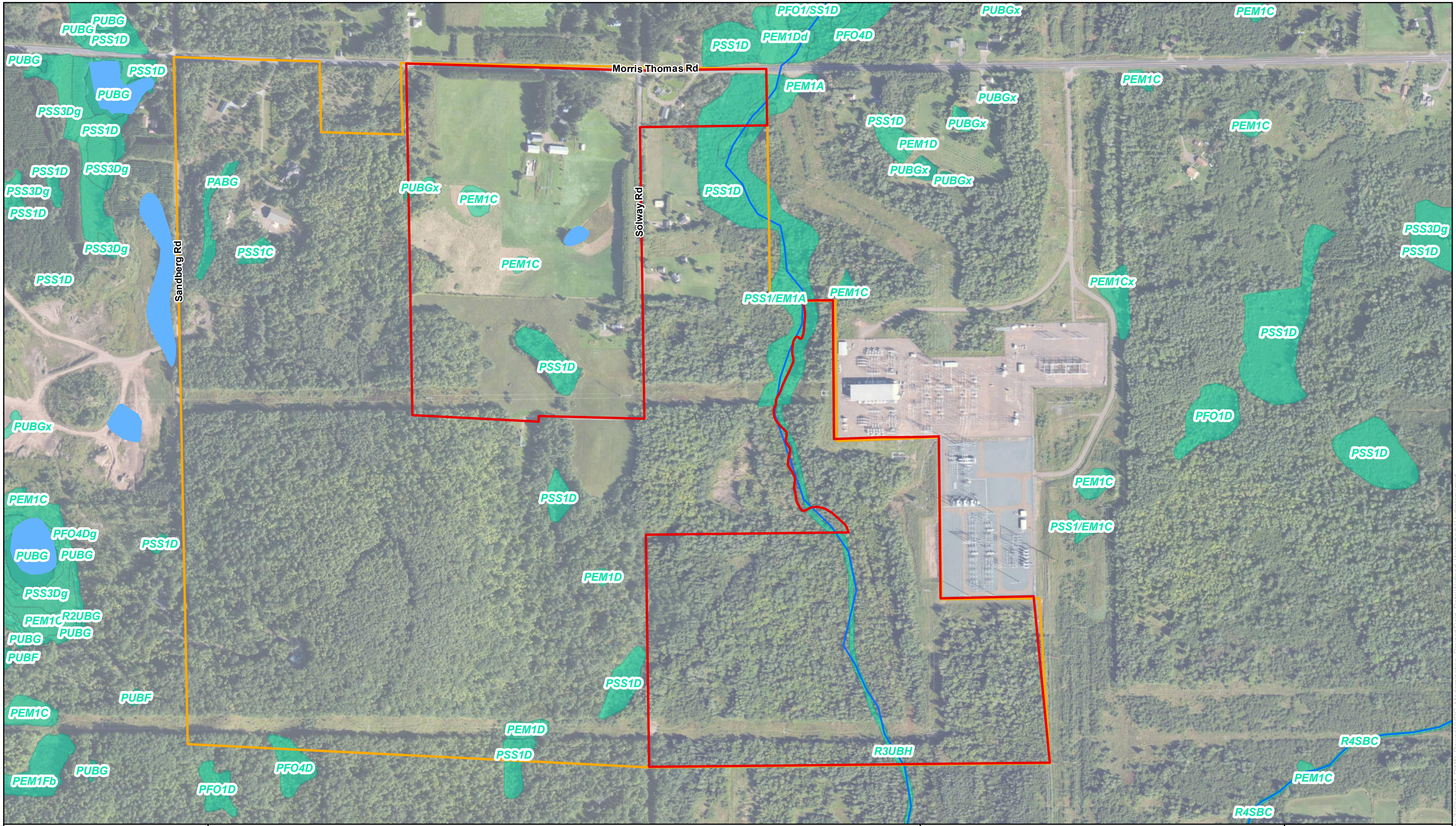

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Figure 4: Hydrology
HVDC Modernization Project
Minnesota Power
St. Louis County, Minnesota

🟥	Survey Area (August & September 2022)	●	Mapped Waterbody (NHD)
🟧	Project Study Area (January 2023)	🟩	Mapped Wetland (NWI)
~	Mapped Waterway (NHD)		

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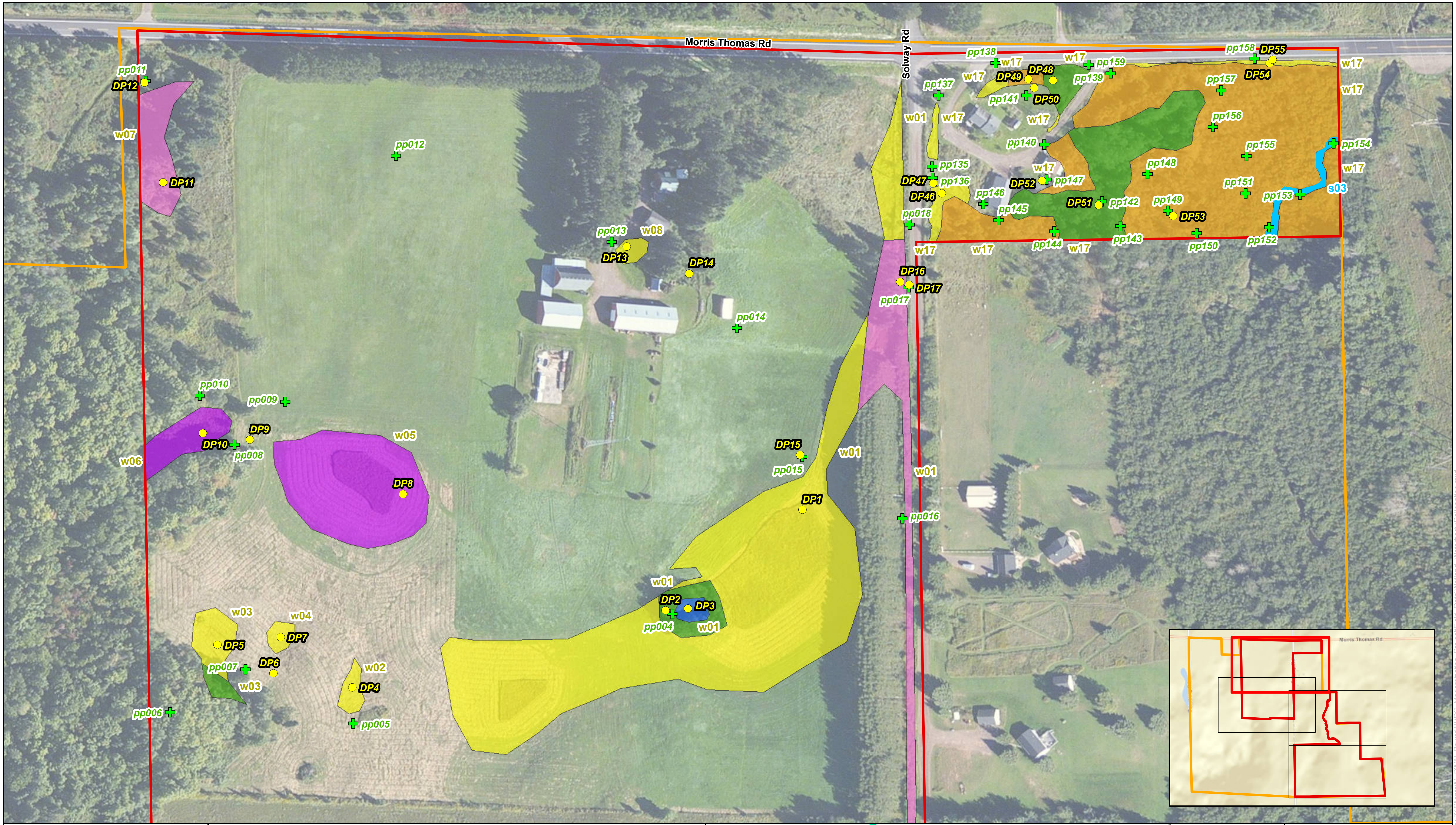
Date: (1/24/2023) Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Field_Data\Wetland_Waterbody\Hydrology.mxd

Figure 5

Delineation Results



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Feet

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Figure 5: Delineated Features
HVDC Modernization Project
Minnesota Power
St. Louis County, Minnesota

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🟥 Survey Area (August & September 2022)
🟧 Project Study Area (January 2023)
✚ Photo Point
● Wetland Data Point

Open Waterbody
Delineated Waterway

Delineated Wetland

- Alder thicket
- Conifer swamp
- Fresh wet meadow
- Hardwood swamp
- Sedge meadow
- Shallow marsh
- Shallow open water
- Shrub-carr

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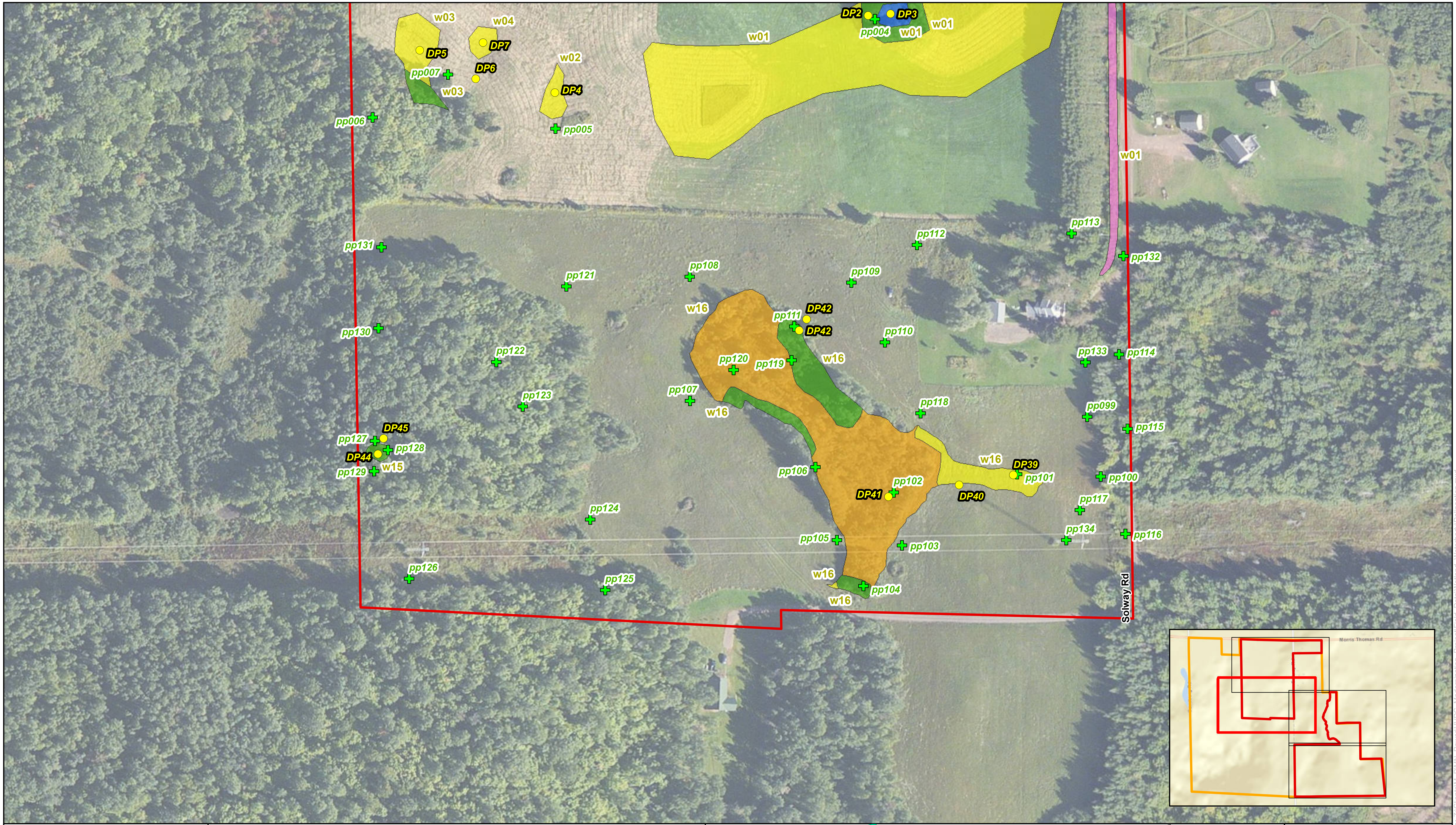
Source: Z:\Clients\M_PMN_Power\HVDC_Modernization_Project\Field_Data\Wetland_Waterbody\Delineation.mxd

Date: (1/24/2023)



0 75 150
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N W E S

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Figure 5: Delineated Features
HVDC Modernization Project
Minnesota Power
St. Louis County, Minnesota

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🟥 Survey Area (August & September 2022)
🟧 Project Study Area (January 2023)
✚ Photo Point
● Wetland Data Point

Open Waterbody
Delineated Waterway

Delineated Wetland
Alder thicket
Conifer swamp
Fresh wet meadow
Hardwood swamp
Sedge meadow
Shallow marsh
Shallow open water
Shrub-carr

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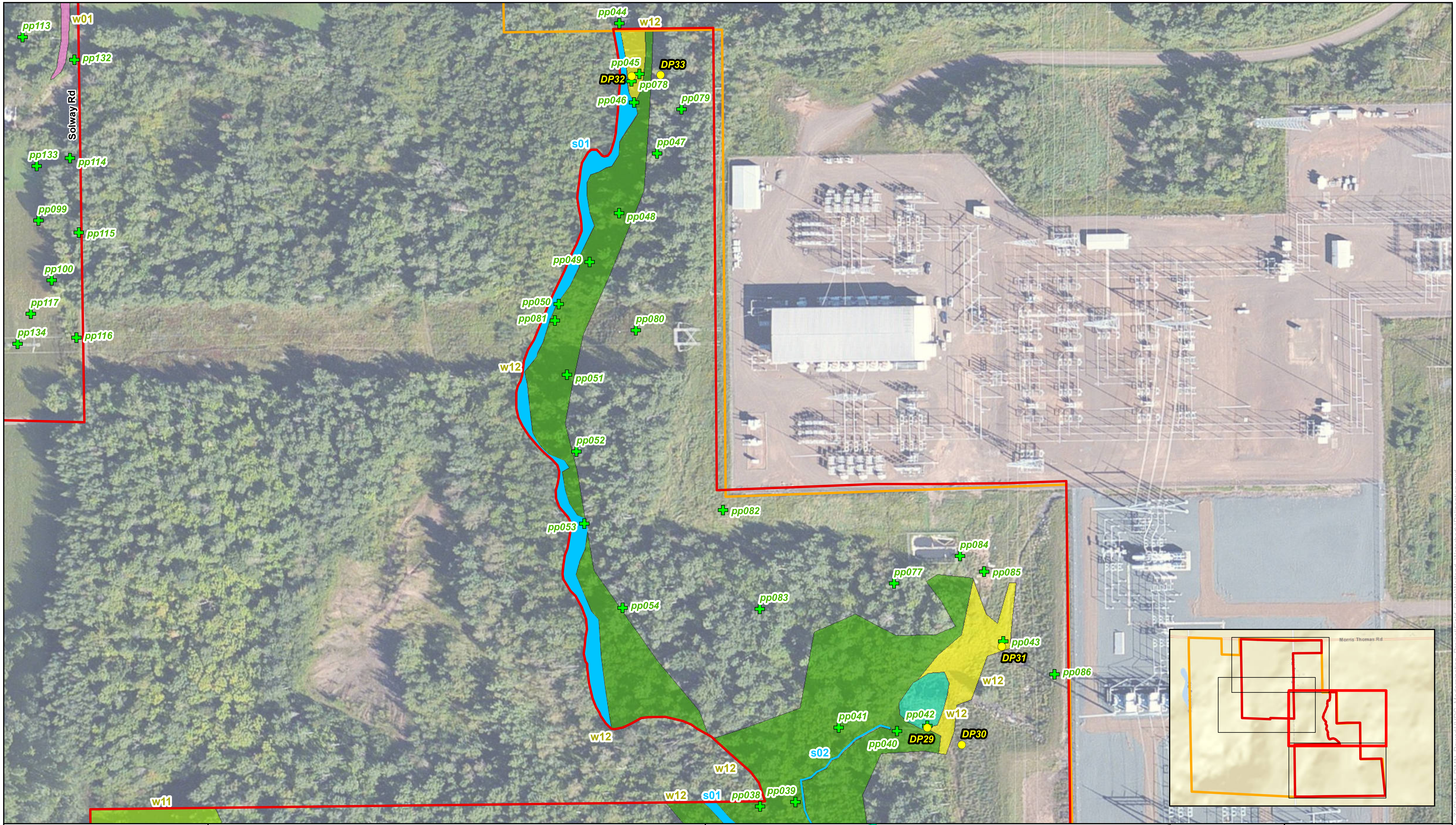
Date: (1/24/2023) **Source:** Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Field_Data\Wetland_Waterbody\Delineation.mxd



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Feet

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Figure 5: Delineated Features
HVDC Modernization Project
Minnesota Power
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- 🟥 Survey Area (August & September 2022)
- 🟧 Project Study Area (January 2023)
- ✚ Photo Point
- ● Wetland Data Point
- 🟦 Open Waterbody
- 🟦 Delineated Waterway

Delineated Wetland

- 🟧 Alder thicket
- 🟩 Conifer swamp
- 🟨 Fresh wet meadow
- 🟩 Hardwood swamp
- 🟪 Sedge meadow
- 🟩 Shallow marsh
- 🟦 Shallow open water
- 🟪 Shrub-carr

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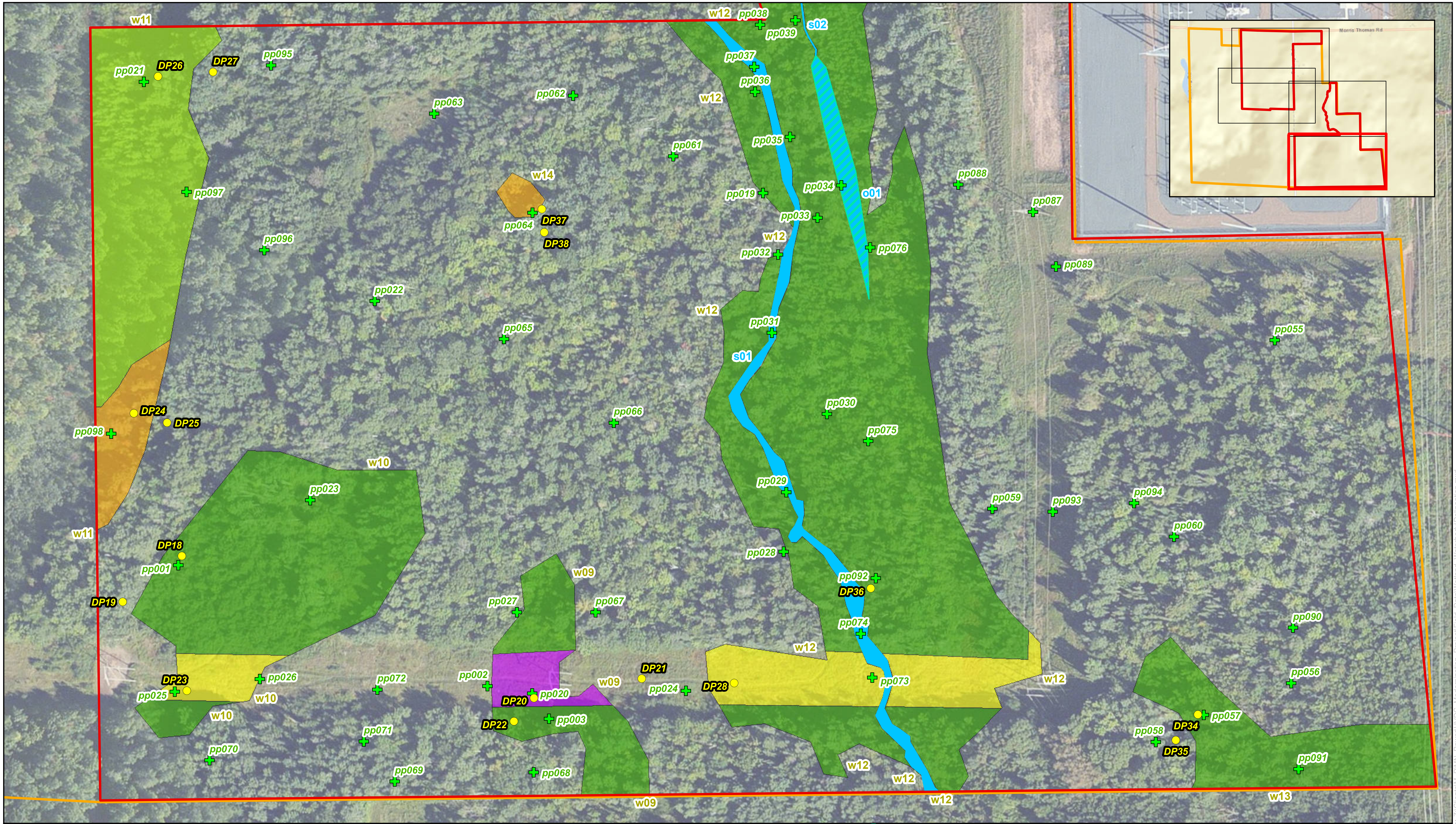
MPUC Docket No. E015/CN-22-607

Date: (1/24/2023) **Source:** Z:\Clients\M_PWN_Power\HVDC_Modernization_Project\Field_Data\Wetland_Waterbody\Delineation.mxd



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Feet

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Figure 5: Delineated Features
HVDC Modernization Project
Minnesota Power
St. Louis County, Minnesota

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- 🟥 Survey Area (August & September 2022)
- 🟧 Project Study Area (January 2023)
- ✚ Photo Point
- ● Wetland Data Point
- ▨ Open Waterbody
- Delineated Waterway

Delineated Wetland
- Alder thicket
- Conifer swamp
- Fresh wet meadow
- Hardwood swamp
- Sedge meadow
- Shallow marsh
- Shallow open water
- Shrub-carr

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Source: Z:\Clients\M_PWN_Power\HVDC_Modernization_Project\Field_Data\Wetland_Waterbody\Delineation.mxd

Date: (1/24/2023)

Appendix A

Survey Photographs

Photograph pp001 view East

Photograph pp001 view North

Photograph pp001 view South

Photograph pp001 view West

Photograph pp002 view East

Photograph pp002 view North

Photograph pp002 view South

Photograph pp002 view West

Photograph pp003 view East

Photograph pp003 view North

Photograph pp003 view South

Photograph pp003 view West

Photograph pp004 view North

Photograph pp004 view Northwest

Photograph pp005 view East

Photograph pp005 view North

Photograph pp005 view South

Photograph pp005 view West

Photograph pp006 view East

Photograph pp006 view North

Photograph pp006 view South

Photograph pp007 view Northeast

Photograph pp007 view Northwest

Photograph pp007 view Southwest

Photograph pp008 view West

Photograph pp009 view North

Photograph pp009 view Southeast

Photograph pp009 view Southwest

Photograph pp010 view North

Photograph pp010 view South

Photograph pp011 view East

Photograph pp011 view North

Photograph pp011 view South

Photograph pp012 view Northeast

Photograph pp012 view Northwest

Photograph pp012 view Southeast

Photograph pp012 view Southwest

Photograph pp013 view East

Photograph pp013 view North

Photograph pp013 view South

Photograph pp013 view West

Photograph pp014 view East

Photograph pp014 view North

Photograph pp014 view South

Photograph pp014 view West

Photograph pp015 view Northeast

Photograph pp015 view Southwest

Photograph pp016 view North

Photograph pp016 view South

Photograph pp017 view Northwest

Photograph pp017 view Southwest

Photograph pp018 view West

Photograph pp019 view East

Photograph pp019 view North

Photograph pp019 view South

Photograph pp019 view West

Photograph pp020 view East

Photograph pp020 view North

Photograph pp020 view South

Photograph pp020 view West

Photograph pp021 view East

Photograph pp021 view North

Photograph pp021 view South

Photograph pp021 view West

Photograph pp022 view East

Photograph pp022 view North

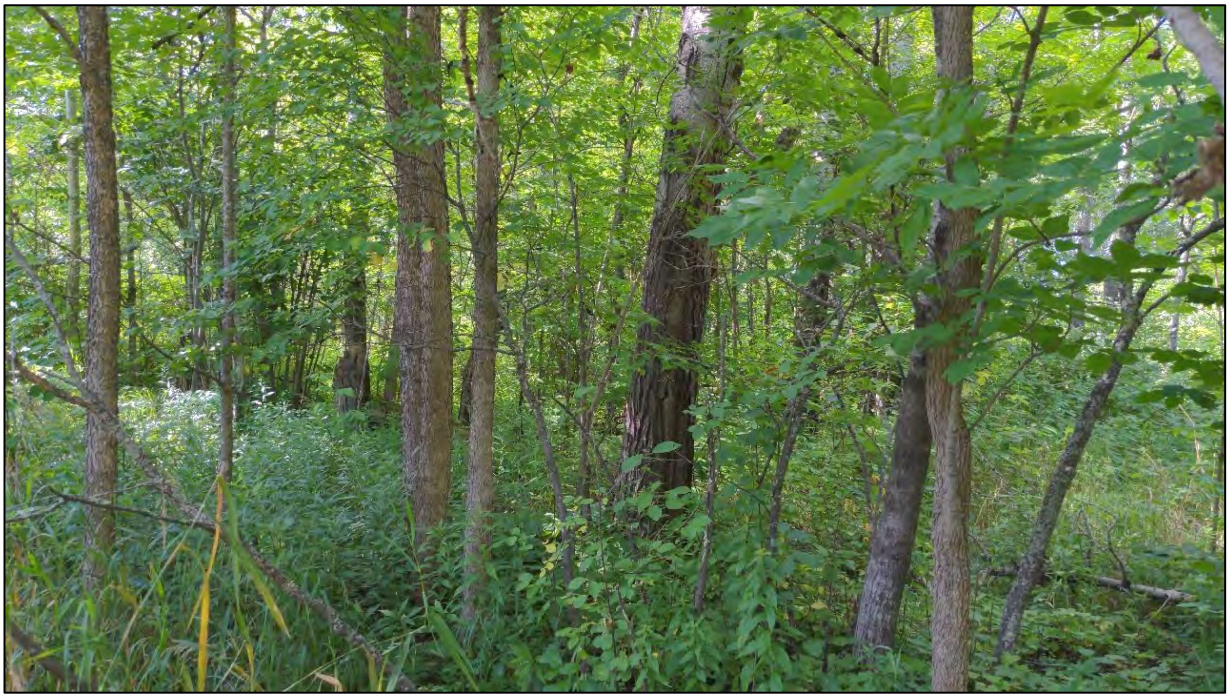
Photograph pp022 view South

Photograph pp022 view West

Photograph pp023 view East

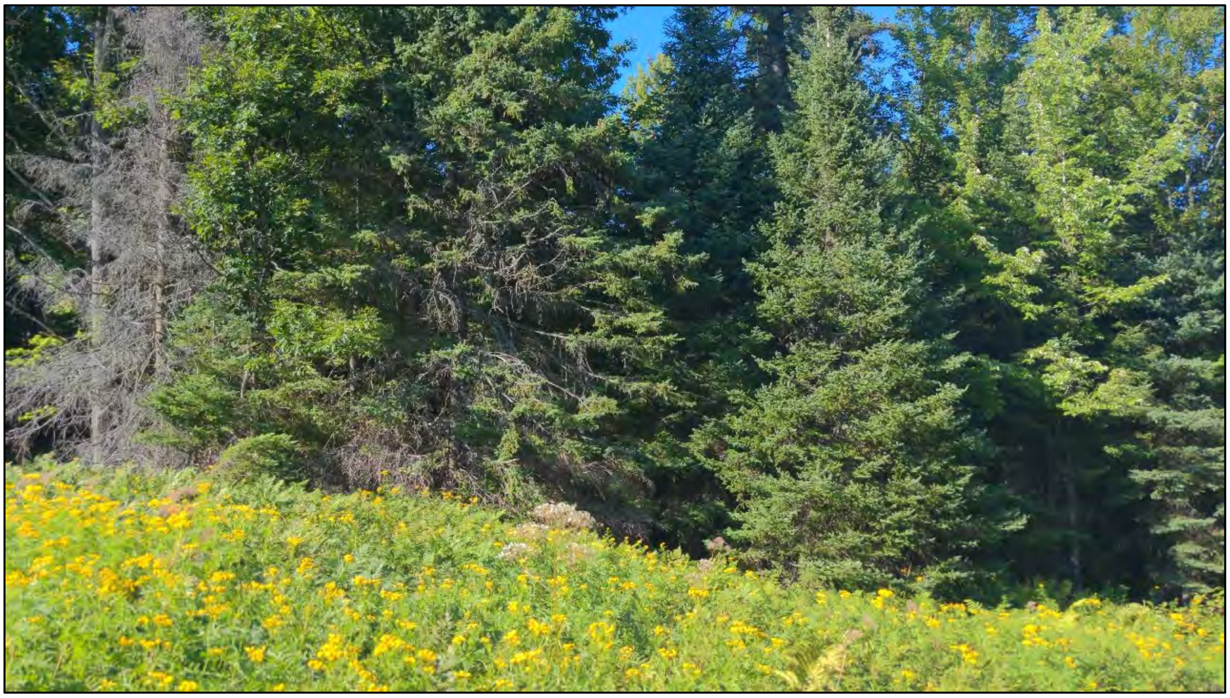
Photograph pp023 view North

Photograph pp023 view South



Photograph pp023 view West

Photograph pp024 view East



Photograph pp024 view North

Photograph pp024 view South

Photograph pp024 view West

Photograph pp025 view East

Photograph pp025 view North

Photograph pp025 view South

Photograph pp025 view Southwest

Photograph pp026 view East

Photograph pp026 view West

Photograph pp027 view East

Photograph pp027 view North

Photograph pp027 view South

Photograph pp027 view West

Photograph pp028 view East

Photograph pp028 view North

Photograph pp028 view South

Photograph pp028 view West

Photograph pp029 view East

Photograph pp029 view North

Photograph pp029 view South

Photograph pp029 view West

Photograph pp030 view East

Photograph pp030 view North

Photograph pp030 view South

Photograph pp030 view West

Photograph pp031 view North

Photograph pp031 view South

Photograph pp032 view East

Photograph pp032 view North

Photograph pp032 view South

Photograph pp032 view West

Photograph pp033 view East

Photograph pp033 view North

Photograph pp033 view South

Photograph pp033 view West

Photograph pp034 view East

Photograph pp034 view North

Photograph pp034 view South

Photograph pp034 view West

Photograph pp035 view East

Photograph pp035 view North

Photograph pp035 view South

Photograph pp035 view West

Photograph pp036 view East

Photograph pp036 view North

Photograph pp036 view South

Photograph pp036 view West

Photograph pp037 view North

Photograph pp037 view South

Photograph pp038 view East

Photograph pp038 view North

Photograph pp038 view South

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Photograph pp040 view North

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Photograph pp040 view West

Photograph pp041 view East

Photograph pp041 view West

Photograph pp042 view North

Photograph pp042 view South

Photograph pp043 view East

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Photograph pp046 view Northeast

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Photograph pp047 view East

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Photograph pp048 view East

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Photograph pp066 view East

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Photograph pp066 view South

Photograph pp066 view West

Photograph pp067 view East

Photograph pp067 view North

Photograph pp067 view South

Photograph pp067 view West

Photograph pp068 view East

Photograph pp068 view North

Photograph pp068 view South

Photograph pp069 view East

Photograph pp069 view North

Photograph pp069 view South

Photograph pp069 view West

Photograph pp070 view East

Photograph pp070 view North

Photograph pp070 view South

Photograph pp070 view West

Photograph pp071 view East

Photograph pp071 view North

Photograph pp071 view South

Photograph pp071 view West

Photograph pp072 view East

Photograph pp072 view North

Photograph pp072 view South

Photograph pp072 view West

Photograph pp073 view East

Photograph pp073 view North

Photograph pp073 view South

Photograph pp073 view West

Photograph pp074 view East

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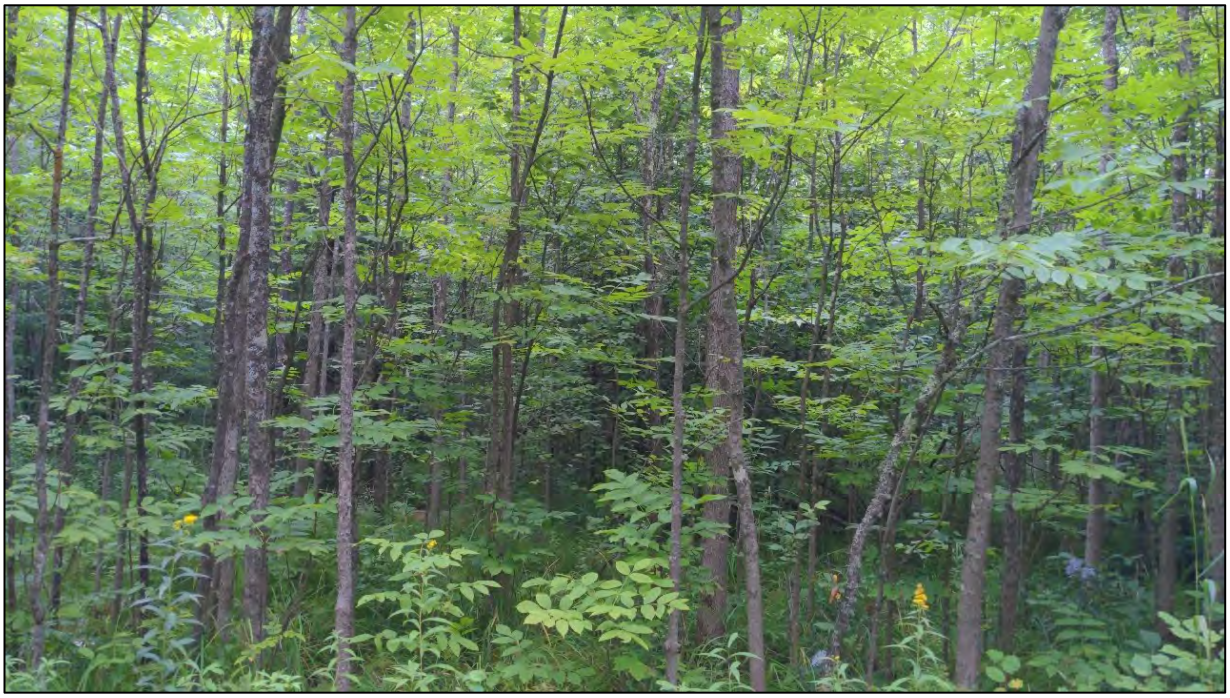
Photograph pp075 view East

Photograph pp075 view North

Photograph pp075 view South

Photograph pp075 view West



Photograph pp076 view East

Photograph pp076 view North

Photograph pp076 view South

Photograph pp076 view West

Photograph pp077 view East

Photograph pp077 view North

Photograph pp077 view South

Photograph pp077 view West

Photograph pp078 view East

Photograph pp078 view North

Photograph pp078 view South

Photograph pp078 view West

Photograph pp079 view East

Photograph pp079 view North

Photograph pp079 view South

Photograph pp079 view West

Photograph pp080 view East

Photograph pp080 view North

Photograph pp080 view South

Photograph pp080 view West

Photograph pp081 view North

Photograph pp081 view South

Photograph pp082 view East

Photograph pp082 view North

Photograph pp082 view South

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Photograph pp083 view South

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Photograph pp085 view North

Photograph pp085 view South

Photograph pp086 view North

Photograph pp086 view South

Photograph pp086 view West

Photograph pp087 view North

Photograph pp087 view South

Photograph pp088 view East

Photograph pp088 view North

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Photograph pp088 view West

Photograph pp089 view West

Photograph pp090 view East

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Photograph pp094 view East

Photograph pp094 view North

Photograph pp094 view South

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Photograph pp095 view East

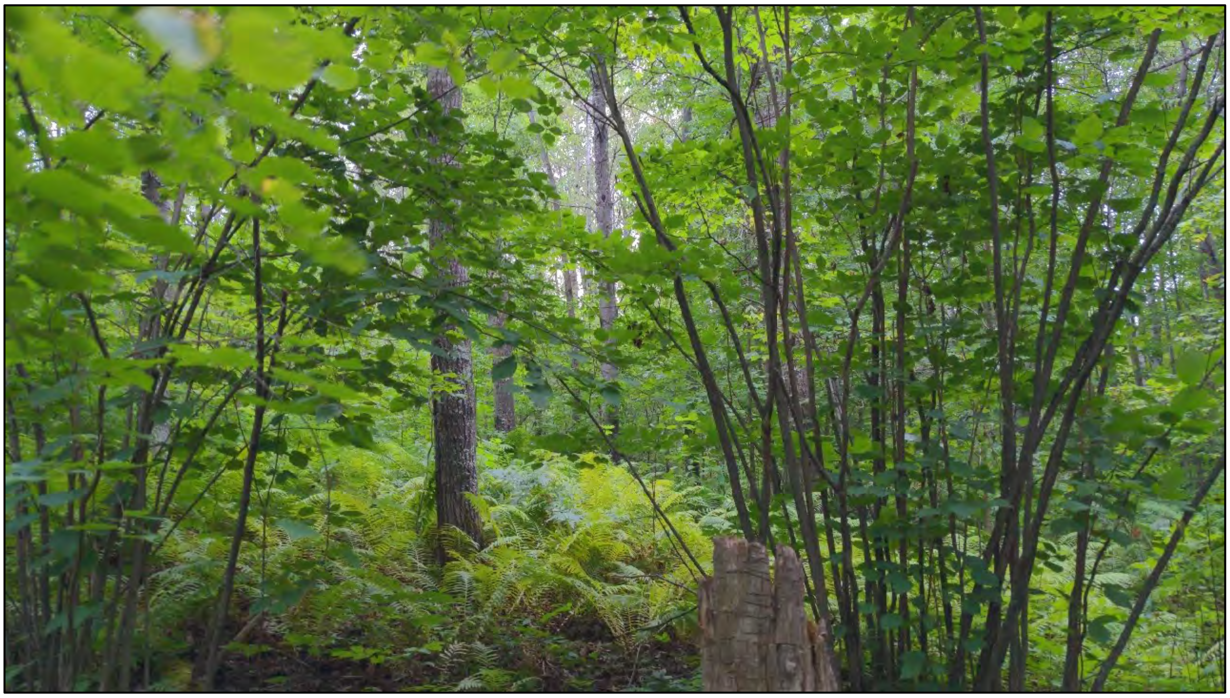
Photograph pp095 view North

Photograph pp095 view South

Photograph pp095 view West

Photograph pp096 view East

Photograph pp096 view North



Photograph pp096 view South

Photograph pp096 view West

Photograph pp097 view East

Photograph pp097 view West

Photograph pp098 view North

Photograph pp098 view South

Photograph pp099 view East

Photograph pp099 view North

Photograph pp099 view South

Photograph pp099 view West

Photograph pp100 view East

Photograph pp100 view North

Photograph pp100 view South

Photograph pp100 view West

Photograph pp101 view East

Photograph pp101 view North

Photograph pp101 view South

Photograph pp101 view West

Photograph pp102 view East

Photograph pp102 view North

Photograph pp102 view South

Photograph pp102 view West

Photograph pp103 view East

Photograph pp103 view North

Photograph pp103 view South

Photograph pp103 view West

Photograph pp104 view East

Photograph pp104 view North

Photograph pp104 view South

Photograph pp104 view West

Photograph pp105 view East

Photograph pp105 view North

Photograph pp105 view South

Photograph pp105 view West

Photograph pp106 view East

Photograph pp106 view North

Photograph pp106 view South

Photograph pp106 view West

Photograph pp107 view North

Photograph pp107 view Northeast

Photograph pp107 view South

Photograph pp107 view Southeast

Photograph pp107 view West

Photograph pp108 view East

Photograph pp108 view North

Photograph pp108 view South

Photograph pp108 view Southeast

Appendix B

Wetland Determination Data Forms – Northcentral Northeast Region

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP1

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): K 93A Lat: 46.7764313 Long: -92.3025662 Datum: WGS 84

Soil Map Unit Name: F142A - Canosia loam, 0 to 2 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___ Hydric Soil Present? Yes ✓ No ___ Wetland Hydrology Present? Yes ✓ No ___	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ___ If yes, optional Wetland Site ID: w01

Remarks: (Explain alternative procedures here or in a separate report.)

Swale/drainage containing wetland species. Area broadens and contracts with the landscape. Parcel is mostly a hay field with upland prairie that was historically grazed. Parcel contains multiple low spots and drainage swales. Dominant species include Scirpus atrocinctus, Phalaris arundinacea, Calamagrostis canadensis. Hydric soil and hydrology indicators present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Vis ble on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ✓ No ___ Depth (inches): 14

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 12

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Area is located in a drainage swale between two hills.

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VEGETATION – Use scientific names of plants.

Sampling Point: DP1

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Salix petiolaris	10	✓	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	10%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Scirpus cyperinus	30	✓	OBL
2. Calamagrostis canadensis	20	✓	OBL
3. Phalaris arundinacea	15		FACW
4. Carex retrorsa	10		OBL
5. Iris versicolor	10		OBL
6. Juncus effusus	10		OBL
7.			
8.			
9.			
10.			
11.			
12.			
	95%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80
FACW species	25	x 2 =	50
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	105 (A)		130 (B)

Prevalence Index = B/A = 1.24

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0 - 14	10YR 2/1	100					Mucky Loam/Clay	
14 - 22	10YR 2/1	30					Mucky Loam/Clay	
14 - 22	10YR 3/1	55	2.5YR 2.5/4	15	C	M	Sandy Loam	
22 - 24	10YR 4/2	95	5YR 4/4	5	C	M	Sandy Loam	
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
✔ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP2
Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W
Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2
Subregion (LRR or MLRA): K 93A Lat: 46.7759631 Long: -92.3034747 Datum: WGS 84
Soil Map Unit Name: F142A - Canosia loam, 0 to 2 percent slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___
Hydric Soil Present? Yes ✓ No ___
Wetland Hydrology Present? Yes ✓ No ___

Is the Sampled Area within a Wetland? Yes ✓ No ___
If yes, optional Wetland Site ID: w01

Remarks: (Explain alternative procedures here or in a separate report.)

Depression between two hills with pothole pond surrounded by grove of trees. PFO classification.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
✓ Saturation (A3)
✓ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
✓ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
✓ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
✓ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✓ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ✓ No ___ Depth (inches): 14
Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 10

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Small pothole pond less than 1 acre surrounded by mature birch and balsam poplar trees. Ponding in the middle of the depression surrounded by water stained leaves and drainage patterns indicating fluctuations in water levels. Area can be noticed on aerial photography. Water marks visibility in downed timber.

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP2

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus balsamifera	30	✔	FACW
2. Betula papyrifera	15	✔	FACU
3. Populus tremuloides	10		FACU
4.			
5.			
6.			
7.			
	55%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Cornus alternifolia	20	✔	FACU
2. Salix discolor	20	✔	FACW
3. Alnus incana	5		FACW
4. Populus balsamifera	5		FACW
5.			
6.			
7.			
	50%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Calamagrostis canadensis	20	✔	OBL
2. Equisetum sylvaticum	10	✔	FACW
3. Glyceria grandis	10	✔	OBL
4. Bidens tripartita	5		FACW
5. Carex gracillima	5		FACU
6. Carex retrorsa	5		OBL
7.			
8.			
9.			
10.			
11.			
12.			
	55%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	5	(A)
Total Number of Dominant Species Across All Strata:	7	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	71.4	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	35	x 1 =	35
FACW species	75	x 2 =	150
FAC species	0	x 3 =	0
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	160 (A)		385 (B)

Prevalence Index = B/A = 2.41

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	7.5YR 2.5/2	100					Sandy Loam	
6 - 20	7.5YR 3/2	75	5YR 3/4	25	C	M	Sandy Clay Loam	
20 - 24	7.5YR 3/2	80	5YR 3/2	20	C	M	Sandy Clay Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.
[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP3

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Pothole Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR or MLRA): K 93A Lat: 46.7759046 Long: -92.3034591 Datum: WGS 84

Soil Map Unit Name: F142A - Canosia loam, 0 to 2 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ______

Hydric Soil Present? Yes ✓ No ______

Wetland Hydrology Present? Yes ✓ No ______

Is the Sampled Area within a Wetland? Yes ✓ **No** ______

If yes, optional Wetland Site ID: w01

Remarks: (Explain alternative procedures here or in a separate report.)

Pothole pond at base of depression surrounded by PFO. Covered in Lemna.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

✓ Surface Water (A1)
✓ High Water Table (A2)
✓ Saturation (A3)
✓ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
✓ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

✓ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✓ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ______ Depth (inches): 0

Water Table Present? Yes ✓ No ______ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP3

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5 ft r)			
1. Lemna turionifera	95	✓	OBL
2. Glyceria grandis	5		OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	100	x 1 =	100
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		100 (B)

Prevalence Index = B/A = 1.00

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation
✓ 2 - Dominance Test is >50%
✓ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
✔ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ✔ **No**

Remarks:

did not dig due to water levels. Soil assumed Hydric.

Appendix I
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP4
Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W
Landform (hillslope, terrace, etc.): Closed Depression Local relief (concave, convex, none): Concave Slope (%): 4
Subregion (LRR or MLRA): K 93A Lat: 46.7756049 Long: -92.3055988 Datum: WGS 84
Soil Map Unit Name: F121B - Aldenlake sandy loam, 2 to 8 percent slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✔ No ___ Hydric Soil Present? Yes ✔ No ___ Wetland Hydrology Present? Yes ✔ No ___	**Is the Sampled Area within a Wetland?** **Yes** ✔ **No** ___ If yes, optional Wetland Site ID: w02

Remarks: (Explain alternative procedures here or in a separate report.)

Small pocket depression below hill summit above wetland swale. Hydrophytic veg dominant with small patches of salix.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
✔ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✔ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___
Water Table Present? Yes ___ No ✔ Depth (inches): ___
Saturation Present? Yes ___ No ✔ Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ✔ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrologic indicators present.

VEGETATION – Use scientific names of plants.

Sampling Point: DP4

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix pedicellaris	15	✔	OBL
2. Salix bebbiana	5	✔	FACW
3.			
4.			
5.			
6.			
7.			
	20% = Total Cover		

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Scirpus cyperinus	20	✔	OBL
2. Iris versicolor	15	✔	OBL
3. Calamagrostis canadensis	10	✔	OBL
4. Carex scoparia	10	✔	FACW
5. Poa palustris	10	✔	FACW
6. Tanacetum vulgare	10	✔	FACU
7. Carex tuckermanii	5		OBL
8. Onoclea sensibilis	5		FACW
9.			
10.			
11.			
12.			
	85% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 87.5 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	65	x 1 =	65
FACW species	30	x 2 =	60
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	105 (A)		165 (B)

Prevalence Index = B/A = 1.57

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

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HVDC Modernization Project
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SOIL

Sampling Point: DP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 2/2	100					Loam	
2 - 6	10YR 2/1	95	5YR 4/6	5	C	PL / M	Clay Loam	
6 - 8	10YR 2.5/1	85	5YR 4/6	15	C	PL / M	Clay Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.
[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ✔ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock, parent material

Depth (inches): 8

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

No indicators met due to restrictive layer, soils assumed Hydric.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP5

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): K 93A Lat: 46.7758410 Long: -92.3065504 Datum: WGS 84

Soil Map Unit Name: F121B - Aldenlake sandy loam, 2 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____ Hydric Soil Present? Yes ✓ No ____ Wetland Hydrology Present? Yes ✓ No ____	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ____ If yes, optional Wetland Site ID: w03

Remarks: (Explain alternative procedures here or in a separate report.)

Depression below hill summit containing wetland species. Micro tomographic discrepancy with small Salix patches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ________

Water Table Present? Yes ____ No ✓ Depth (inches): ________

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ________

Wetland Hydrology Present? Yes ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrological indicators present.

VEGETATION – Use scientific names of plants.

Sampling Point: DP5

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Salix pedicellaris	10	✔	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	10%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Scirpus cyperinus	60	✔	OBL
2. Calamagrostis canadensis	25	✔	OBL
3. Glyceria grandis	10		OBL
4. Carex scoparia	5		FACW
5. Iris versicolor	5		OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	105%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	110	x 1 =	110
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		120 (B)

Prevalence Index = B/A = 1.04

Hydrophytic Vegetation Indicators:

✔ 1 - Rapid Test for Hydrophytic Vegetation
✔ 2 - Dominance Test is >50%
✔ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 13	10YR 2/1	100					Mucky Loam/Clay	
13 - 16	10YR 3/1	98	5YR 3/4	2	C	PL	Clay Loam	
16 - 22	10YR 5/1	60	5YR 4/6	40	C	M	Silty Clay Loam	
22 - 30	10YR 6/1	60	10YR 5/6	40	C	M	Silty Clay	
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
✓ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
✓ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
✓ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP6

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): Convex Slope (%): 4

Subregion (LRR or MLRA): K 93A Lat: 46.7756375 Long: -92.3060717 Datum: WGS 84

Soil Map Unit Name: F121B - Aldenlake sandy loam, 2 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are “Normal Circumstances” present? Yes ✔ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ______ No ✔

Hydric Soil Present? Yes ______ No ✔

Wetland Hydrology Present? Yes ______ No ✔

Is the Sampled Area within a Wetland? Yes ______ No ✔

If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

Upland meadow, Hydrophytic veg not present. Hydrology indicators were not observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Vis ble on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✔ Depth (inches): ______

Water Table Present? Yes ______ No ✔ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✔ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrological indicators not present

VEGETATION – Use scientific names of plants.

Sampling Point: DP6

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Poa pratensis	80	✓	FACU
2. Solidago altissima	35	✓	FACU
3. Rubus idaeus	5		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	120%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	120	x 4 =	480
UPL species	0	x 5 =	0
Column Totals:	120 (A)		480 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ______ **No** ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	7.5YR 3/3	100					Loam	
6 - 14	10YR 3/2	30					Sandy Clay Loam	
6 - 14	7.5YR 4/3	68	7.5YR 4/4	2	D	M	Sandy Clay Loam	
14 - 24	10YR 3/2	20					Sandy Clay Loam	
14 - 24	7.5R 4/3	70	5YR 4/4	10	C	M	Sandy Clay Loam	
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✔

Remarks:

Hydric soil not met

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP7

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR or MLRA): K 93A Lat: 46.7758561 Long: -92.3061096 Datum: WGS 84

Soil Map Unit Name: F121B - Aldenlake sandy loam, 2 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___

Hydric Soil Present? Yes ✓ No ___

Wetland Hydrology Present? Yes ✓ No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___

If yes, optional Wetland Site ID: w04

Remarks: (Explain alternative procedures here or in a separate report.)

Depression located on back slope containing sedges and salix. Hydrology indicators, Hydrophytic veg and Hydric soil all present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? Yes ___ No ✓ Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrological indicators present

VEGETATION – Use scientific names of plants.

Sampling Point: DP7

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix pedicellaris	10	✓	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	10%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Carex vesicaria	30	✓	OBL
2. Carex tuckermanii	20	✓	OBL
3. Scirpus cyperinus	15		OBL
4. Elymus repens	10		FACU
5. Poa palustris	5		FACW
6. Tanacetum vulgare	5		FACU
7.			
8.			
9.			
10.			
11.			
12.			
	85%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	75	x 1 =	75
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	95 (A)		145 (B)

Prevalence Index = B/A = 1.53

Hydrophytic Vegetation Indicators:

- ✓ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: DP7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 9	10YR 3/2	95	7.5YR 4/6	5	C	M	Clay Loam	
9 - 17	10YR 3/1	18	5YR 4/6	2	C	M	Clay Loam	
9 - 17	7.5YR 4/3	70	5YR 4/6	10	C	M	Sandy Clay Loam	
17 - 24	10YR 5/3	60	5YR 4/6	40	C	M	Sandy Clay Loam	
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ✓ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP8

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR or MLRA): K 93A Lat: 46.7765146 Long: -92.3052603 Datum: WGS 84

Soil Map Unit Name: F142A - Canosia loam, 0 to 2 percent slopes NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ___
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ✓ No ___	If yes, optional Wetland Site ID: w05

Remarks: (Explain alternative procedures here or in a separate report.)

Elongated PEM depression/swale in between a hay field and an upland meadow. Swale running west to east dominated by wool grass. Micro-topographic and small tussocks present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
✓ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✓ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
✓ Microtopographic Relief (D4)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP8

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus nigra	5	✓	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	5% = Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5 ft r)			
1. Scirpus cyperinus	80	✓	OBL
2. Calamagrostis canadensis	15		OBL
3. Phalaris arundinacea	15		FACW
4. Carex scoparia	10		FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	120% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	95	x 1 =	95
FACW species	30	x 2 =	60
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	125 (A)		155 (B)

Prevalence Index = B/A = 1.24

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation
✓ 2 - Dominance Test is >50%
✓ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ______

Remarks: (Include photo numbers here or on a separate sheet.)

Appendix I
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611
MPUC Docket No. E015/CN-22-607
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SOIL

Sampling Point: DP8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 2	10YR 2/1	100					Mucky Loam/Clay	
2 - 7	10YR 5/1	90	5YR 4/6	5	C	M	Silty Clay Loam	
7 - 12	7.5YR 4/2	70	5YR 4/6	30	C	M	Silty Clay Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
✔ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Gravel/parent material
Depth (inches): 12

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP9
Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W
Landform (hillslope, terrace, etc.): Upland Local relief (concave, convex, none): Convex Slope (%): 2
Subregion (LRR or MLRA): K 93A Lat: 46.7767799 Long: -92.306323 Datum: WGS 84
Soil Map Unit Name: F121B - Aldenlake sandy loam, 2 to 8 percent slopes NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ______	No ✔	**Is the Sampled Area within a Wetland?** **Yes** ______ **No** ✔
Hydric Soil Present?	Yes ✔	No ______	
Wetland Hydrology Present?	Yes ______	No ✔	If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

Upland bridge between two wetlands. Edge of forested parkland and open prairie. Hydric soil present but veg and hydrology not present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Vis ble on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✔ Depth (inches): ____________
Water Table Present? Yes ______ No ✔ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes ______ No ✔ Depth (inches): ____________

Wetland Hydrology Present? Yes ______ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Hydrological indicators not present

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP9

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Quercus rubra	25	✔	FACU
2. Acer negundo	5		FAC
3.			
4.			
5.			
6.			
7.			
	30%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft r)			
1. Poa pratensis	50	✔	FACU
2. Tanacetum vulgare	40	✔	FACU
3. Phleum pratense	10		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100%	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	125	x 4 =	500
UPL species	0	x 5 =	0
Column Totals:	130 (A)		515 (B)

Prevalence Index = B/A = 3.96

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ______ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic veg not present

Appendix I
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611

SOIL

Sampling Point: DP9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0 - 6	7.5YR 2.5/2	100					Loam	
6 - 16	7.5YR 4/2	70	5YR 4/6	30	C	M	Silt Loam	
-			10R /					
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
✔ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Gravel

Depth (inches): 16

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP10
Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W
Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2
Subregion (LRR or MLRA): K 93A Lat: 46.7767707 Long: -92.3067635 Datum: WGS 84
Soil Map Unit Name: F142A - Canosia loam, 0 to 2 percent slopes NWI classification: PUBGx
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✔ No ___
Hydric Soil Present? Yes ✔ No ___
Wetland Hydrology Present? Yes ✔ No ___

Is the Sampled Area within a Wetland? Yes ✔ No ___
If yes, optional Wetland Site ID: w06

Remarks: (Explain alternative procedures here or in a separate report.)

Sedge meadow depression surrounded by open oak parkland/pasture.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
✔ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✔ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
✔ Microtopographic Relief (D4)
✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___
Water Table Present? Yes ___ No ✔ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Oval shape Pocket depression dominated by sedges. Hydrological indicators present.

VEGETATION – Use scientific names of plants.

Sampling Point: DP10

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	5	✔	FAC
2. Acer saccharinum	5	✔	FACW
3.			
4.			
5.			
6.			
7.			
	10%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Alnus incana	5	✔	FACW
2. Salix bebbiana	5	✔	FACW
3.			
4.			
5.			
6.			
7.			
	10%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Carex tuckermanii	50	✔	OBL
2. Carex retrorsa	20	✔	OBL
3. Sparganium eurycarpum	15		OBL
4. Bidens tripartita	10		FACW
5. Carex vesicaria	5		OBL
6. Scirpus cyperinus	5		OBL
7.			
8.			
9.			
10.			
11.			
12.			
	105%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	95	x 1 = 95
FACW species	25	x 2 = 50
FAC species	5	x 3 = 15
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	125 (A)	160 (B)

Prevalence Index = B/A = 1.28

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 4/1	100					Mucky Loam/Clay	
10 - 12	10YR 5/1	95	5YR 4/6	5	C	M	Silty Clay	
12 - 24	10YR 4/2	55	5YR 4/6	45	C	M	Silty Clay	
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
✔ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
✔ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP11

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR or MLRA): K 93A Lat: 46.7779554 Long: -92.3069215 Datum: WGS 84

Soil Map Unit Name: F121B - Aldenlake sandy loam, 2 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____

Hydric Soil Present? Yes ✓ No ____

Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ____

If yes, optional Wetland Site ID: w07

Remarks: (Explain alternative procedures here or in a separate report.)

PSS shrub kar, slight depression. Surrounding cover conifer deciduous mix.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Vis ble on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ✓ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ________

Water Table Present? Yes ____ No ✓ Depth (inches): ________

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ________

Wetland Hydrology Present? Yes ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrological indicators present

VEGETATION – Use scientific names of plants.

Sampling Point: DP11

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Betula papyrifera	20	✓	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	20% = Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix pedicellaris	80	✓	OBL
2. Salix bebbiana	10		FACW
3. Cornus alternifolia	5		FACU
4. Fraxinus nigra	5		FACW
5.			
6.			
7.			
	100% = Total Cover		

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Onoclea sensibilis	80	✓	FACW
2. Calamagrostis canadensis	5		OBL
3. Rubus pubescens	5		FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	85	x 1 =	85
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	0	x 5 =	0
Column Totals:	210 (A)		385 (B)

Prevalence Index = B/A = 1.83

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 7	10YR 2/1	100					Clay Loam	
7 - 18	10YR 3/1	20						
7 - 18	7.5YR 5/2	65	5YR 4/6	15	C	M	Sandy Clay Loam	
18 - 24	7.5YR 5/3	50	5YR 5/8	50	C	M	Sandy Loam	
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (**LRR R, MLRA 149B**)
☐ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
☐ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
☐ Loamy Mucky Mineral (F1) (**LRR K, L**)
☐ Loamy Gleyed Matrix (F2)
☑ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
☐ Dark Surface (S7) (**LRR K, L**)
☐ Polyvalue Below Surface (S8) (**LRR K, L**)
☐ Thin Dark Surface (S9) (**LRR K, L**)
☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
☐ Red Parent Material (F21)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP12

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Shoulder Local relief (concave, convex, none): Convex Slope (%): 2

Subregion (LRR or MLRA): K 93A Lat: 46.7784333 Long: -92.3069803 Datum: WGS 84

Soil Map Unit Name: F121B - Aldenlake sandy loam, 2 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ______ No ✓		**Is the Sampled Area within a Wetland?** **Yes** ______ **No** ✓
Hydric Soil Present? Yes ______ No ✓		
Wetland Hydrology Present? Yes ______ No ✓		If yes, optional Wetland Site ID: ______________

Remarks: (Explain alternative procedures here or in a separate report.)

Upland hill slope between wetland and road

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ____________

Water Table Present? Yes ______ No ✓ Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ____________

Wetland Hydrology Present? Yes ______ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrology indicators not present

VEGETATION – Use scientific names of plants.

Sampling Point: DP12

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	20	✓	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	20%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Tanacetum vulgare	75	✓	FACU
2. Poa pratensis	25		FACU
3. Rubus idaeus	15		FACU
4. Solidago altissima	10		FACU
5. Achillea millefolium	5		FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	130%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	20	x 3 = 60
FACU species	130	x 4 = 520
UPL species	0	x 5 = 0
Column Totals:	150 (A)	580 (B)

Prevalence Index = B/A = 3.87

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✓

Remarks: (Include photo numbers here or on a separate sheet.)

Hydrophytic veg not present

SOIL

Sampling Point: DP12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 3	7.5YR 3/3	100					Loam	
3 - 20	7.5YR 4/4	100					Loam	
20 - 24	7.5YR 4/6	97	2.5YR 3/6	3	C	M	Sandy Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ______ No ✔

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP13

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Drainageway Local relief (concave, convex, none): Concave Slope (%): 4

Subregion (LRR or MLRA): K 93A Lat: 46.7776662 Long: -92.3037579 Datum: WGS 84

Soil Map Unit Name: F121B - Aldenlake sandy loam, 2 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____ Hydric Soil Present? Yes ✓ No ____ Wetland Hydrology Present? Yes ✓ No ____	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ____ If yes, optional Wetland Site ID: w08

Remarks: (Explain alternative procedures here or in a separate report.)

Wetland depression with driveway built across it with culvert.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ________

Water Table Present? Yes ____ No ✓ Depth (inches): ________

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ________

Wetland Hydrology Present? Yes ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrology indicators observed

Appendix I
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611
MPUC Docket No. E015/CN-22-607
265 of 393

VEGETATION – Use scientific names of plants.

Sampling Point: DP13

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	10	✓	OBL
2. Prunus americana	5	✓	UPL
3.			
4.			
5.			
6.			
7.			
	15%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Phalaris arundinacea	40	✓	FACW
2. Agrostis gigantea	20	✓	FACW
3. Galeopsis tetrahit	20	✓	FACU
4. Poa palustris	10		FACW
5. Urtica dioica	10		FAC
6. Solidago gigantea	5		FACW
7.			
8.			
9.			
10.			
11.			
12.			
	105%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	60	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	75	x 2 =	150
FAC species	10	x 3 =	30
FACU species	20	x 4 =	80
UPL species	5	x 5 =	25
Column Totals:	120 (A)		295 (B)

Prevalence Index = B/A = 2.46

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
✓ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ✓ **No** ___

Remarks:

Did not dig due to proximity of house and barn structures. Soils assumed Hydric.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP14

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): ______ Slope (%): 5

Subregion (LRR or MLRA): K 93A Lat: 46.7775461 Long: -92.3033366 Datum: WGS 84

Soil Map Unit Name: F121B - Aldenlake sandy loam, 2 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ______ No ✔

Hydric Soil Present? Yes ______ No ✔

Wetland Hydrology Present? Yes ______ No ✔

Is the Sampled Area within a Wetland? **Yes** ______ **No** ✔

If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

Hillslope next to barn leading into wetland below

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Vis ble on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✔ Depth (inches): ______

Water Table Present? Yes ______ No ✔ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✔ Depth (inches): ______

Wetland Hydrology Present? Yes ______ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators present

VEGETATION – Use scientific names of plants.

Sampling Point: DP14

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer saccharinum	20	✔	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	20%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Bromus inermis	30	✔	UPL
2. Rubus idaeus	30	✔	FACU
3. Galeopsis tetrahit	15	✔	FACU
4.			
5.			
6.			
7.			
	75%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Bromus inermis	40	✔	UPL
2. Rubus idaeus	30	✔	FACU
3. Galeopsis tetrahit	15		FACU
4. Tanacetum vulgare	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	6	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	16.7	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	0	x 3 =	0
FACU species	95	x 4 =	380
UPL species	70	x 5 =	350
Column Totals:	185 (A)		770 (B)

Prevalence Index = B/A = 4.16

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ______ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

No dig due to proximity of buildings soils assumed non Hydric

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP15

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Rise Local relief (concave, convex, none): Convex Slope (%): 2

Subregion (LRR or MLRA): K 93A Lat: 46.7766815 Long: -92.3025666 Datum: WGS 84

Soil Map Unit Name: F142A - Canosia loam, 0 to 2 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No ✔	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** ✔
Hydric Soil Present?	Yes ___ No ✔	
Wetland Hydrology Present?	Yes ___ No ✔	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

Mowed hay field

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP15

Tree Stratum (Plot size: 30 ft r)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
= Total Cover			

Sapling/Shrub Stratum (Plot size: 15 ft r)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
= Total Cover			

Herb Stratum (Plot size: 5 ft r)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Poa pratensis	90	✔	FACU
2. Phleum pratense	10		FACU
3. Hieracium caespitosum	5		
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
= Total Cover	105%		

Woody Vine Stratum (Plot size: 30 ft r)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column Totals:	100 (A)		400 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 3/2	100					Loam	
12 - 18	7.5YR 4/3	85	5YR 4/6	15	C	M	Sandy Loam	
18 - 24	10YR 5/2	50	5YR 5/6	25	C	M	Sandy Loam	
18 - 24			2.5YR 3/4	25	C	M	Sandy Loam	
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

Appendix I
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP16

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Ditch Local relief (concave, convex, none): Concave Slope (%): 4

Subregion (LRR or MLRA): K 93A Lat: 46.7774664 Long: -92.3018259 Datum: WGS 84

Soil Map Unit Name: F117D - Rollins sandy loam, 8 to 18 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✔ No ___

Hydric Soil Present? Yes ✔ No ___

Wetland Hydrology Present? Yes ✔ No ___

Is the Sampled Area within a Wetland? Yes ✔ **No** ___

If yes, optional Wetland Site ID: dp16

Remarks: (Explain alternative procedures here or in a separate report.)

Road ditch

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✔ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrological indicators present

VEGETATION – Use scientific names of plants.

Sampling Point: DP16

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix eriocephala	80	✔	FACW
2. Cornus alba	5		FACW
3.			
4.			
5.			
6.			
7.			
	85% = Total Cover		

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Apocynum androsaemifolium	10	✔	UPL
2. Calamagrostis canadensis	10	✔	OBL
3. Impatiens capensis	10	✔	FACW
4. Phalaris canariensis	10	✔	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	95	x 2 =	190
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	10	x 5 =	50
Column Totals:	125 (A)		290 (B)

Prevalence Index = B/A = 2.32

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ☐ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ☐ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ☐ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ☐ Dark Surface (S7) (**LRR K, L**)
- ☐ Polyvalue Below Surface (S8) (**LRR K, L**)
- ☐ Thin Dark Surface (S9) (**LRR K, L**)
- ☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (TF12)
- ☑ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ✓ **No**

Remarks:

No dig due to proximity of roadway. Soils assumed Hydric.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP17

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR or MLRA): K 93A Lat: 46.7775018 Long: -92.3018084 Datum: WGS 84

Soil Map Unit Name: F117D - Rollins sandy loam, 8 to 18 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No ✓
Hydric Soil Present? Yes ___ No ✓
Wetland Hydrology Present? Yes ___ No ✓

Is the Sampled Area within a Wetland? **Yes** ___ **No** ✓

If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

Road edge, recently mowed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? Yes ___ No ✓ Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators

VEGETATION – Use scientific names of plants.

Sampling Point: DP17

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Bromus inermis	90	✓	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90 (A)		450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ______ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______________________

Depth (inches): ______________________

Hydric Soil Present? Yes ______ No ✓

Remarks:

No dig due to road edge. Soils assumed non Hydric.

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP18

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Microrelief Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR or MLRA): K 93A Lat: 46.7688025 Long: -92.3011343 Datum: WGS 84

Soil Map Unit Name: F137B - Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____

Hydric Soil Present? Yes ✓ No ____

Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ____

If yes, optional Wetland Site ID: w10

Remarks: (Explain alternative procedures here or in a separate report.)

Black ash PFO with a sedge understory, area is relatively flat and viability is low.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Vis ble on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ________

Water Table Present? Yes ____ No ✓ Depth (inches): ________

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ________

Wetland Hydrology Present? Yes ✓ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrological indicators observed

VEGETATION – Use scientific names of plants.

Sampling Point: DP18

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus nigra	90	✔	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	90%	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Frangula alnus	20	✔	FAC
2. Fraxinus nigra	20	✔	FACW
3. Populus balsamifera	10	✔	FACW
4.			
5.			
6.			
7.			
	50%	= Total Cover	
Herb Stratum (Plot size: 5 ft r)			
1. Carex tuckermanii	30	✔	OBL
2. Rubus pubescens	30	✔	FACW
3. Calamagrostis canadensis	10		OBL
4. Ribes triste	10		OBL
5. Carex intumescens	5		FACW
6. Carex scoparia	5		FACW
7.			
8.			
9.			
10.			
11.			
12.			
	90%	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50	x 1 =	50
FACW species	160	x 2 =	320
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	230 (A)		430 (B)

Prevalence Index = B/A = 1.87

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

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SOIL

Sampling Point: DP18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 2/1	100					Loam	
12 - 20	7.5YR 6/2	60	5YR 4/6	35	C	M	Silt Loam	
12 - 20			2.5YR 3/6	5	C	M	Silt Loam	
20 - 24	5YR 3/2	50	5YR 4/6	50	C	M	Silty Clay Loam	
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
✔ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP19

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): Convex Slope (%): 2

Subregion (LRR or MLRA): K 93A Lat: 46.7686302 Long: -92.3015404 Datum: WGS 84

Soil Map Unit Name: F137B - Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No ✓	**Is the Sampled Area within a Wetland?**	**Yes** ___ **No** ✓
Hydric Soil Present?	Yes ___ No ✓		
Wetland Hydrology Present?	Yes ___ No ✓	If yes, optional Wetland Site ID: dp19	

Remarks: (Explain alternative procedures here or in a separate report.)

Slight raise in the landscape, wooded area with dry silt loam soils.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Vis ble on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? Yes ___ No ✓ Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrology indicators not present

VEGETATION – Use scientific names of plants.

Sampling Point: DP19

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus tremuloides	80	✓	FACU
2. Betula papyrifera	20		FACU
3. Acer rubrum	15		FAC
4.			
5.			
6.			
7.			
	115%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Betula papyrifera	20	✓	FACU
2. Quercus rubra	20	✓	FACU
3. Cornus alba	10	✓	FACW
4.			
5.			
6.			
7.			
	50%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Apocynum androsaemifolium	75	✓	UPL
2. Eurybia macrophylla	25		UPL
3. Tanacetum vulgare	10		FACU
4. Aralia nudicaulis	5		FACU
5. Parthenocissus inserta	5		FACU
6. Phleum pratense	5		FACU
7. Solidago gigantea	5		FACW
8.			
9.			
10.			
11.			
12.			
	130%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	20	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	15	x 3 =	45
FACU species	165	x 4 =	660
UPL species	100	x 5 =	500
Column Totals:	295 (A)		1235 (B)

Prevalence Index = B/A = 4.19

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 3/3	100					Silt Loam	
10 - 24	2.5Y 4/3	100					Silt Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

Hydric soil not present

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP20

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): K 93A Lat: 46.7681934 Long: -92.2987801 Datum: WGS 84

Soil Map Unit Name: F151A - Tacoosh mucky peat, dense substratum, 0 to 1 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ___
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ✓ No ___	If yes, optional Wetland Site ID: w09

Remarks: (Explain alternative procedures here or in a separate report.)

Depression wetland above waterway

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ✓ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Depression at base of ridge line. Hydrological indicators observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP20

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	10	✓	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	10% = Total Cover		

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Scirpus cyperinus	40	✓	OBL
2. Carex lacustris	15	✓	OBL
3. Eutrochium maculatum	10		OBL
4. Scirpus pedicellatus	10		OBL
5. Glyceria canadensis	5		OBL
6. Hypericum fraseri	5		OBL
7. Osmunda claytoniana	5		FAC
8.			
9.			
10.			
11.			
12.			
	90% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	85	x 1 =	85
FACW species	10	x 2 =	20
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		120 (B)

Prevalence Index = B/A = 1.20

Hydrophytic Vegetation Indicators:

- ✓ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

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SOIL

Sampling Point: DP20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 22	10YR 2/1	100					Mucky Loam/Clay	
22 - 24	10YR 2/1						Mucky Sand	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
✔ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ✔ **No**

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-23
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP21
Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W
Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): Convex Slope (%): 7
Subregion (LRR or MLRA): K 93A Lat: 46.7682459 Long: -92.2990834 Datum: WGS 84
Soil Map Unit Name: F144D - Aldenlake-Ahmeek complex, 8 to 18 percent slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No ✓
Hydric Soil Present? Yes ___ No ✓
Wetland Hydrology Present? Yes ___ No ✓

Is the Sampled Area within a Wetland? **Yes** ___ **No** ✓
If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

Upland point within power line row

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Vis ble on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrological indicators observed

VEGETATION – Use scientific names of plants.

Sampling Point: DP21

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus tremuloides	5	✓	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	5%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pteridium aquilinum	75	✓	FACU
2. Tanacetum vulgare	30	✓	FACU
3. Valeriana officinalis	15		
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	120%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	110	x 4 =	440
UPL species	0	x 5 =	0
Column Totals:	110 (A)		440 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 2/1	100					Sandy Loam	
8 - 20	10YR 3/3	95	5YR 3/4	5	C	M	Sandy Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Gravel

Depth (inches): 20

Hydric Soil Present? Yes ______ No ✔

Remarks:

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP22

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): K 93A Lat: 46.7681014 Long: -92.2986376 Datum: WGS 84

Soil Map Unit Name: F151A - Tacoosh mucky peat, dense substratum, 0 to 1 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___

Hydric Soil Present? Yes ✓ No ___

Wetland Hydrology Present? Yes ✓ No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___

If yes, optional Wetland Site ID: w09

Remarks: (Explain alternative procedures here or in a separate report.)

Wetland extends out of power line row and into undisturbed woods. PFO hardwood swamp.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Vis ble on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? Yes ___ No ✓ Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrological indicators met

VEGETATION – Use scientific names of plants.

Sampling Point: DP22

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus nigra	75	✔	FACW
2. Abies balsamea	10		FAC
3. Acer rubrum	10		FAC
4.			
5.			
6.			
7.			
	95%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	15	✔	FACW
2. Frangula alnus	15	✔	FAC
3. Fraxinus nigra	10	✔	FACW
4.			
5.			
6.			
7.			
	40%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Athyrium angustum	50	✔	FAC
2. Equisetum sylvaticum	30	✔	FACW
3. Carex crinita	10		OBL
4. Cornus canadensis	10		FAC
5. Rubus pubescens	5		FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	105%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	135	x 2 =	270
FAC species	95	x 3 =	285
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	240 (A)		565 (B)

Prevalence Index = B/A = 2.35

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP22

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 24	10YR 2/1	100					Mucky Loam/Clay	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
✔ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-23

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP23

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): K 93A Lat: 46.7682534 Long: -92.3010996 Datum: WGS 84

Soil Map Unit Name: F137B - Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✔ No ___

Hydric Soil Present? Yes ✔ No ___

Wetland Hydrology Present? Yes ✔ No ___

Is the Sampled Area within a Wetland? **Yes** ✔ **No** ___

If yes, optional Wetland Site ID: w10

Remarks: (Explain alternative procedures here or in a separate report.)

Power line row, mature trees have been cleared. PEM cover dominated by Scirpus and calamagrostis. Hydric soils present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✔ Microtopographic Relief (D4)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrological indicators present

VEGETATION – Use scientific names of plants.

Sampling Point: DP23

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	5	✔	FACW
2. Salix bebbiana	5	✔	FACW
3. Salix pyrifolia	5	✔	FACW
4.			
5.			
6.			
7.			
	15% = Total Cover		

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Scirpus cyperinus	40	✔	OBL
2. Calamagrostis canadensis	20	✔	OBL
3. Onoclea sensibilis	15		FACW
4. Carex scoparia	5		FACW
5. Glyceria canadensis	5		OBL
6. Persicaria sagittata	5		OBL
7.			
8.			
9.			
10.			
11.			
12.			
	90% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	70	x 1 =	70
FACW species	35	x 2 =	70
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	105 (A)		140 (B)

Prevalence Index = B/A = 1.33

Hydrophytic Vegetation Indicators:

✔ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 9	10YR 2/1	10					Mucky Loam/Clay	
0 - 9	10YR 2/2	88	7.5YR 3/3	2	C	PL	Clay Loam	
9 - 20	5YR 4/2	80	5YR 4/6	20	C	M	Silty Clay	
20 - 24	7.5YR 4/2	50	5YR 4/6	50	C	M	Silty Clay	
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

Appendix I
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611
MPUC Docket No. E015/CN-22-607
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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-23

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP24

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): K 93A Lat: 46.7695364 Long: -92.3014672 Datum: WGS 84

Soil Map Unit Name: F151A - Tacoosh mucky peat, dense substratum, 0 to 1 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✔ No ___

Hydric Soil Present? Yes ✔ No ___

Wetland Hydrology Present? Yes ✔ No ___

Is the Sampled Area within a Wetland? **Yes** ✔ **No** ___

If yes, optional Wetland Site ID: w11

Remarks: (Explain alternative procedures here or in a separate report.)

Large swale or basin covered in sphagnum moss and tag alder with a broad hardwood PFO fringe. Tamaracks present and more prevalent west.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
✔ High Water Table (A2)
✔ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
✔ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
✔ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Vis ble on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✔ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ✔ No ___ Depth (inches): 8

Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 3

Wetland Hydrology Present? Yes ✔ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP24

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Larix laricina	20	✓	FACW
2. Acer rubrum	10	✓	FAC
3. Populus tremuloides	10	✓	FACU
4.			
5.			
6.			
7.			
	40%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Alnus incana	90	✓	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	90%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Osmundastrum cinnamomeum	40	✓	FACW
2. Glyceria striata	20	✓	OBL
3. Carex intumescens	5		FACW
4. Solidago gigantea	5		FACW
5. Trientalis borealis	5		FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	5	(A)
Total Number of Dominant Species Across All Strata:	6	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	83.3	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	160	x 2 =	320
FAC species	15	x 3 =	45
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	205 (A)		425 (B)

Prevalence Index = B/A = 2.07

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
✓ 2 - Dominance Test is >50%
✓ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ______

Remarks: (Include photo numbers here or on a separate sheet.)

Sphagnum moss at 80% cover

SOIL

Sampling Point: DP24

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 2/1	100					Peat	
6 - 24	10YR 2/1	100					Peat	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

Organic matter varying levels of decomposition

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-23
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP25
Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W
Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): Convex Slope (%): 7
Subregion (LRR or MLRA): K 93A Lat: 46.7694718 Long: -92.3011356 Datum: WGS 84
Soil Map Unit Name: F137B - Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ______ No ✔
Hydric Soil Present? Yes ______ No ✔
Wetland Hydrology Present? Yes ______ No ✔

Is the Sampled Area within a Wetland? **Yes** ______ **No** ✔
If yes, optional Wetland Site ID: ______________

Remarks: (Explain alternative procedures here or in a separate report.)

Hillslope above tag alder sphagnum basin.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✔ Depth (inches): ______________
Water Table Present? Yes ______ No ✔ Depth (inches): ______________
Saturation Present? (includes capillary fringe) Yes ______ No ✔ Depth (inches): ______________

Wetland Hydrology Present? Yes ______ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology not present

VEGETATION – Use scientific names of plants.

Sampling Point: DP25

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	50	✓	FAC
2. Populus tremuloides	40	✓	FACU
3. Fraxinus nigra	5		FACW
4. Malus pumila	5		
5.			
6.			
7.			
	100%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Fraxinus nigra	10	✓	FACW
2. Lonicera canadensis	10	✓	FACU
3. Prunus virginiana	10	✓	FACU
4. Corylus cornuta	5		FACU
5.			
6.			
7.			
	35%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Solidago gigantea	30	✓	FACW
2. Rubus pubescens	10		FACW
3. Thalictrum dioicum	10		FACU
4. Cornus canadensis	5		FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	55%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	55	x 2 =	110
FAC species	55	x 3 =	165
FACU species	75	x 4 =	300
UPL species	0	x 5 =	0
Column Totals:	185 (A)		575 (B)

Prevalence Index = B/A = 3.11

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ______ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP25

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0 - 8	10YR 2/2	100					Loam	
8 - 14	10YR 3/3	100					Loam	
14 - 24	10YR 4/4	100					Silt Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

Hydric soil not present

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-23

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP26

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): K 93A Lat: 46.7711024 Long: -92.3012457 Datum: WGS 84

Soil Map Unit Name: F151A - Tacoosh mucky peat, dense substratum, 0 to 1 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✔ No ___
Hydric Soil Present? Yes ✔ No ___
Wetland Hydrology Present? Yes ✔ No ___

Is the Sampled Area within a Wetland? Yes ✔ No ___
If yes, optional Wetland Site ID: w11

Remarks: (Explain alternative procedures here or in a separate report.)

Fringe hardwood PFO area between tamarack stand and upland hardwood.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
✔ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
✔ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✔ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
✔ Microtopographic Relief (D4)
✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___
Water Table Present? Yes ✔ No ___ Depth (inches): 16
Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 12

Wetland Hydrology Present? Yes ✔ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Forested peatland

VEGETATION – Use scientific names of plants.

Sampling Point: DP26

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Larix laricina	60	✔	FACW
2. Abies balsamea	10		FAC
3. Picea mariana	10		FACW
4. Betula alleghaniensis	5		FAC
5.			
6.			
7.			
	85%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	5	✔	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	5%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Rhododendron groenlandicum	65	✔	OBL
2. Calla palustris	15		OBL
3. Gaultheria hispidula	10		FACW
4. Carex magellanica	5		OBL
5. Maianthemum canadense	5		FACU
6. Trientalis borealis	5		FAC
7.			
8.			
9.			
10.			
11.			
12.			
	105%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	85	x 1 = 85
FACW species	80	x 2 = 160
FAC species	25	x 3 = 75
FACU species	5	x 4 = 20
UPL species	0	x 5 = 0
Column Totals:	195 (A)	340 (B)

Prevalence Index = B/A = 1.74

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ______

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP26

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 24	10YR 2/2	100					Peat	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

✔ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-23
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP27
Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W
Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): Convex Slope (%): 5
Subregion (LRR or MLRA): K 93A Lat: 46.7714168 Long: -92.3009624 Datum: WGS 84
Soil Map Unit Name: F137B - Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ______ No ✔
Hydric Soil Present? Yes ______ No ✔
Wetland Hydrology Present? Yes ______ No ✔

Is the Sampled Area within a Wetland? **Yes** ______ **No** ✔
If yes, optional Wetland Site ID: ______________________

Remarks: (Explain alternative procedures here or in a separate report.)

Midway down wooded slope outside of wetland boundary.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✔ Depth (inches): ____________
Water Table Present? Yes ______ No ✔ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes ______ No ✔ Depth (inches): ____________

Wetland Hydrology Present? Yes ______ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators observed

VEGETATION – Use scientific names of plants.

Sampling Point: DP27

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	60	✓	FAC
2. Populus tremuloides	30	✓	FACU
3.			
4.			
5.			
6.			
7.			
	90%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Frangula alnus	20	✓	FAC
2. Lonicera canadensis	15	✓	FACU
3. Fraxinus nigra	5		FACW
4.			
5.			
6.			
7.			
	40%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Diervilla lonicera	80	✓	
2. Actaea rubra	10		FACU
3. Frangula alnus	10		FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	90	x 3 =	270
FACU species	55	x 4 =	220
UPL species	0	x 5 =	0
Column Totals:	150 (A)		500 (B)

Prevalence Index = B/A = 3.33

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP27

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 17	10YR 3/2	100					Silt Loam	
17 - 24	10YR 3/4	100					Silt Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______________________

Depth (inches): ______________________

Hydric Soil Present? Yes ______ **No** ✓

Remarks:

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-23

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP28

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): River Valley Local relief (concave, convex, none): ______ Slope (%): 5

Subregion (LRR or MLRA): K 93A Lat: 46.7682686 Long: -92.2973958 Datum: WGS 84

Soil Map Unit Name: F137B - Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ______	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ______
Hydric Soil Present?	Yes ✓ No ______	
Wetland Hydrology Present?	Yes ✓ No ______	If yes, optional Wetland Site ID: w12

Remarks: (Explain alternative procedures here or in a separate report.)

Power line ROW, PEM fresh wet meadow

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✓ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
✓ Microtopographic Relief (D4)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______
Water Table Present? Yes ______ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrological indicators observed

VEGETATION – Use scientific names of plants.

Sampling Point: DP28

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus tremuloides	5	✔	FACU
2. Salix bebbiana	5	✔	FACW
3.			
4.			
5.			
6.			
7.			
	10% = Total Cover		

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Calamagrostis canadensis	30	✔	OBL
2. Scirpus cyperinus	30	✔	OBL
3. Tanacetum vulgare	15		FACU
4. Eutrochium maculatum	10		OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	75	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	70	x 1 =	70
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	95 (A)		160 (B)

Prevalence Index = B/A = 1.68

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ______

Remarks: (Include photo numbers here or on a separate sheet.)

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SOIL

Sampling Point: DP28

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 7	10YR 2/2	100					Sandy Loam	
7 - 21	10YR 2/1	10					Sandy Loam	
7 - 24	10YR 4/2	80	5YR 4/6	10	C	M	Sandy Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
✓ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-24

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP29

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Open Depression Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): K 93A Lat: 46.7716959 Long: -92.2960444 Datum: WGS 84

Soil Map Unit Name: 1020A - Bowstring and Fluvaquents, loamy, 0 to 2 percent slopes, frequently flooded NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔ No ______	**Is the Sampled Area within a Wetland?** **Yes** ✔ **No** ______
Hydric Soil Present?	Yes ✔ No ______	
Wetland Hydrology Present?	Yes ✔ No ______	If yes, optional Wetland Site ID: w12

Remarks: (Explain alternative procedures here or in a separate report.)

Depression vegetated by cattails and Lemna with a small ephemeral stream at the lowest point.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

✔ Surface Water (A1)
✔ High Water Table (A2)
✔ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
✔ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
✔ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
✔ Aquatic Fauna (B13)
___ Marl Deposits (B15)
✔ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✔ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✔ No ______ Depth (inches): 3
Water Table Present? Yes ✔ No ______ Depth (inches): 0
Saturation Present? (includes capillary fringe) Yes ✔ No ______ Depth (inches): 0

Wetland Hydrology Present? Yes ✔ **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Wetland hydrology indicators met

VEGETATION – Use scientific names of plants.

Sampling Point: DP29

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	5	✔	FACW
2. Prunus virginiana	5	✔	FACU
3.			
4.			
5.			
6.			
7.			
	10%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Typha X glauca	95	✔	OBL
2. Lemna turionifera	20		OBL
3. Equisetum fluviatile	15		OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	130%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	130	x 1 =	130
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	140 (A)		160 (B)

Prevalence Index = B/A = 1.14

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP29

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 2/1	100					Mucky Loam/Clay	
6 - 24	10YR 3/1	95	5YR 4/6	5	C	M	Mucky Loam/Clay	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
✔ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

Inundation

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-24
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP30
Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W
Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): Convex Slope (%): 10
Subregion (LRR or MLRA): K 93A Lat: 46.7716080 Long: -92.2958111 Datum: WGS 84
Soil Map Unit Name: 1020A - Bowstring and Fluvaquents, loamy, 0 to 2 percent slopes, frequently flooded NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No ✓
Hydric Soil Present? Yes ___ No ✓
Wetland Hydrology Present? Yes ___ No ✓

Is the Sampled Area within a Wetland? **Yes** ___ **No** ✓
If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

Side of large slope/man made shelf that the service area sits on. Likely built up for development.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Vis ble on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? Yes ___ No ✓ Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrological indicators observed.

VEGETATION – Use scientific names of plants.

Sampling Point: DP30

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Tanacetum vulgare	85	✔	FACU
2. Poa pratensis	30	✔	FACU
3. Solidago altissima	10		FACU
4. Phalaris arundinacea	5		FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	130% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	5	x 2 =	10
FAC species	0	x 3 =	0
FACU species	125	x 4 =	500
UPL species	0	x 5 =	0
Column Totals:	130 (A)		510 (B)

Prevalence Index = B/A = 3.92

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

Veg does not meet Hydrophytic requirements for a wetland

SOIL

Sampling Point: DP30

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ **No** ✓

Remarks:

No dig due to safety concerns. Soil assumed disturbed and non Hydric

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-24

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP31

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Drainageway Local relief (concave, convex, none): Concave Slope (%): 5

Subregion (LRR or MLRA): K 93A Lat: 46.7720655 Long: -92.2955325 Datum: WGS 84

Soil Map Unit Name: 1020A - Bowstring and Fluvaquents, loamy, 0 to 2 percent slopes, frequently flooded NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ✓, or Hydrology ✓ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___ Hydric Soil Present? Yes ✓ No ___ Wetland Hydrology Present? Yes ✓ No ___	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ___ If yes, optional Wetland Site ID: w12

Remarks: (Explain alternative procedures here or in a separate report.)

Run off creek coming from station. Well defined drainage way with evidence that it was man made.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ✓ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ✓ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ✓ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 1

Water Table Present? Yes ✓ No ___ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrology indicators present

VEGETATION – Use scientific names of plants.

Sampling Point: DP31

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix pedicellaris	5	✓	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	5% = Total Cover		

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Phalaris arundinacea	30	✓	FACW
2. Scirpus cyperinus	15	✓	OBL
3. Scirpus atrovirens	10		OBL
4. Calamagrostis canadensis	5		OBL
5. Valeriana officinalis	5		
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	65% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	35	x 1 =	35
FACW species	30	x 2 =	60
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	65 (A)		95 (B)

Prevalence Index = B/A = 1.46

Hydrophytic Vegetation Indicators:

- ✓ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP31

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.
[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Dark Surface (S7) (**LRR R, MLRA 149B**)
☐ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
☐ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
☐ Loamy Mucky Mineral (F1) (**LRR K, L**)
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
☐ Dark Surface (S7) (**LRR K, L**)
☐ Polyvalue Below Surface (S8) (**LRR K, L**)
☐ Thin Dark Surface (S9) (**LRR K, L**)
☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
☐ Red Parent Material (F21)
☐ Very Shallow Dark Surface (TF12)
☑ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? Yes ✔ **No**

Remarks:

No dig due to presence of power station. Soils assumed Hydric.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-24

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP32

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Stream Terrace Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): K 93A Lat: 46.7747386 Long: -92.2980344 Datum: WGS 84

Soil Map Unit Name: 1020A - Bowstring and Fluvaquents, loamy, 0 to 2 percent slopes, frequently flooded NWI classification: PSS1/EM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✔ No ___

Hydric Soil Present? Yes ✔ No ___

Wetland Hydrology Present? Yes ✔ No ___

Is the Sampled Area within a Wetland? **Yes** ✔ **No** ___

If yes, optional Wetland Site ID: w12

Remarks: (Explain alternative procedures here or in a separate report.)

PEM buffer around trout stream. Dominant species include spotted joe pie weed and calamagrostis Canadenses. Mosaic landscape switching from alder thickets to PFO to fresh wet meadows.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Vis ble on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___

Water Table Present? Yes ___ No ✔ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrological features observed

VEGETATION – Use scientific names of plants.

Sampling Point: DP32

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	10	✓	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	10%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Calamagrostis canadensis	60	✓	OBL
2. Eutrochium maculatum	35	✓	OBL
3. Cirsium arvense	10		FACU
4. Impatiens capensis	5		FACW
5. Mentha arvensis	5		FACW
6. Solidago altissima	5		FACU
7. Urtica dioica	5		FAC
8.			
9.			
10.			
11.			
12.			
	125%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	95	x 1 =	95
FACW species	20	x 2 =	40
FAC species	5	x 3 =	15
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	135 (A)		210 (B)

Prevalence Index = B/A = 1.56

Hydrophytic Vegetation Indicators:

- ✓ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ✓ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP32

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0 - 7	10YR 2/2	100	10R /				Loam	
7 - 16	10YR 2/1	90	5YR 3/4	10	C	PL / M	Silty Clay Loam	
16 - 24	10YR 3/1	85	5YR 4/6	15	C	M	Silty Clay	
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
✔ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

Appendix I
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-24
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP33
Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W
Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): Convex Slope (%): 9
Subregion (LRR or MLRA): K 93A Lat: 46.7747428 Long: -92.2978141 Datum: WGS 84
Soil Map Unit Name: F144D - Aldenlake-Ahmeek complex, 8 to 18 percent slopes NWI classification: PSS1/EM1A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ______	No ✔	**Is the Sampled Area within a Wetland?** **Yes** ______ **No** ✔
Hydric Soil Present?	Yes ______	No ✔	
Wetland Hydrology Present?	Yes ______	No ✔	If yes, optional Wetland Site ID: ______________

Remarks: (Explain alternative procedures here or in a separate report.)

Forested slope, loamy soils, ash/poplar canopy.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ______	No ✔	Depth (inches): ______
Water Table Present?	Yes ______	No ✔	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ______	No ✔	Depth (inches): ______

Wetland Hydrology Present? Yes ______ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrology indicators not present

VEGETATION – Use scientific names of plants.

Sampling Point: DP33

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus nigra	50	✔	FACW
2. Populus tremuloides	40	✔	FACU
3.			
4.			
5.			
6.			
7.			
	90%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Fraxinus nigra	45	✔	FACW
2. Populus tremuloides	15	✔	FACU
3.			
4.			
5.			
6.			
7.			
	60%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Athyrium angustum	20	✔	FAC
2. Carex pedunculata	10	✔	FAC
3. Diervilla lonicera	5		
4. Maianthemum canadense	5		FACU
5. Ribes triste	5		OBL
6. Thalictrum dioicum	5		FACU
7.			
8.			
9.			
10.			
11.			
12.			
	50%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	95	x 2 =	190
FAC species	30	x 3 =	90
FACU species	65	x 4 =	260
UPL species	0	x 5 =	0
Column Totals:	195 (A)		545 (B)

Prevalence Index = B/A = 2.79

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP33

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 10	10YR 2/2	100					Silt Loam	
10 - 24	7.5YR 3/3	100					Silt Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ **No** ✔

Remarks:

Hydric soil indicators not present

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-24
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP34
Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W
Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): Concave Slope (%): 2
Subregion (LRR or MLRA): K 93A Lat: 46.7680144 Long: -92.2942072 Datum: WGS 84
Soil Map Unit Name: F137B - Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✔ No ___
Hydric Soil Present? Yes ✔ No ___
Wetland Hydrology Present? Yes ✔ No ___

Is the Sampled Area within a Wetland? **Yes ✔ No ___**
If yes, optional Wetland Site ID: w13

Remarks: (Explain alternative procedures here or in a separate report.)

Lowland between two hills. Wetland classified as PFO hardwood swamp. Dominant species black ash, and an assortment of ferns.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✔ Microtopographic Relief (D4)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___
Water Table Present? Yes ___ No ✔ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ✔ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrological indicators present and noted

VEGETATION – Use scientific names of plants.

Sampling Point: DP34

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus nigra	75	✔	FACW
2. Betula papyrifera	15		FACU
3. Abies balsamea	10		FAC
4.			
5.			
6.			
7.			
	100%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	35	✔	FACW
2. Acer rubrum	5		FAC
3. Cornus alba	5		FACW
4. Fraxinus nigra	5		FACW
5.			
6.			
7.			
	50%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Athyrium angustum	40	✔	FAC
2. Impatiens capensis	20	✔	FACW
3. Equisetum sylvaticum	15		FACW
4. Glyceria striata	10		OBL
5. Onoclea sensibilis	10		FACW
6. Carex scoparia	5		FACW
7.			
8.			
9.			
10.			
11.			
12.			
	100%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	170	x 2 =	340
FAC species	55	x 3 =	165
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	250 (A)		575 (B)

Prevalence Index = B/A = 2.30

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP34

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 2/1	85	5YR 4/4	15	C	M	Silty Clay	
12 - 20	10YR 5/2	55	7.5YR 5/8	5	C	M	Silty Clay	
12 - 20	10YR 2/2	40					Silty Clay	
20 - 24	7.5YR 5/2	50	5YR 5/8	50	C	M	Silty Clay	
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✔ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-24
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP35
Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W
Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): Convex Slope (%): 5
Subregion (LRR or MLRA): K 93A Lat: 46.7679807 Long: -92.2944156 Datum: WGS 84
Soil Map Unit Name: F137B - Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No ✓	Is the Sampled Area within a Wetland?	Yes ____ No ✓
Hydric Soil Present? Yes ____ No ✓		
Wetland Hydrology Present? Yes ____ No ✓	If yes, optional Wetland Site ID: ____	

Remarks: (Explain alternative procedures here or in a separate report.)

Side of hill above small saddle

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____
Water Table Present? Yes ____ No ✓ Depth (inches): ____
Saturation Present? Yes ____ No ✓ Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrological indicators not present

VEGETATION – Use scientific names of plants.

Sampling Point: DP35

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Abies balsamea	50	✔	FAC
2. Populus tremuloides	30	✔	FACU
3. Betula alleghaniensis	10		FAC
4.			
5.			
6.			
7.			
	90%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Fraxinus nigra	10	✔	FACW
2. Populus tremuloides	5	✔	FACU
3.			
4.			
5.			
6.			
7.			
	15%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Phegopteris connectilis	20	✔	FACU
2. Athyrium angustum	15	✔	FAC
3. Gymnocarpium dryopteris	15	✔	FACU
4. Carex pedunculata	10		FAC
5. Maianthemum canadense	5		FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	65%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	7	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	42.9	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	85	x 3 =	255
FACU species	75	x 4 =	300
UPL species	0	x 5 =	0
Column Totals:	170 (A)		575 (B)

Prevalence Index = B/A = 3.38

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ______ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP35

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 2/1	100					Sandy Loam	
6 - 16	7.5YR 2.5/3	100					Sandy Loam	
16 - 24	7.5YR 4/2	90	5YR 4/6	10	C	M	Sandy Clay Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? Yes ______ No ✔

Remarks:

Hydric soil not present

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-24
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP36
Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W
Landform (hillslope, terrace, etc.): Lowland Local relief (concave, convex, none): Concave Slope (%): 1
Subregion (LRR or MLRA): K 93A Lat: 46.7686942 Long: -92.2964943 Datum: WGS 84
Soil Map Unit Name: 1020A - Bowstring and Fluvaquents, loamy, 0 to 2 percent slopes, frequently flooded NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ______ Hydric Soil Present? Yes ✓ No ______ Wetland Hydrology Present? Yes ✓ No ______	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ______ If yes, optional Wetland Site ID: w12

Remarks: (Explain alternative procedures here or in a separate report.)

Forested riparian valley. River bottom or floodplain flat associated with river between two valleys. Dominated by ferns, Carex, and mixed canopy.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
✓ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

✓ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✓ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______
Water Table Present? Yes ✓ No ______ Depth (inches): 14
Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 10

Wetland Hydrology Present? Yes ✓ **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP36

Tree Stratum (Plot size: 30 ft r)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Picea mariana	35	✔	FACW
2. Abies balsamea	30	✔	FAC
3. Betula alleghaniensis	20	✔	FAC
4. Fraxinus nigra	15		FACW
5.			
6.			
7.			
	100%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	20	✔	FACW
2. Frangula alnus	5	✔	FAC
3.			
4.			
5.			
6.			
7.			
	25%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)

	Absolute % Cover	Dominant Species?	Indicator Status
1. Carex lacustris	40	✔	OBL
2. Athyrium angustum	30	✔	FAC
3. Laportea canadensis	20		FACW
4. Equisetum sylvaticum	10		FACW
5. Matteuccia struthiopteris	10		FAC
6. Onoclea sensibilis	10		FACW
7.			
8.			
9.			
10.			
11.			
12.			
	120%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	110	x 2 =	220
FAC species	95	x 3 =	285
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	245 (A)		545 (B)

Prevalence Index = B/A = 2.22

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL Sampling Point: DP36

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 2/2	100					Sandy Clay Loam	
4 - 16	10YR 2/1	98	5YR 4/6	2	C	M	Sandy Clay Loam	
16 - 22	10YR 2/1	100					Sandy Clay Loam	
22 - 24	10YR 3/1	100					Loamy Sand	
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✔ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-24
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP37
Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W
Landform (hillslope, terrace, etc.): Closed Depression Local relief (concave, convex, none): Concave Slope (%): 3
Subregion (LRR or MLRA): K 93A Lat: 46.7704985 Long: -92.2986952 Datum: WGS 84
Soil Map Unit Name: F144D - Aldenlake-Ahmeek complex, 8 to 18 percent slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___
Hydric Soil Present? Yes ✓ No ___
Wetland Hydrology Present? Yes ✓ No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___
If yes, optional Wetland Site ID: w14

Remarks: (Explain alternative procedures here or in a separate report.)

Pothole depression surrounded by a ridge on 3 sides. Slight uphill on the 4th side than steep slope to the river bottom.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 1
Water Table Present? Yes ✓ No ___ Depth (inches): 0
Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrology indicators present

VEGETATION – Use scientific names of plants.

Sampling Point: DP37

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus nigra	10	✔	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	10% = Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	30	✔	FACW
2. Cornus alba	10	✔	FACW
3.			
4.			
5.			
6.			
7.			
	40% = Total Cover		

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Carex tuckermanii	55	✔	OBL
2. Bidens frondosa	10		FACW
3. Impatiens capensis	10		FACW
4. Cicuta maculata	5		OBL
5. Cinna latifolia	5		FACW
6. Equisetum pratense	5		FACW
7. Onoclea sensibilis	5		FACW
8.			
9.			
10.			
11.			
12.			
	95% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	60	x 1 = 60
FACW species	85	x 2 = 170
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	145 (A)	230 (B)

Prevalence Index = B/A = 1.59

Hydrophytic Vegetation Indicators:

✔ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP37

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 14	10YR 2/1	100					Mucky Loam/Clay	
14 - 22	7.5YR 4/2	60	2.5YR 4/6	40	C	M	Sandy Clay	
22 - 25	5YR 4/6	100					Sandy Clay	
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
✔ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
✔ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-08-24

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP38

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Backslope Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR or MLRA): K 93A Lat: 46.7703552 Long: -92.2986243 Datum: WGS 84

Soil Map Unit Name: F144D - Aldenlake-Ahmeek complex, 8 to 18 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ______	No ✔	**Is the Sampled Area within a Wetland?** **Yes** ______ **No** ✔
Hydric Soil Present?	Yes ______	No ✔	
Wetland Hydrology Present?	Yes ______	No ✔	If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

Base of sharp ridge tapering off to slight slope. Forested.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Vis ble on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ______	No ✔	Depth (inches): ______
Water Table Present?	Yes ______	No ✔	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ______	No ✔	Depth (inches): ______

Wetland Hydrology Present? Yes ______ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators present

VEGETATION – Use scientific names of plants.

Sampling Point: DP38

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	20	✔	FAC
2. Populus tremuloides	20	✔	FACU
3. Tilia americana	20	✔	FACU
4. Betula alleghaniensis	10		FAC
5.			
6.			
7.			
	70%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Corylus cornuta	40	✔	FACU
2. Populus tremuloides	10	✔	FACU
3.			
4.			
5.			
6.			
7.			
	50%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Cornus canadensis	35	✔	FAC
2. Athyrium angustum	30	✔	FAC
3. Carex pensylvanica	20	✔	
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	7	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	42.9	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	95	x 3 =	285
FACU species	90	x 4 =	360
UPL species	0	x 5 =	0
Column Totals:	185 (A)		645 (B)

Prevalence Index = B/A = 3.49

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP38

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/2	100					Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 6

Hydric Soil Present? Yes ______ **No** ✓

Remarks:

Appendix I
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611
MPUC Docket No. E015/CN-22-607
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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP39

Investigator(s): Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Drainageway Local relief (concave, convex, none): Concave Slope (%): 4

Subregion (LRR or MLRA): K 93A Lat: 46.7738361 Long: -92.3025236 Datum: WGS 84

Soil Map Unit Name: F144D - Aldenlake-Ahmeek complex, 8 to 18 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ______
Hydric Soil Present? Yes ✓ No ______
Wetland Hydrology Present? Yes ✓ No ______

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ______
If yes, optional Wetland Site ID: w15

Remarks: (Explain alternative procedures here or in a separate report.)

Drainage way between two slopes covered by wool grass, Carex, calamagrostis, and RCG. Hydrophytic vegetation tapers out down slope and it switches to a upland prairie. Soils meet Hydric and hydrology indicators were observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
✓ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
✓ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✓ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
✓ Microtopographic Relief (D4)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______
Water Table Present? Yes ______ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydrology indicators present

VEGETATION – Use scientific names of plants.

Sampling Point: DP39

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix pedicellaris	10	✔	OBL
2.			
3.			
4.			
5.			
6.			
7.			
	10%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Scirpus cyperinus	50	✔	OBL
2. Phalaris arundinacea	35	✔	FACW
3. Calamagrostis canadensis	30	✔	OBL
4. Onoclea sensibilis	5		FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	120%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	90	x 1 =	90
FACW species	40	x 2 =	80
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	130 (A)		170 (B)

Prevalence Index = B/A = 1.31

Hydrophytic Vegetation Indicators:

- ✔ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP39

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 24	10Y 3/1	95	5YR 4/6	5	C	M	Sandy Clay Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
✓ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP40

Investigator(s): Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): Convex Slope (%): 4

Subregion (LRR or MLRA): K 93A Lat: 46.7737629 Long: -92.3029206 Datum: WGS 84

Soil Map Unit Name: F144D - Aldenlake-Ahmeek complex, 8 to 18 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes ✔ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No ✔ Hydric Soil Present? Yes ____ No ✔ Wetland Hydrology Present? Yes ____ No ✔	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ✔ If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

Bottom of hill just before start of Hydrophytic veg/ Hydric soil

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✔ Depth (inches): ____
Water Table Present? Yes ____ No ✔ Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No ✔ Depth (inches): ____

Wetland Hydrology Present? Yes ____ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrological indicators observed

VEGETATION – Use scientific names of plants.

Sampling Point: DP40

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Poa pratensis	95	✔	FACU
2. Achillea millefolium	5		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	100	x 4 =	400
UPL species	0	x 5 =	0
Column Totals:	100 (A)		400 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ______ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP40

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 14	10YR 3/4	99	5YR 4/6	1	C	M	Sandy Clay Loam	
14 - 24	7.5YR 3/3	97	5YR 4/6	3	C	M	Sandy Clay Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______________________

Depth (inches): ______________________

Hydric Soil Present? Yes ______ **No** ✓

Remarks:

Hydric soil net met

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP41

Investigator(s): Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Open Depression Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): K 93A Lat: 46.7737423 Long: -92.3033395 Datum: WGS 84

Soil Map Unit Name: F144D - Aldenlake-Ahmeek complex, 8 to 18 percent slopes NWI classification: PSS1D

Are climatic / hydrologic conditions on the site typical for this time of year? [✓ Yes] No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? [✓ Yes] No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? [✓ Yes] No ___

Hydric Soil Present? [✓ Yes] No ___

Wetland Hydrology Present? [✓ Yes] No ___

Is the Sampled Area within a Wetland? [✓ **Yes**] **No** ___

If yes, optional Wetland Site ID: w15

Remarks: (Explain alternative procedures here or in a separate report.)

PSs alder swamp located in an open depression leading to a drainage-way. Concave surface with water stained leaves and areas of sparse understory vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Vis ble on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ [✓ No] Depth (inches): ___

Water Table Present? Yes ___ [✓ No] Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ [✓ No] Depth (inches): ___

Wetland Hydrology Present? [✓ **Yes**] **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP41

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	80	✓	FACW
2. Salix pedicellaris	10		OBL
3.			
4.			
5.			
6.			
7.			
	90% = Total Cover		

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Carex scoparia	25	✓	FACW
2. Galium aparine	10	✓	FACU
3. Rubus pubescens	10	✓	FACW
4. Carex intumescens	5		FACW
5. Solidago gigantea	5		FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	55% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	10	x 1 = 10
FACW species	125	x 2 = 250
FAC species	0	x 3 = 0
FACU species	10	x 4 = 40
UPL species	0	x 5 = 0
Column Totals:	145 (A)	300 (B)

Prevalence Index = B/A = 2.07

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

Appendix I
HVDC Modernization Project
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SOIL

Sampling Point: DP41

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 2/1	97	5YR 4/6	3	C	M	Silty Clay Loam	
5 - 12	10Y 5/2	60	5YR 4/6	40	C	M	Silty Clay	
14 - 24	7.5YR 4/4	75	5YR 4/6	25	C	M	Sandy Clay	
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
✔ Depleted Matrix (F3)
✔ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP42

Investigator(s): Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Open Depression Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): K 93A Lat: 46.7744940 Long: -92.3039655 Datum: WGS 84

Soil Map Unit Name: F144D - Aldenlake-Ahmeek complex, 8 to 18 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? Yes ✓ No ____

If yes, optional Wetland Site ID: w15

Remarks: (Explain alternative procedures here or in a separate report.)

Open depression draining east. Wetland contains 3 classes, PSS and PFO intermix. This location has enough tree cover to qualify as a pfo.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ________
Water Table Present? Yes ____ No ✓ Depth (inches): ________
Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ________

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP42

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer saccharum	30	✔	FACU
2. Acer rubrum	15	✔	FAC
3. Betula papyrifera	15	✔	FACU
4. Larix laricina	10		FACW
5.			
6.			
7.			
	70%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Corylus cornuta	25	✔	FACU
2. Salix discolor	25	✔	FACW
3. Cornus alba	15		FACW
4. Salix pedicellaris	15		OBL
5. Alnus incana	10		FACW
6.			
7.			
	90%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Calamagrostis canadensis	39	✔	OBL
2. Athyrium angustum	30	✔	FAC
3. Onoclea sensibilis	25	✔	FACW
4. Eurybia macrophylla	10		UPL
5. Solidago gigantea	10		FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	114%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 62.5 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	54	x 1 =	54
FACW species	95	x 2 =	190
FAC species	45	x 3 =	135
FACU species	70	x 4 =	280
UPL species	10	x 5 =	50
Column Totals:	274 (A)		709 (B)

Prevalence Index = B/A = 2.59

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

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SOIL

Sampling Point: DP42

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 2/1	97	5YR 4/6	3	C	M	Silty Clay Loam	
12 - 24	10YR 5/1	95	5YR 3/4	5	C	M	Sandy Clay	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
[✓] Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
[✓] Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ____________
Depth (inches): ____________

Hydric Soil Present? Yes [✓] **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP43

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Shoulder Local relief (concave, convex, none): Convex Slope (%): 7

Subregion (LRR or MLRA): K 93A Lat: 46.7745632 Long: -92.3039135 Datum: WGS 84

Soil Map Unit Name: F144D - Aldenlake-Ahmeek complex, 8 to 18 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ______ No ✓	**Is the Sampled Area within a Wetland?**	**Yes** ______ **No** ✓
Hydric Soil Present?	Yes ______ No ✓		
Wetland Hydrology Present?	Yes ______ No ✓	If yes, optional Wetland Site ID: ______	

Remarks: (Explain alternative procedures here or in a separate report.)

Just below summit of depression steeped drop down to the bottom

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

☐ Surface Water (A1)
☐ High Water Table (A2)
☐ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or Crust (B4)
☐ Iron Deposits (B5)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Sparsely Vegetated Concave Surface (B8)

☐ Water-Stained Leaves (B9)
☐ Aquatic Fauna (B13)
☐ Marl Deposits (B15)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres on Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Thin Muck Surface (C7)
☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

☐ Surface Soil Cracks (B6)
☐ Drainage Patterns (B10)
☐ Moss Trim Lines (B16)
☐ Dry-Season Water Table (C2)
☐ Crayfish Burrows (C8)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Stunted or Stressed Plants (D1)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ Microtopographic Relief (D4)
☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators observed

VEGETATION – Use scientific names of plants.

Sampling Point: DP43

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer saccharinum	45	✓	FACW
2. Betula papyrifera	40	✓	FACU
3.			
4.			
5.			
6.			
7.			
	85%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Corylus cornuta	35	✓	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	35%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Eurybia macrophylla	25	✓	UPL
2. Poa pratensis	10	✓	FACU
3. Calamagrostis canadensis	5		OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	45	x 2 =	90
FAC species	0	x 3 =	0
FACU species	85	x 4 =	340
UPL species	25	x 5 =	125
Column Totals:	160 (A)		560 (B)

Prevalence Index = B/A = 3.50

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP43

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 11	10YR 3/3	100					Loamy Sand	
11 - 24	10YR 4/3	100					Sandy Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ **No** ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-22

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP44

Investigator(s): Jared Booms Section, Township, Range: S36 T50N R16W

Landform (hillslope, terrace, etc.): Closed Depression Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): K 93A Lat: 46.7739700 Long: -92.3068651 Datum: WGS 84

Soil Map Unit Name: F145F - Ahmeek-Aldenlake complex, 18 to 45 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✔ No ____ Hydric Soil Present? Yes ✔ No ____ Wetland Hydrology Present? Yes ✔ No ____	**Is the Sampled Area within a Wetland?** **Yes** ✔ **No** ____ If yes, optional Wetland Site ID: w16

Remarks: (Explain alternative procedures here or in a separate report.)

Depression on top of hill. Concave sparse vegetation, water stained leaves redox within first 6 inches

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✔ Sparsely Vegetated Concave Surface (B8)
- ✔ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✔ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✔ Microtopographic Relief (D4)
- ✔ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✔ Depth (inches): ________

Water Table Present? Yes ____ No ✔ Depth (inches): ________

Saturation Present? (includes capillary fringe) Yes ____ No ✔ Depth (inches): ________

Wetland Hydrology Present? Yes ✔ **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP44

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus tremuloides	40	✔	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	40%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Fraxinus nigra	5	✔	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	5%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Onoclea sensibilis	35	✔	FACW
2. Athyrium angustum	20	✔	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	55%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	75	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	40	x 2 =	80
FAC species	20	x 3 =	60
FACU species	40	x 4 =	160
UPL species	0	x 5 =	0
Column Totals:	100 (A)		300 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✔ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP44

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 8	10YR 3/2	95	5YR 4/6	35	C	M	Silt Loam	
8 - 24	10YR 4/2	95	5YR 4/6	5	C	M	Silty Clay Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
✔ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-22
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP45
Investigator(s): Jared Booms Section, Township, Range: S36 T50N R16W
Landform (hillslope, terrace, etc.): Shoulder Local relief (concave, convex, none): Convex Slope (%): 8
Subregion (LRR or MLRA): K 93A Lat: 46.7739990 Long: -92.3067848 Datum: WGS 84
Soil Map Unit Name: F145F - Ahmeek-Aldenlake complex, 18 to 45 percent slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ______ No ✓	**Is the Sampled Area within a Wetland?** **Yes** ______ **No** ✓
Hydric Soil Present?	Yes ______ No ✓	
Wetland Hydrology Present?	Yes ______ No ✓	If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

Forested hill side dropping down into a perched depression. Lots of large boulders in the area making soil pits difficult.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______
Water Table Present? Yes ______ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators observed

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VEGETATION – Use scientific names of plants.

Sampling Point: DP45

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer saccharum	45	✔	FACU
2. Populus tremuloides	45	✔	FACU
3.			
4.			
5.			
6.			
7.			
	90%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Corylus cornuta	10	✔	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	10%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)			
1. Carex pensylvanica	10	✔	
2. Maianthemum racemosum	5	✔	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	15%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	105	x 4 =	420
UPL species	0	x 5 =	0
Column Totals:	105 (A)		420 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP45

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	10YR 3/3	98	5YR 4/6	2	C	M	Silt Loam	
12 - 18	7.5R 4/4	98	5YR 4/6	2	C	M	Sandy Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______________________

Depth (inches): ______________________

Hydric Soil Present? Yes ______ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-23
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP46
Investigator(s): Jared Booms Section, Township, Range: S31 T50N R15W
Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 3
Subregion (LRR or MLRA): K 93A Lat: 46.7779687 Long: -92.3016352 Datum: WGS 84
Soil Map Unit Name: F117D - Rollins sandy loam, 8 to 18 percent slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are “Normal Circumstances” present? Yes ✓ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___
Hydric Soil Present? Yes ✓ No ___
Wetland Hydrology Present? Yes ✓ No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___
If yes, optional Wetland Site ID: w17

Remarks: (Explain alternative procedures here or in a separate report.)

Landscaping rock placed to build up the driveway. PEM wetland that fringes PSs. PEM wetland runs road ditch

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Vis ble on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✓ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
✓ Microtopographic Relief (D4)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP46

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft r)			
1. Phalaris arundinacea	75	✓	FACW
2. Solidago gigantea	20		FACW
3. Tanacetum vulgare	10		FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	105%	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	95	x 2 = 190
FAC species	0	x 3 = 0
FACU species	10	x 4 = 40
UPL species	0	x 5 = 0
Column Totals:	105 (A)	230 (B)

Prevalence Index = B/A = 2.19

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation
✓ 2 - Dominance Test is >50%
✓ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

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SOIL

Sampling Point: DP46

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
✔ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

No dig due presence of road and driveway

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-23

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP47

Investigator(s): Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Roadway Embankment Local relief (concave, convex, none): Convex Slope (%): 5

Subregion (LRR or MLRA): K 93A Lat: 46.7779486 Long: -92.3016635 Datum: WGS 84

Soil Map Unit Name: F117D - Rollins sandy loam, 8 to 18 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No ✔

Hydric Soil Present? Yes ____ No ✔

Wetland Hydrology Present? Yes ____ No ✔

Is the Sampled Area within a Wetland? Yes ____ No ✔

If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)

Shoulder between wetland and roadway

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Vis ble on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✔ Depth (inches): ____

Water Table Present? Yes ____ No ✔ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✔ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrological indicators observed

VEGETATION – Use scientific names of plants.

Sampling Point: DP47

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5 ft r)			
1. Tanacetum vulgare	40	✔	FACU
2. Trifolium hybridum	30	✔	FACU
3. Poa pratensis	20	✔	FACU
4. Bromus inermis	10		UPL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	90	x 4 =	360
UPL species	10	x 5 =	50
Column Totals:	100 (A)		410 (B)

Prevalence Index = B/A = 4.10

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

Appendix I
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611
MPUC Docket No. E015/GN-22-607
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SOIL

Sampling Point: DP47

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______________________

Depth (inches): ______________________

Hydric Soil Present? Yes ______ No ✓

Remarks:

No dig due to presence or roadway and driveway. Soil assumed non Hydric

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-23

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP48

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): K 93A Lat: 46.7783863 Long: -92.3008247 Datum: WGS 84

Soil Map Unit Name: F117D - Rollins sandy loam, 8 to 18 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___ Hydric Soil Present? Yes ✓ No ___ Wetland Hydrology Present? Yes ✓ No ___	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ___ If yes, optional Wetland Site ID: w17

Remarks: (Explain alternative procedures here or in a separate report.)

Area of natural veg in the road ditch and working its way into the lawn.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Vis ble on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP48

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus balsamifera	70	✔	FACW
2. Pinus resinosa	15		FACU
3.			
4.			
5.			
6.			
7.			
	85%	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	30	✔	FACW
2. Salix bebbiana	20	✔	FACW
3.			
4.			
5.			
6.			
7.			
	50%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Onoclea sensibilis	60	✔	FACW
2. Solidago gigantea	10		FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Solanum dulcamara	10	✔	FAC
2.			
3.			
4.			
	10%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	5	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	0	x 1 =	0	
FACW species	190	x 2 =	380	
FAC species	10	x 3 =	30	
FACU species	15	x 4 =	60	
UPL species	0	x 5 =	0	
Column Totals:	215	(A)	470	(B)

Prevalence Index = B/A = 2.19

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ✔ 2 - Dominance Test is >50%
- ✔ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ☐

Remarks: (Include photo numbers here or on a separate sheet.)

Appendix I
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611
MPUC Docket No. E015/CN-22-607
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SOIL

Sampling Point: DP48

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ✔ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

No dig due to presences of road and homestead, soils assumed hydric.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-23

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP49

Investigator(s): Andy Kranz, Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Ditch Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR or MLRA): K 93A Lat: 46.7784125 Long: -92.3009816 Datum: WGS 84

Soil Map Unit Name: F117D - Rollins sandy loam, 8 to 18 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___ Hydric Soil Present? Yes ✓ No ___ Wetland Hydrology Present? Yes ✓ No ___	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ___ If yes, optional Wetland Site ID: w17

Remarks: (Explain alternative procedures here or in a separate report.)

Tag alder ditch between road and lawn

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Vis ble on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ Microtopographic Relief (D4)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP49

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	35	✔	FACW
2. Salix bebbiana	30	✔	FACW
3.			
4.			
5.			
6.			
7.			
	65%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Onoclea sensibilis	20	✔	FACW
2. Calamagrostis canadensis	15	✔	OBL
3. Solidago gigantea	15	✔	FACW
4. Tanacetum vulgare	15	✔	FACU
5. Agrostis gigantea	10		FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Solanum dulcamara	15	✔	FAC
2.			
3.			
4.			
	15%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	6	(A)
Total Number of Dominant Species Across All Strata:	7	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	85.7	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	110	x 2 =	220
FAC species	15	x 3 =	45
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	155 (A)		340 (B)

Prevalence Index = B/A = 2.19

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ______

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP49

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.
[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
✔ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

No dig due to presence of roadway and septic

Appendix I
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611
MPUC Docket No. E015/CN-22-607
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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-23
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP50
Investigator(s): Jared Booms Section, Township, Range: S31 T50N R15W
Landform (hillslope, terrace, etc.): Rise Local relief (concave, convex, none): Convex Slope (%): 3
Subregion (LRR or MLRA): K 93A Lat: 46.7783784 Long: -92.3009629 Datum: WGS 84
Soil Map Unit Name: F117D - Rollins sandy loam, 8 to 18 percent slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)
Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______
Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ______ No ✓ Hydric Soil Present? Yes ______ No ✓ Wetland Hydrology Present? Yes ______ No ✓	**Is the Sampled Area within a Wetland?** **Yes** ______ **No** ✓ If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)

Slight hill /rise in the landscape, I don't think it's a drainage bed or septic mound but there is one in the area. Mowed lawn.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Vis ble on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______
Water Table Present? Yes ______ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators present

VEGETATION – Use scientific names of plants.

Sampling Point: DP50

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5 ft r)			
1. Poa pratensis	80	✔	FACU
2. Taraxacum officinale	5		FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	85	x 4 =	340
UPL species	0	x 5 =	0
Column Totals:	85 (A)		340 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP50

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ **No** ✔

Remarks:

No dig due to potential septic, soils assumed non Hydric

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-23
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP51
Investigator(s): Jared Booms Section, Township, Range: S31 T50N R15W
Landform (hillslope, terrace, etc.): Basin Local relief (concave, convex, none): Linear Slope (%): 1
Subregion (LRR or MLRA): K 93A Lat: 46.7778553 Long: -92.3005078 Datum: WGS 84
Soil Map Unit Name: 1020A - Bowstring and Fluvaquents, loamy, 0 to 2 percent slopes, frequently flooded NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___		**Is the Sampled Area within a Wetland?** **Yes** ✓ **No** ___
Hydric Soil Present? Yes ✓ No ___		
Wetland Hydrology Present? Yes ✓ No ___		If yes, optional Wetland Site ID: w17

Remarks: (Explain alternative procedures here or in a separate report.)

PFO wetland with tag alder and balsam poplar. Soils organic and considered fibric.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

✓ Surface Water (A1)
✓ High Water Table (A2)
✓ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
✓ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✓ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
✓ Microtopographic Relief (D4)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 1
Water Table Present? Yes ✓ No ___ Depth (inches): 6
Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP51

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus balsamifera	35	✔	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	35% = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1. Alnus incana	60	✔	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	60% = Total Cover		
Herb Stratum (Plot size: 5 ft r)			
1. Cinna latifolia	30	✔	FACW
2. Thalictrum dasycarpum	20	✔	FACW
3. Eutrochium maculatum	10		OBL
4. Rubus pubescens	10		FACW
5. Petasites frigidus	5		FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75% = Total Cover		
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	160	x 2 =	320
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	170 (A)		330 (B)

Prevalence Index = B/A = 1.94

Hydrophytic Vegetation Indicators:

✔ 1 - Rapid Test for Hydrophytic Vegetation
✔ 2 - Dominance Test is >50%
✔ 3 - Prevalence Index is ≤3.0[1]
4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No**

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP51

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 2/1	100					Mucky Loam/Clay	
4 - 24	10YR 2/1	40					Mucky Loam/Clay	
4 - 24		60					Peat	Large chunks of decomposing organic matter -fibric
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

✔ Histosol (A1)
✔ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-23
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP52
Investigator(s): Jared Booms Section, Township, Range: S31 T50N R15W
Landform (hillslope, terrace, etc.): Fill Local relief (concave, convex, none): Convex Slope (%): 3
Subregion (LRR or MLRA): K 93A Lat: 46.7779617 Long: -92.3009046 Datum: WGS 84
Soil Map Unit Name: F117D - Rollins sandy loam, 8 to 18 percent slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ✔, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No ✔	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** ✔
Hydric Soil Present? Yes ___ No ✔	
Wetland Hydrology Present? Yes ___ No ✔	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

Shed along with all structures seem to be built on a built up filled plantform.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): ___
Water Table Present? Yes ___ No ✔ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✔ Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrological indicators observed

VEGETATION – Use scientific names of plants.

Sampling Point: DP52

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft r)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft r)			
1. Poa pratensis	50	✔	FACU
2. Cirsium arvense	30	✔	FACU
3. Tanacetum vulgare	30	✔	FACU
4. Solidago altissima	10		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	120%	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	120	x 4 =	480
UPL species	0	x 5 =	0
Column Totals:	120 (A)		480 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

Appendix I
HVDC Modernization Project
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SOIL

Sampling Point: DP52

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 6	7.5R 3/3	98	5R 4/6	2	C		Sandy Clay Loam	
6 - 12	7.5R 3/4	97	5YR 4/6	3	C	M	Sandy Clay Loam	
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock

Depth (inches): 12

Hydric Soil Present? Yes ______ No ✔

Remarks:

Appendix I
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611
MPUC Docket No. E015/CN-22-607
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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-23

Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP53

Investigator(s): Jared Booms Section, Township, Range: S31 T50N R15W

Landform (hillslope, terrace, etc.): Basin Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR or MLRA): K 93A Lat: 46.7777739 Long: -92.3000424 Datum: WGS 84

Soil Map Unit Name: 1020A - Bowstring and Fluvaquents, loamy, 0 to 2 percent slopes, frequently flooded NWI classification: PSS1D

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___

Hydric Soil Present? Yes ✓ No ___

Wetland Hydrology Present? Yes ✓ No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___

If yes, optional Wetland Site ID: w17

Remarks: (Explain alternative procedures here or in a separate report.)

Alder thicket, cinna, Carex, and other obl species

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

✓ Surface Water (A1)
✓ High Water Table (A2)
✓ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✓ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
✓ Microtopographic Relief (D4)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 1

Water Table Present? Yes ✓ No ___ Depth (inches): 6

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 1

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP53

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
= Total Cover			

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	50	✓	FACW
2. Populus balsamifera	15	✓	FACW
3.			
4.			
5.			
6.			
7.			
= Total Cover	65%		

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Carex lacustris	35	✓	OBL
2. Calamagrostis canadensis	30	✓	OBL
3. Thalictrum dasycarpum	20	✓	FACW
4. Solanum dulcamara	15		
5. Cinna latifolia	10		FACW
6. Eutrochium maculatum	10		OBL
7. Galium asprellum	10		OBL
8. Rubus pubescens	10		FACW
9. Carex retrorsa	5		OBL
10. Solidago gigantea	5		FACW
11.			
12.			
= Total Cover	150%		

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover	0%		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	90	x 1 =	90
FACW species	110	x 2 =	220
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	200 (A)		310 (B)

Prevalence Index = B/A = 1.55

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP53

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 2/1	100					Mucky Loam/Clay	
5 - 24	10YR 2/1	40					Mucky Loam/Clay	
5 - 24		60					Peat	(Fibric decomposing materials)
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

✓ Histosol (A1)
✓ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-23
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP54
Investigator(s): Jared Booms Section, Township, Range: S31 T50N R15W
Landform (hillslope, terrace, etc.): Ditch Local relief (concave, convex, none): Concave Slope (%): 4
Subregion (LRR or MLRA): K 93A Lat: 46.7784950 Long: -92.2993690 Datum: WGS 84
Soil Map Unit Name: 1020A - Bowstring and Fluvaquents, loamy, 0 to 2 percent slopes, frequently flooded NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___
Hydric Soil Present? Yes ✓ No ___
Wetland Hydrology Present? Yes ✓ No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___
If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

PEM ditch between road and PSs

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
✓ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Vis ble on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
✓ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP54

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Sapling/Shrub Stratum (Plot size: 15 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus incana	10	✔	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	10%	= Total Cover	

Herb Stratum (Plot size: 5 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1. Calamagrostis canadensis	80	✔	OBL
2. Thalictrum dasycarpum	15		FACW
3. Carex lacustris	5		OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100%	= Total Cover	

Woody Vine Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	85	x 1 =	85	
FACW species	25	x 2 =	50	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	110	(A)	135	(B)

Prevalence Index = B/A = 1.23

Hydrophytic Vegetation Indicators:

✔ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

✔ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✔ **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP54

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
✔ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✔ **No** ______

Remarks:

No dig due to road way, soils assumed Hydric and probably similar to previous data points for the tag alder PFO wetland

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: HVDC MODERNIZATION PROJECT City/County: St. Louis County Sampling Date: 2022-09-23
Applicant/Owner: Minnesota Power - Allete State: Minnesota Sampling Point: DP55
Investigator(s): Jared Booms Section, Township, Range: S31 T50N R15W
Landform (hillslope, terrace, etc.): Roadway Embankment Local relief (concave, convex, none): Convex Slope (%): 8
Subregion (LRR or MLRA): K 93A Lat: 46.7784941 Long: -92.2993624 Datum: WGS 84
Soil Map Unit Name: 1020A - Bowstring and Fluvaquents, loamy, 0 to 2 percent slopes, frequently flooded NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No ✓	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** ✓
Hydric Soil Present?	Yes ___ No ✓	
Wetland Hydrology Present?	Yes ___ No ✓	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)

Half blacktop within sample plot

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology indicators observed

VEGETATION – Use scientific names of plants.

Sampling Point: DP55

Tree Stratum (Plot size: 30 ft r)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15 ft r)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5 ft r)			
1. Bromus inermis	25	✔	UPL
2. Tanacetum vulgare	25	✔	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	50% = Total Cover		

Woody Vine Stratum (Plot size: 30 ft r)			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	25	x 5 =	125
Column Totals:	50 (A)		225 (B)

Prevalence Index = B/A = 4.50

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✔

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: DP55

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								
-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) (**LRR R, MLRA 149B**)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Dark Surface (S7) (**LRR K, L**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______________________

Depth (inches): ________________

Hydric Soil Present? Yes ______ **No** ✓

Remarks:

No dig sue to road way soils assumed upland fill

Appendix J

Agency Correspondence

Date: 11/09/22

Minnesota Power Attendee: Dan McCourtney

City of Hermantown Attendee: John Mulder- City Administrator

Minnesota Power met with City of Hermantown Administrator on 11/09/22 at 2:00 PM at the city offices located at 5105 Maple Grove Rd, Hermantown, MN 55811. A map of the project area and project one-pager was provided.

Project Intro

Minnesota Power is proposing to rebuild an existing substation which would be located in either Solway Township or the City of Hermantown. The existing facility which is Minnesota Power's Arrowhead substation had an original operating life was 30 years. It's now close to 45 years old and is obsolete.

Taking a look at this map, the proposed facility would consist of two separate substation yards for a total of about 40 acres located within this area. MP is working on agreements with landowners and will be finalizing the design later this year or early 2023.

The project would also require three half mile long transmission lines also within the project study area that will connect the new substation facilities into the electric grid.

The Project will need approval through the Minnesota Public Utilities Commission. But before we started that process I wanted to first meet with the City, introduce the project and answer any questions

Discussion Items

City inquired about the size of the project: It was explained that the substation footprint would be about 40 acres within the larger 350 acre project study area.

City inquired about ownership agreements with the individuals within the project study area: It was explained that Minnesota Power is in the process of obtaining development rights with all of the landowners in the project study area.

City inquired about substation locations: It was explained that project design is preliminary and will be finalized once landowner agreements were completed

City inquired about timeline: Permitting in 2023- Design and Procurement 2024- Construction 2025 through 2027- Project completion 2027.

Date: 11/15/22

Minnesota Power Attendee: Dan McCourtney

Solway Township: Town Board Chair - Scott Welsh
Town Supervisor - Ron Gajewski
Town Supervisor - Scott Welsh
Town Clerk - Tami McGregor
Town Treasurer - Cindy Moe

General Public: Eight members of the general public
Boy Scout Troop

Minnesota Power introduced the project at a Solway Township meeting on 11/15/22 at 6:30 PM at the Solway Town Hall located 4029 Munger Shaw Rd, Cloquet, MN 55720. A map of the project area and project one-pager was provided.

Project Intro

Minnesota Power is proposing to rebuild an existing substation which would be located in either Solway Township or the City of Hermantown. The existing facility which is Minnesota Power's Arrowhead substation had an original operating life was 30 years. It's now close to 45 years old and is obsolete.

Taking a look at this map, the proposed facility would consist of two separate substation yards for a total of about 40 acres located within this area. MP is working on agreements with landowners and will be finalizing the design later this year or early 2023.

The project would also require three half mile long transmission lines also within the project study area that will connect the new substation facilities into the electric grid.

The Project will need approval through the Minnesota Public Utilities Commission. But before we started that process we wanted to first meet with Fond du Lac, introduce the project and answer any questions

Discussion Items

The Township inquired about substation locations: It was explained that project design is preliminary and will be finalized once landowner agreements were completed.

The Township inquired about the size of the project: It was explained that the substation footprint would be about 40 acres within the larger 350 acre project study area.

Minnesota Power discussed the public open house for the project scheduled for November 22, 2022 at 6:00 PM and that meeting invites were sent to all landowners/residents within ¼ mile of the project study area.

The township inquired about noise: it was explained that vendors were still being selected but that facility noise was expected to be below background levels between 1,000-1,500 feet away from the facility.

Other members of the public requested being included in future mailings for the project.

City inquired about timeline: Permitting in 2023- Design and Procurement 2024- Construction 2025 through 2027- Project completion 2027.

Solway Township Requested a public open house the week of January 9th at the Solway Town Hall and send invites to the entire Township. Minnesota Scheduled one for January 11, 2023 @6:00.

Date: 11/17/22

Minnesota Power Attendee: Dan McCourtney

Fond du Lac Attendee: Evan Schroder- Tribal Historic Preservation Officer, Tribal Staff Member

Minnesota Power met with Fond du Lac Tribal Historic Preservation Office (THPO) Staff on 11/17/22 at 2:00 PM at the tribal offices located at 1720 Big Lake Rd, Cloquet, MN 55720. A map of the project area and project one-pager was provided.

Project Intro

Minnesota Power is proposing to rebuild an existing substation which would be located in either Solway Township or the City of Hermantown. The existing facility which is Minnesota Power's Arrowhead substation had an original operating life was 30 years. It's now close to 45 years old and is obsolete.

Taking a look at this map, the proposed facility would consist of two separate substation yards for a total of about 40 acres located within this area. MP is working on agreements with landowners and will be finalizing the design later this year or early 2023.

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The Project will need approval through the Minnesota Public Utilities Commission. But before we started that process we wanted to first meet with Fond du Lac, introduce the project and answer any questions

Discussion Items

THPO inquired about substation locations: It was explained that project design is preliminary and will be finalized once landowner agreements were completed.

THPO- brought up that there may be an old trail on the very south side of the project study area and if the project is located at the southern end of the Study area, a tribal survey may be needed. MP said that they would reach back out to the Band once project design had progressed.

THPO inquired about timeline: Permitting in 2023- Design and Procurement 2024- Construction 2025 through 2027- Project completion 2027.

THPO was pleased that Minnesota Power engaged early in the project to discuss concerns.

December 16, 2022 **VIA U.S. Mail**

Duluth Field Office
USACE St. Paul Regulatory District
600 South Lake Avenue, Suite 211
Duluth, MN 55802

Re: HVDC Modernization Project
St. Louis County, Minnesota
MPUC Docket No. E015/CN-22-607 and E015/TL-22-611

Dear Duluth Field Office:

Minnesota Power (also the "Company") is proposing to construct a project known as the HVDC Modernization Project (also the "Project"). The Project involves modernizing and upgrading the existing High Voltage Direct Current ("HVDC") terminals for Minnesota Power's HVDC Line, which are currently located near the existing Arrowhead Substation in Hermantown, Minnesota and the existing Center HVDC Substation in Center, North Dakota. This proposed modernization project will require the construction of new terminals and short transmission line segments in both States, near the existing stations. The Minnesota Portion of the HVDC Modernization Project is regulated by the Minnesota Public Utilities Commission ("Commission").

The HVDC Modernization Project is needed to modernize aging HVDC assets, continue to position the region's transmission grid for continued clean energy transition, and improve the reliability of the transmission system in Minnesota and North Dakota. The existing HVDC terminal has operated for 45 years, 15 years in excess of its 30-year design life. In recent years, Minnesota Power has experienced HVDC terminal outages due to failures in the control system, power electronics, transformers, and other components. The orderly replacement of the HVDC terminal equipment is prudent to ensure continuous efficient delivery of Minnesota Power's renewable, carbon-free energy resources into the future.

In order to modernize the HVDC terminals and implement the latest technology, new electrical infrastructure would need to be constructed on a new site near the existing HVDC terminals. In Minnesota, to connect the new HVDC terminal to the existing AC system, the Project would require the construction of a new St Louis County 345 kilovolt ("kV")/230 kV substation located less than one mile west of the existing Arrowhead Substation. The new HVDC terminal would be connected to the St Louis County Substation by less than one mile of 345 kV large high-voltage transmission line ("LHVTL") and the new St Louis County Substation would be connected to the existing Arrowhead Substation by two parallel 230 kV LHVTLs less than one mile in length. Additionally, a short portion of the existing ±250 kV HVDC Line in Minnesota will need to be reconfigured to terminate at the new HVDC terminal. The Project is currently scheduled to be in service in 2027.

Two approvals must be obtained from the Commission before high voltage transmission lines and associated facilities like the proposed Project can be built: a Certificate of Need and a Route Permit. Minnesota Power plans to submit a joint application for a Certificate of Need and Route

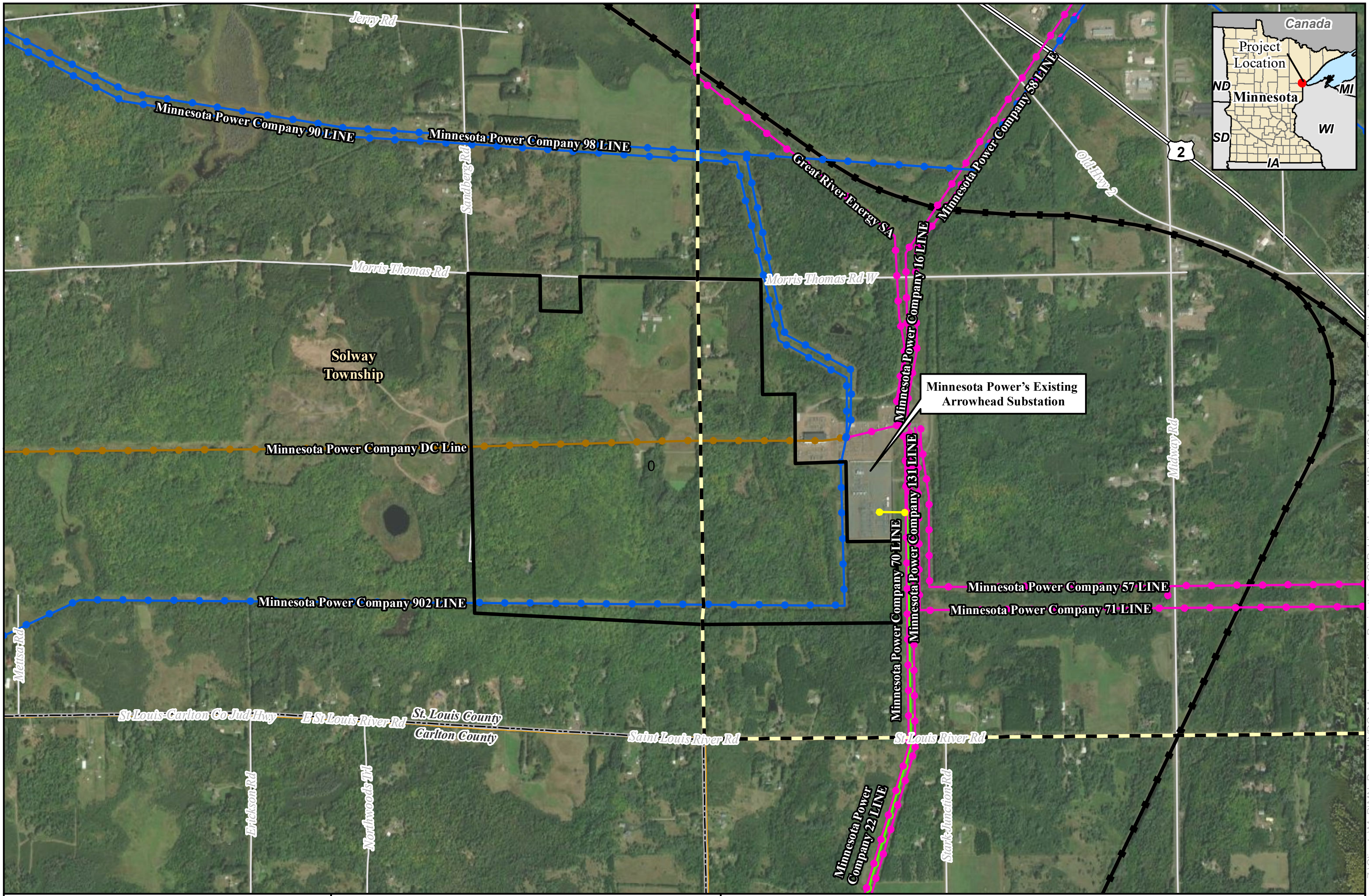
Permit in accordance with Minnesota Rules (Minn. R.) 7849 and Minn. R. 7850 respectively, to the Commission for the Project. As part of this process, Minnesota Power has started gathering stakeholder, agency, tribal, and public input on the Project through letters, meetings, and open houses. We appreciate your assistance as we evaluate siting and routing information and work through the Commission's approval process.

Please let us know if you have information we should consider in evaluating the Project. If you would like to request a meeting, please contact me at (218) 355-3515 or dmccourtney@mnpower.com. I am happy to discuss any questions that you may have about the Project. Additional information about the Project can also be found on the Company's EnergyForward website at: https://www.mnpower.com/energyforward.

Sincerely,

Daniel McCourtney
Manager- Environmental
Strategic Initiatives
ALLETE Inc.

Enclosures Project Overview Map



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1 inch = 1,500 feet

N W E S

For Environmental Review Purposes Only

HVDC Modernization Project

Minnesota Power

Project Area
St. Louis County, Minnesota

▭	Minnesota Power's Project Study Area
▭	County Boundary
▭	Municipal Boundary
●	Existing 115 kV Transmission Line
●	Existing 230 kV Transmission Line
●	Existing 250 kV Transmission Line
●	Existing 345 kV Transmission Line
●	Existing 345kV/115 kV Transmission Line
▪	Railroad

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\ArcGIS\Public_Meeting\MP_HVDC_ModProj_East_Exhibit_A_Poster_letter.mxd

Date: (11/30/2022)

December 16, 2022 **VIA U.S. Mail**

Bret Eknes
Public Utilities Committee
Energy Facilities Permitting Supervisor
121 7th Place E, Suite 350
St. Paul, MN 55101-2147

Re: HVDC Modernization Project
St. Louis County, Minnesota
MPUC Docket No. E015/CN-22-607 and E015/TL-22-611

Dear Bret Eknes:

Minnesota Power (also the "Company") is proposing to construct a project known as the HVDC Modernization Project (also the "Project"). The Project involves modernizing and upgrading the existing High Voltage Direct Current ("HVDC") terminals for Minnesota Power's HVDC Line, which are currently located near the existing Arrowhead Substation in Hermantown, Minnesota and the existing Center HVDC Substation in Center, North Dakota. This proposed modernization project will require the construction of new terminals and short transmission line segments in both States, near the existing stations. The Minnesota Portion of the HVDC Modernization Project is regulated by the Minnesota Public Utilities Commission ("Commission").

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Two approvals must be obtained from the Commission before high voltage transmission lines and associated facilities like the proposed Project can be built: a Certificate of Need and a Route

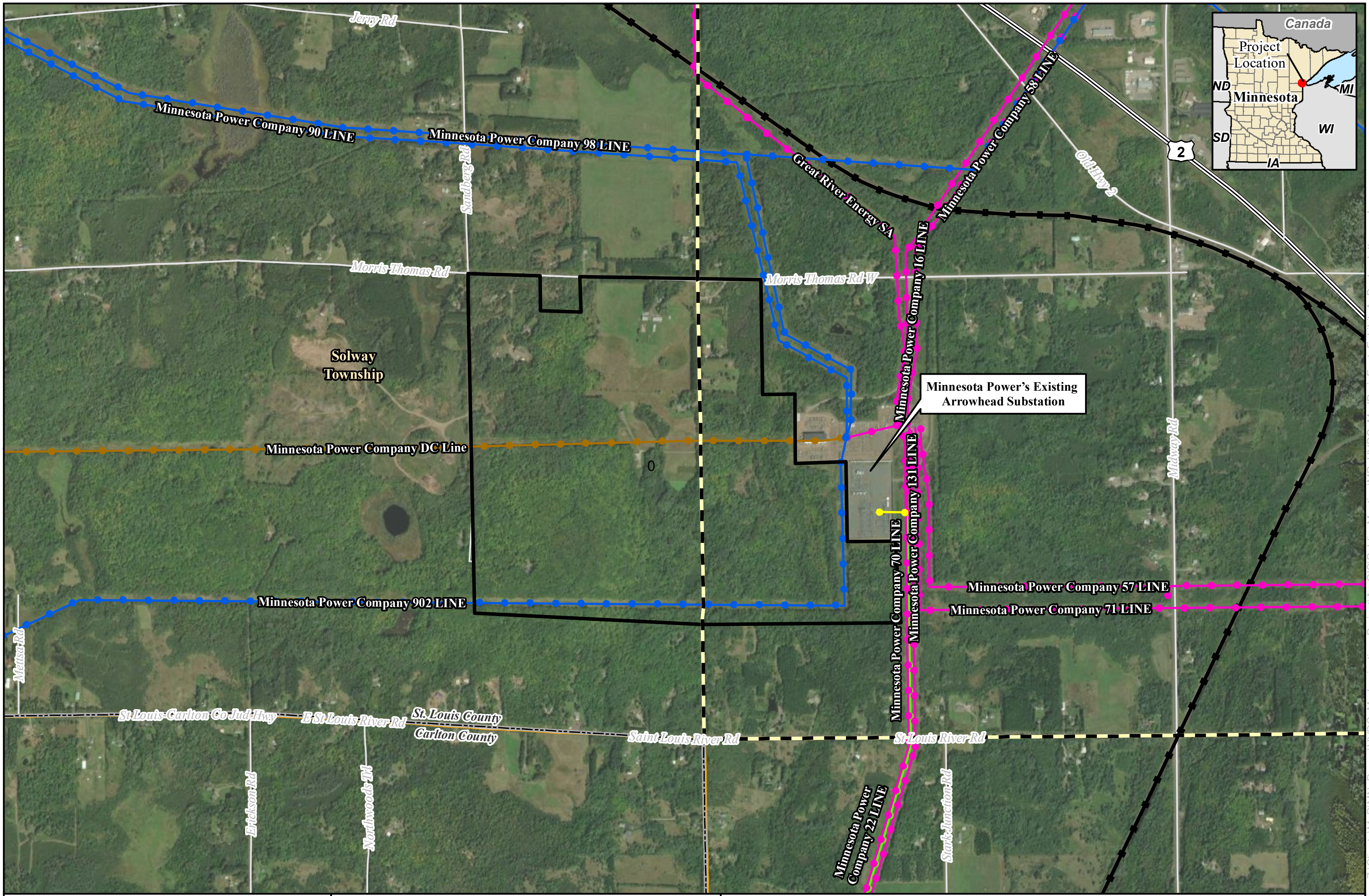
Permit. Minnesota Power plans to submit a joint application for a Certificate of Need and Route Permit in accordance with Minnesota Rules (Minn. R.) 7849 and Minn. R. 7850 respectively, to the Commission for the Project. As part of this process, Minnesota Power has started gathering stakeholder, agency, tribal, and public input on the Project through letters, meetings, and open houses. We appreciate your assistance as we evaluate siting and routing information and work through the Commission's approval process.

Please let us know if you have information we should consider in evaluating the Project. If you would like to request a meeting, please contact me at (218) 355-3515 or dmccourtney@mnpower.com. I am happy to discuss any questions that you may have about the Project. Additional information about the Project can also be found on the Company's EnergyForward website at: https://www.mnpower.com/energyforward.

Sincerely,

Daniel McCourtney
Manager- Environmental
Strategic Initiatives
ALLETE Inc.

Enclosures Project Overview Map



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N E S W

For Environmental Review Purposes Only

HVDC Modernization Project

Minnesota Power

Project Area
St. Louis County, Minnesota

▬	Minnesota Power's Project Study Area
▭	County Boundary
▬ ▬	Municipal Boundary
●─●	Existing 115 kV Transmission Line
●─●	Existing 230 kV Transmission Line
●─●	Existing 250 kV Transmission Line
●─●	Existing 345 kV Transmission Line
●─●	Existing 345kV/115 kV Transmission Line
─■─	Railroad

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Date: (11/30/2022)

December 16, 2022 **VIA U.S. Mail**

Louise Miltich
EERA
Energy Program Director
85 7th Place East, Suite 280
St. Paul, MN 55101

Re: HVDC Modernization Project
St. Louis County, Minnesota
MPUC Docket No. E015/CN-22-607 and E015/TL-22-611

Dear Louise Miltich:

Minnesota Power (also the "Company") is proposing to construct a project known as the HVDC Modernization Project (also the "Project"). The Project involves modernizing and upgrading the existing High Voltage Direct Current ("HVDC") terminals for Minnesota Power's HVDC Line, which are currently located near the existing Arrowhead Substation in Hermantown, Minnesota and the existing Center HVDC Substation in Center, North Dakota. This proposed modernization project will require the construction of new terminals and short transmission line segments in both States, near the existing stations. The Minnesota Portion of the HVDC Modernization Project is regulated by the Minnesota Public Utilities Commission ("Commission").

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Two approvals must be obtained from the Commission before high voltage transmission lines and associated facilities like the proposed Project can be built: a Certificate of Need and a Route

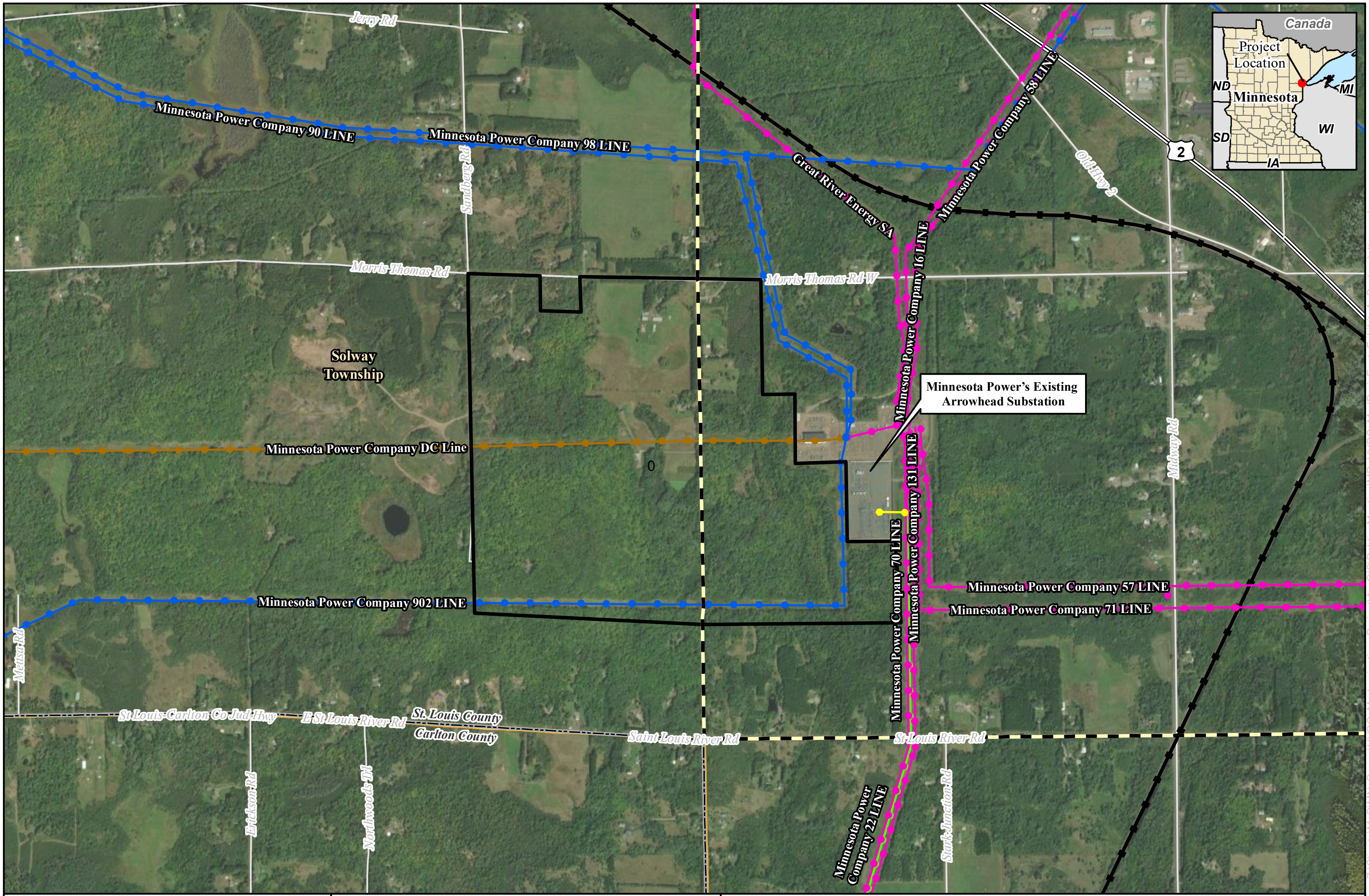
Permit. Minnesota Power plans to submit a joint application for a Certificate of Need and Route Permit in accordance with Minnesota Rules (Minn. R.) 7849 and Minn. R. 7850 respectively, to the Commission for the Project. As part of this process, Minnesota Power has started gathering stakeholder, agency, tribal, and public input on the Project through letters, meetings, and open houses. We appreciate your assistance as we evaluate siting and routing information and work through the Commission's approval process.

Please let us know if you have information we should consider in evaluating the Project. If you would like to request a meeting, please contact me at (218) 355-3515 or dmccourtney@mnpower.com. I am happy to discuss any questions that you may have about the Project. Additional information about the Project can also be found on the Company's EnergyForward website at: https://www.mnpower.com/energyforward.

Sincerely,

Daniel McCourtney
Manager- Environmental
Strategic Initiatives
ALLETE Inc.

Enclosures Project Overview Map



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For Environmental Review Purposes Only

HVDC Modernization Project

Minnesota Power

Project Area
St. Louis County, Minnesota

- ▭ Minnesota Power's Project Study Area
- ▭ County Boundary
- ▭ Municipal Boundary
- ● Existing 115 kV Transmission Line
- ● Existing 230 kV Transmission Line
- ● Existing 250 kV Transmission Line
- ● Existing 345 kV Transmission Line
- ● Existing 345kV/115 kV Transmission Line
- ■ Railroad

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Date: (11/30/2022)

December 16, 2022 **VIA U.S. Mail**

Karen Kromar
Minnesota Pollution Control Agency
Project Manager, Environmental Review Unit
520 Lafayette Road North
St. Paul, MN 55155

Re: HVDC Modernization Project
St. Louis County, Minnesota
MPUC Docket No. E015/CN-22-607 and E015/TL-22-611

Dear Karen Kromar:

Minnesota Power (also the “Company”) is proposing to construct a project known as the HVDC Modernization Project (also the “Project”). The Project involves modernizing and upgrading the existing High Voltage Direct Current (“HVDC”) terminals for Minnesota Power’s HVDC Line, which are currently located near the existing Arrowhead Substation in Hermantown, Minnesota and the existing Center HVDC Substation in Center, North Dakota. This proposed modernization project will require the construction of new terminals and short transmission line segments in both States, near the existing stations. The Minnesota Portion of the HVDC Modernization Project is regulated by the Minnesota Public Utilities Commission (“Commission”).

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Two approvals must be obtained from the Commission before high voltage transmission lines and associated facilities like the proposed Project can be built: a Certificate of Need and a Route

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Sincerely,

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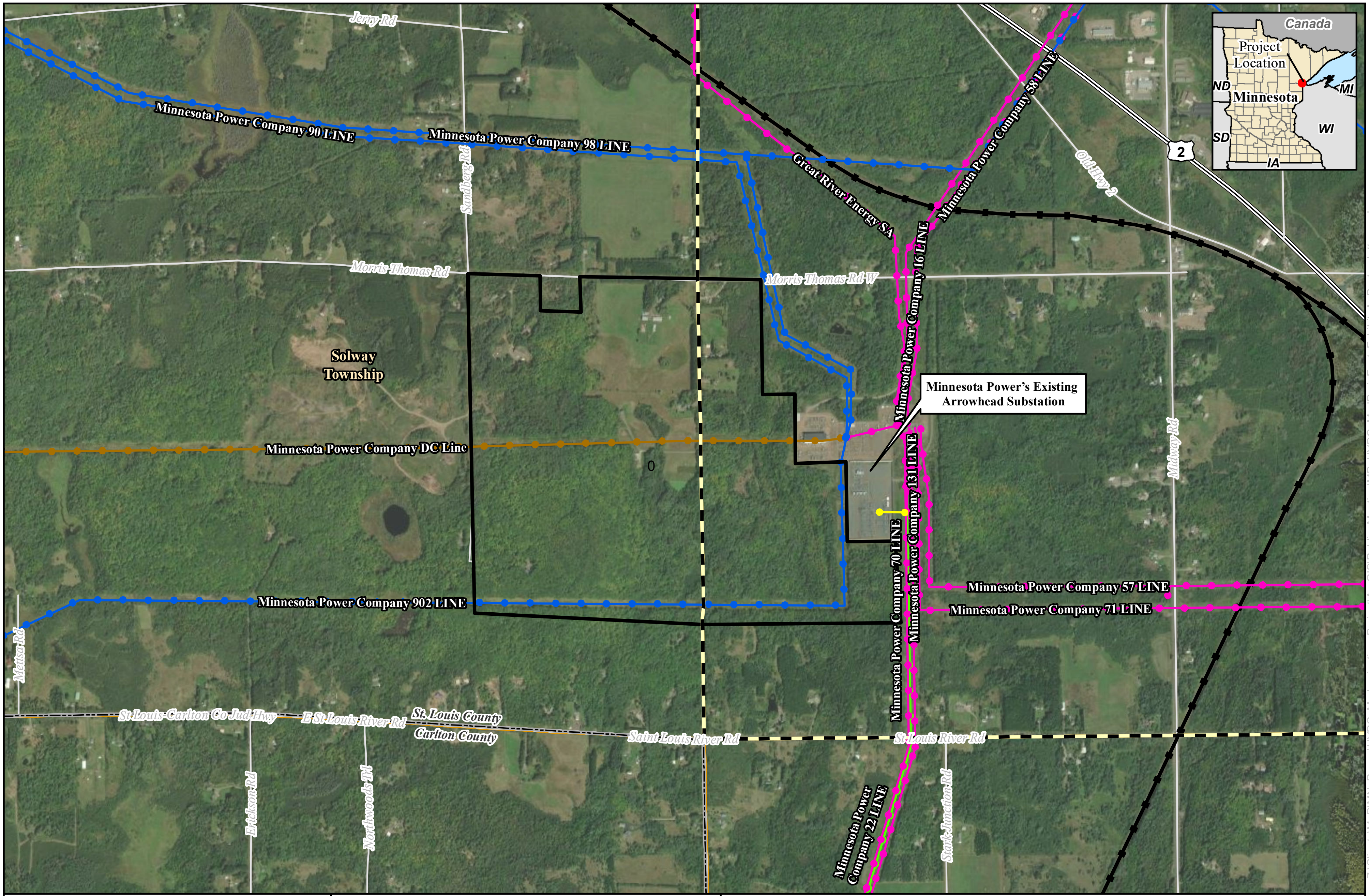
Manager- Environmental
Strategic Initiatives
ALLETE Inc.

Enclosures Project Overview Map



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N W E S

For Environmental Review Purposes Only

HVDC Modernization Project

Minnesota Power

Project Area
St. Louis County, Minnesota

▭	Minnesota Power's Project Study Area
▭	County Boundary
▭	Municipal Boundary
●	Existing 115 kV Transmission Line
●	Existing 230 kV Transmission Line
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■	Railroad

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\ArcGIS\Public_Meeting\MP_HVDC_ModProj_East_Exhibit_A_Poster_letter.mxd

Date: (11/30/2022)

December 16, 2022 **VIA U.S. Mail**

Stephan Roos
MDA
Planner
625 Robert Street North
Saint Paul, MN 55155-2538

Re: HVDC Modernization Project
St. Louis County, Minnesota
MPUC Docket No. E015/CN-22-607 and E015/TL-22-611

Dear Stephan Roos:

Minnesota Power (also the "Company") is proposing to construct a project known as the HVDC Modernization Project (also the "Project"). The Project involves modernizing and upgrading the existing High Voltage Direct Current ("HVDC") terminals for Minnesota Power's HVDC Line, which are currently located near the existing Arrowhead Substation in Hermantown, Minnesota and the existing Center HVDC Substation in Center, North Dakota. This proposed modernization project will require the construction of new terminals and short transmission line segments in both States, near the existing stations. The Minnesota Portion of the HVDC Modernization Project is regulated by the Minnesota Public Utilities Commission ("Commission").

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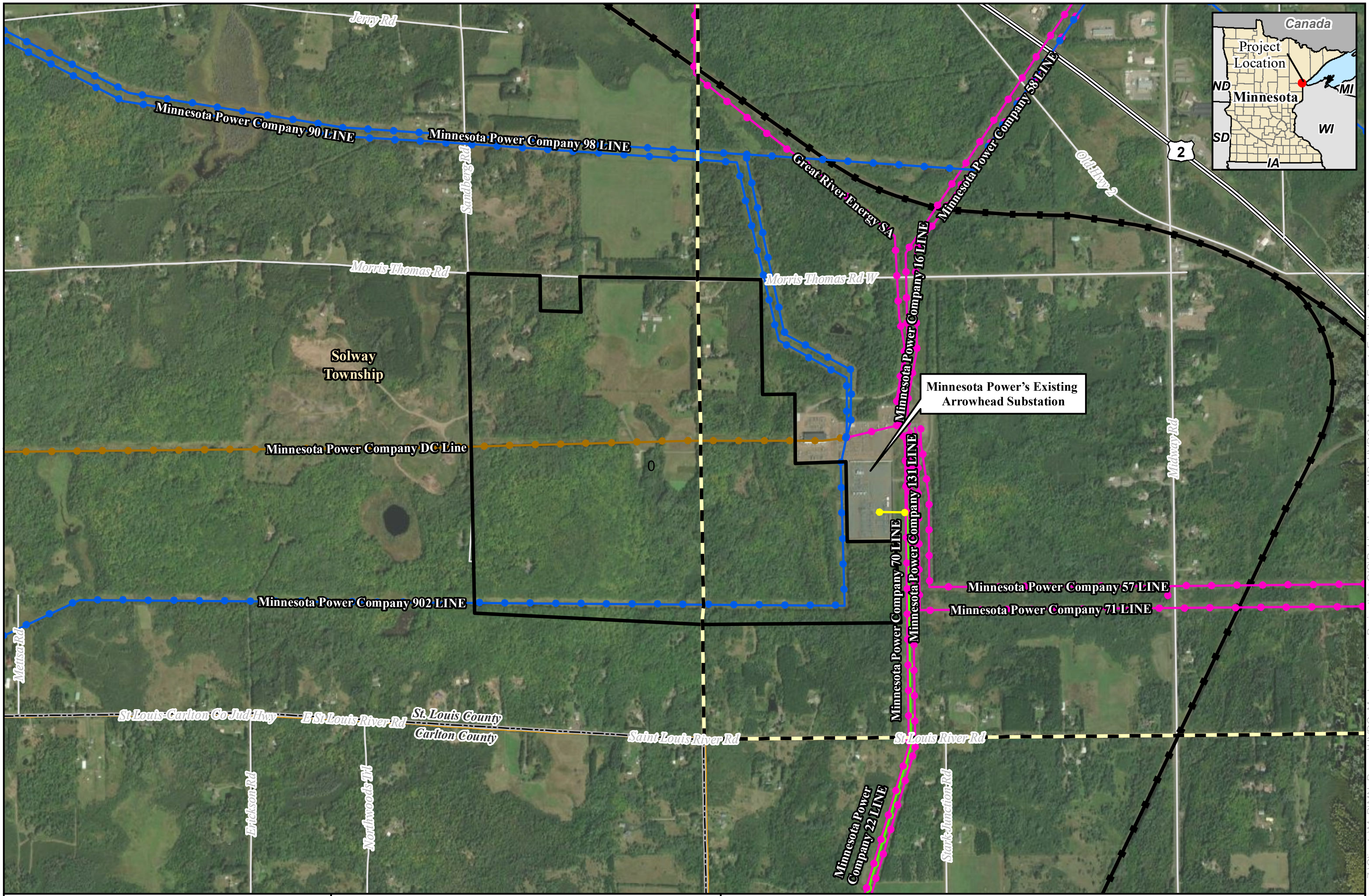
Sincerely,

Daniel McCourtney
Manager- Environmental
Strategic Initiatives
ALLETE Inc.

Enclosures Project Overview Map



For Environmental Review Purposes Only

HVDC Modernization Project

Minnesota Power

Project Area

St. Louis County, Minnesota

- Minnesota Power's Project Study Area
- County Boundary
- Municipal Boundary
- Existing 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 250 kV Transmission Line
- Existing 345 kV Transmission Line
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Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\ArcGIS\Public_Meeting\MP_HVDC_ModProj_East_Exhibit_A_Poster_letter.mxd

Date: (11/30/2022)

December 16, 2022 **VIA U.S. Mail**

Troy Daniell
USDA NRCS
MN State Office
Minnesota State Conservationist
375 Jackson St
St Paul, MN 55101-1854

Re: HVDC Modernization Project
St. Louis County, Minnesota
MPUC Docket No. E015/CN-22-607 and E015/TL-22-611

Dear Troy Daniell:

Minnesota Power (also the "Company") is proposing to construct a project known as the HVDC Modernization Project (also the "Project"). The Project involves modernizing and upgrading the existing High Voltage Direct Current ("HVDC") terminals for Minnesota Power's HVDC Line, which are currently located near the existing Arrowhead Substation in Hermantown, Minnesota and the existing Center HVDC Substation in Center, North Dakota. This proposed modernization project will require the construction of new terminals and short transmission line segments in both States, near the existing stations. The Minnesota Portion of the HVDC Modernization Project is regulated by the Minnesota Public Utilities Commission ("Commission").

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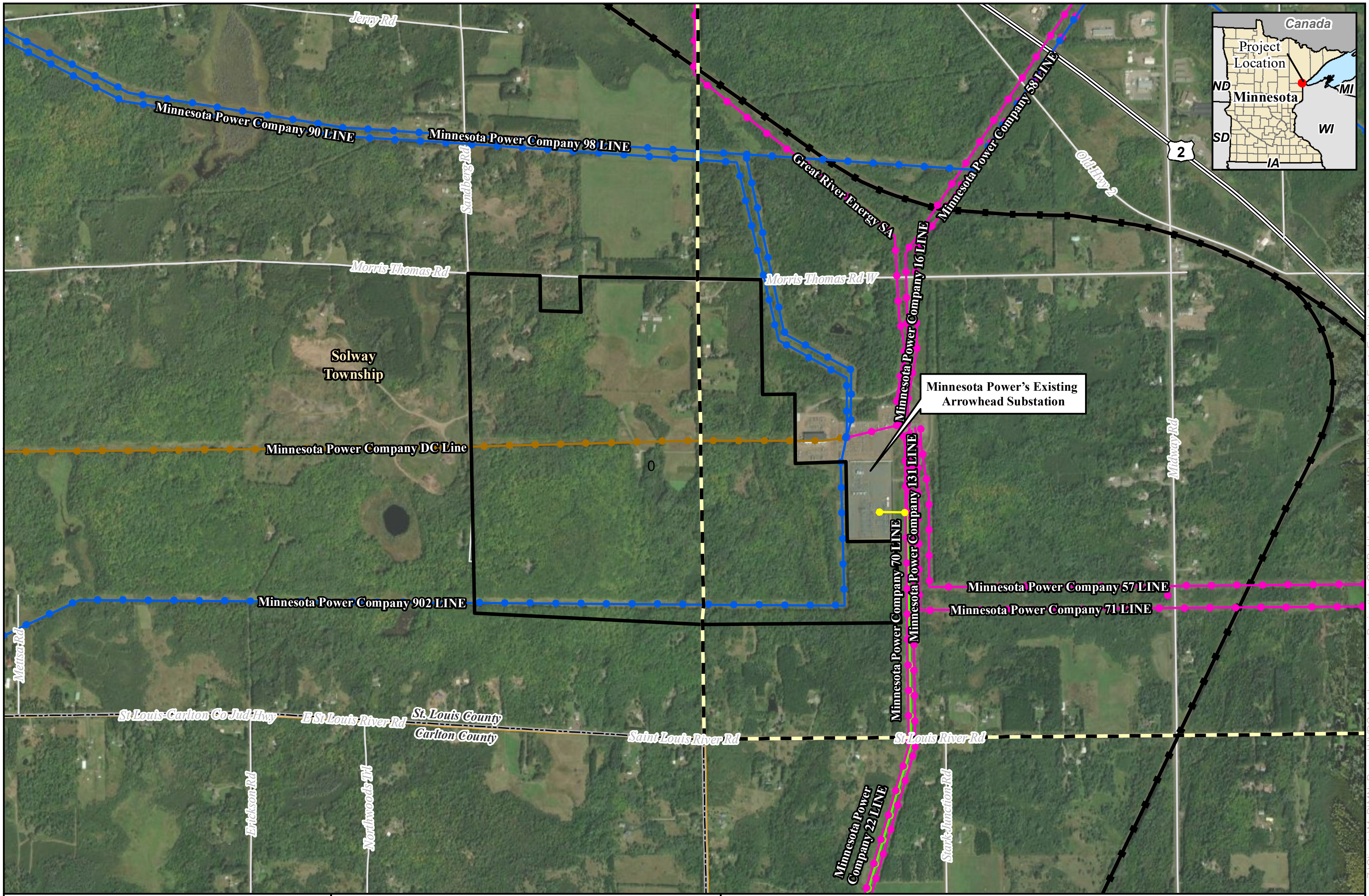
Two approvals must be obtained from the Commission before high voltage transmission lines and associated facilities like the proposed Project can be built: a Certificate of Need and a Route Permit. Minnesota Power plans to submit a joint application for a Certificate of Need and Route Permit in accordance with Minnesota Rules (Minn. R.) 7849 and Minn. R. 7850 respectively, to the Commission for the Project. As part of this process, Minnesota Power has started gathering stakeholder, agency, tribal, and public input on the Project through letters, meetings, and open houses. We appreciate your assistance as we evaluate siting and routing information and work through the Commission's approval process.

Please let us know if you have information we should consider in evaluating the Project. If you would like to request a meeting, please contact me at (218) 355-3515 or dmccourtney@mnpower.com. I am happy to discuss any questions that you may have about the Project. Additional information about the Project can also be found on the Company's EnergyForward website at: https://www.mnpower.com/energyforward.

Sincerely,

Daniel McCourtney
Manager- Environmental
Strategic Initiatives
ALLETE Inc.

Enclosures Project Overview Map



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1 inch = 1,500 feet

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For Environmental Review Purposes Only

HVDC Modernization Project

Minnesota Power

Project Area
St. Louis County, Minnesota

▭	Minnesota Power's Project Study Area
▭	County Boundary
▭	Municipal Boundary
●	Existing 115 kV Transmission Line
●	Existing 230 kV Transmission Line
●	Existing 250 kV Transmission Line
●	Existing 345 kV Transmission Line
●	Existing 345kV/115 kV Transmission Line
■	Railroad

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\ArcGIS\Public_Meeting\MP_HVDC_ModProj_East_Exhibit_A_Poster_letter.mxd

Date: (11/30/2022)

December 16, 2022 **VIA U.S. Mail**

Sarah Biemers
SHPO
Environmental Review Program Manager
50 Sherburne Avenue, Suite 203
Saint Paul, Minnesota 55155

Re: HVDC Modernization Project
St. Louis County, Minnesota
MPUC Docket No. E015/CN-22-607 and E015/TL-22-611

Dear Sarah Biemers:

Minnesota Power (also the "Company") is proposing to construct a project known as the HVDC Modernization Project (also the "Project"). The Project involves modernizing and upgrading the existing High Voltage Direct Current ("HVDC") terminals for Minnesota Power's HVDC Line, which are currently located near the existing Arrowhead Substation in Hermantown, Minnesota and the existing Center HVDC Substation in Center, North Dakota. This proposed modernization project will require the construction of new terminals and short transmission line segments in both States, near the existing stations. The Minnesota Portion of the HVDC Modernization Project is regulated by the Minnesota Public Utilities Commission ("Commission").

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Manager- Environmental
Strategic Initiatives
ALLETE Inc.

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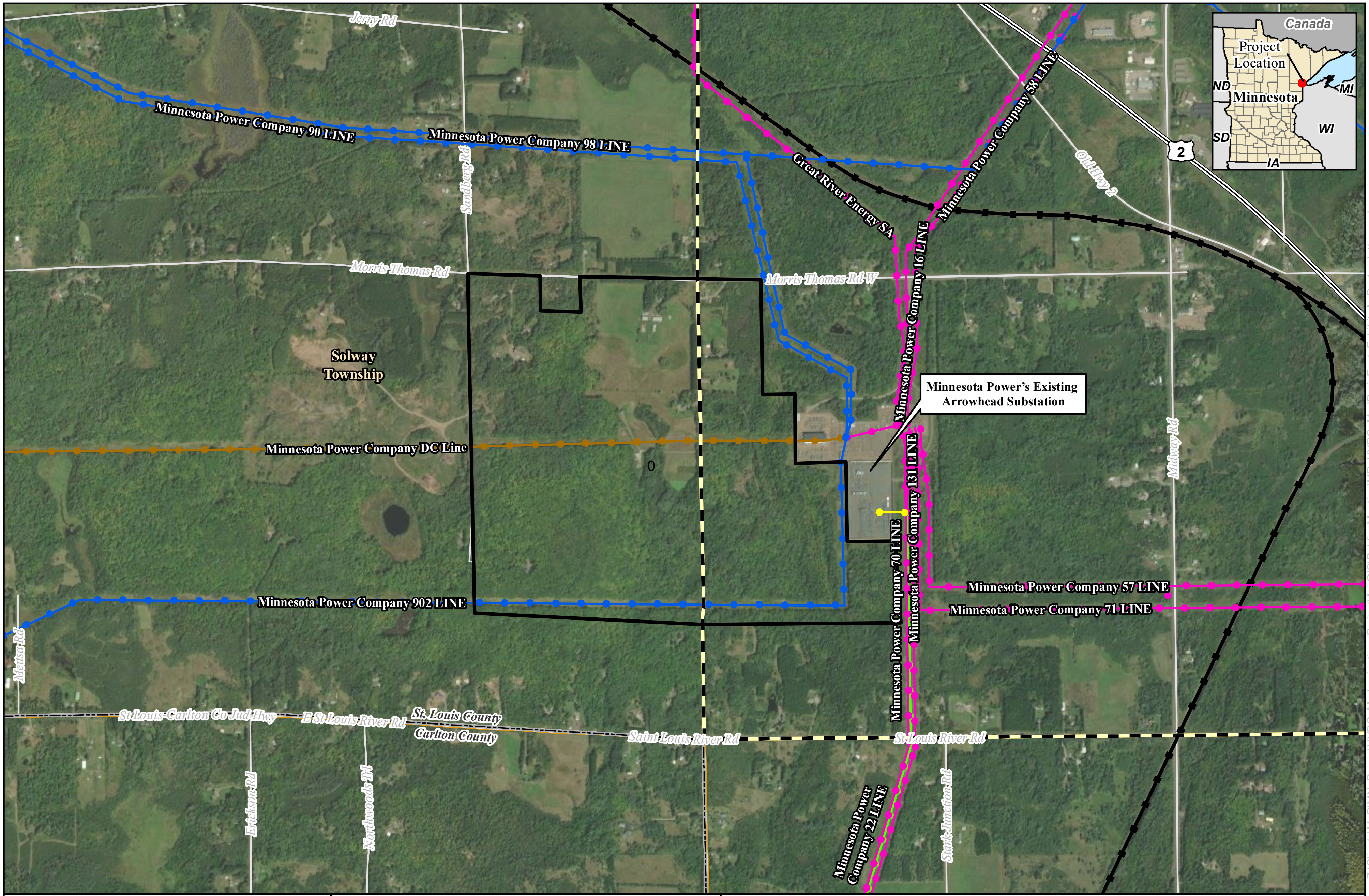

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For Environmental Review Purposes Only

HVDC Modernization Project
Minnesota Power
Project Area
St. Louis County, Minnesota

Minnesota Power's Project Study Area

County Boundary

Municipal Boundary

Existing 115 kV Transmission Line

Existing 230 kV Transmission Line

Existing 250 kV Transmission Line

Existing 345 kV Transmission Line

Existing 345kV/115 kV Transmission Line

Railroad

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\ArcGIS\Public_Meeting\MP_HVDC_ModProj_East_Exhibit_A_Poster_letter.mxd

Date: (11/30/2022)

December 16, 2022 **VIA U.S. Mail**

Amanda Gronhovd
MN State Archaeologist
MN State Archaeologist
328 W. Kellogg Blvd
St. Paul, MN 55102

Re: HVDC Modernization Project
St. Louis County, Minnesota
MPUC Docket No. E015/CN-22-607 and E015/TL-22-611

Dear Amanda Gronhovd:

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Daniel McCourtney
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Strategic Initiatives
ALLETE Inc.

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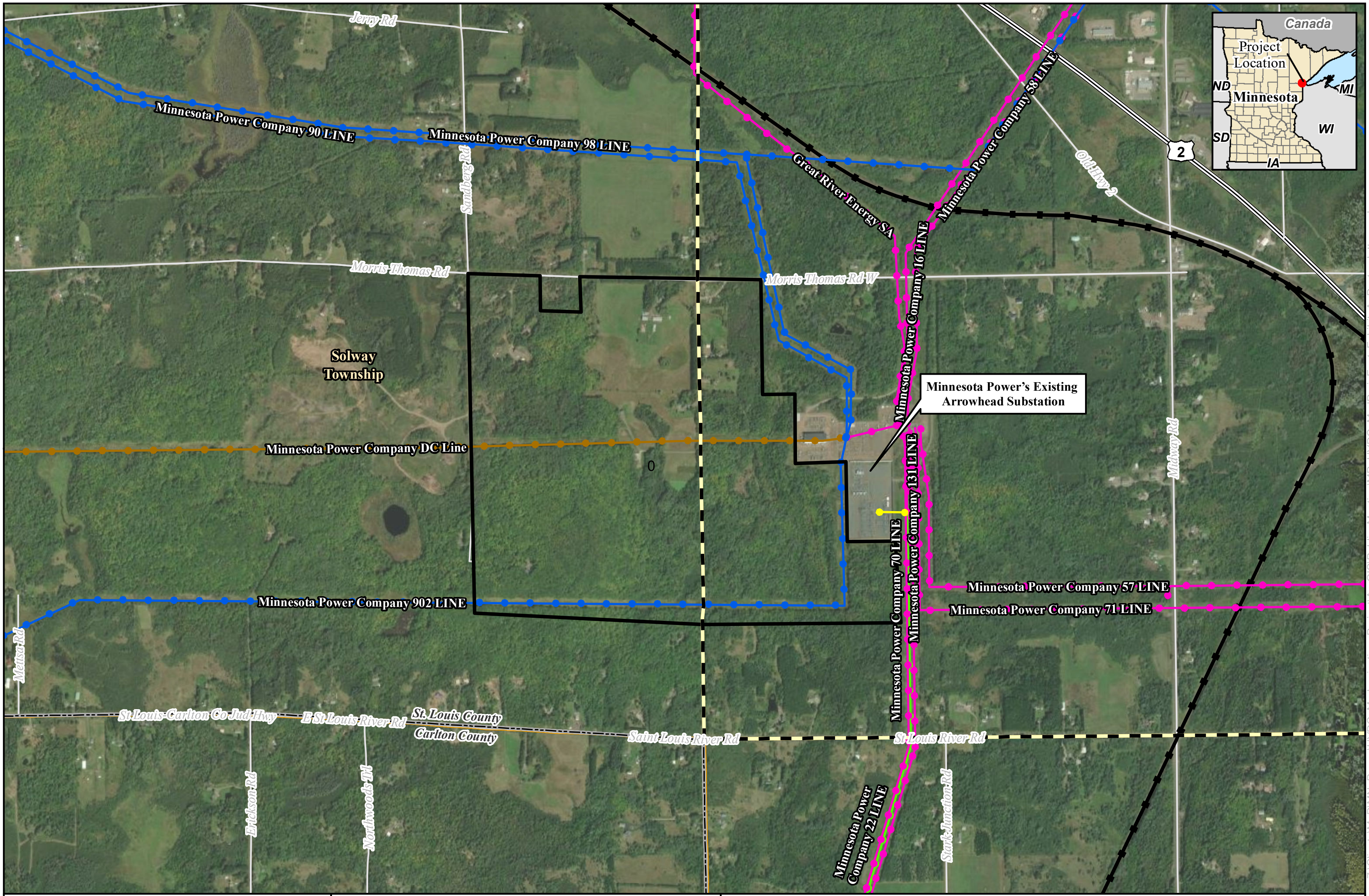

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For Environmental Review Purposes Only

HVDC Modernization Project

Minnesota Power

Project Area
St. Louis County, Minnesota

- ▭ Minnesota Power's Project Study Area
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- ▭ Municipal Boundary
- ● Existing 115 kV Transmission Line
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- ▬ Railroad

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\ArcGIS\Public_Meeting\MP_HVDC_ModProj_East_Exhibit_A_Poster_letter.mxd

Date: (11/30/2022)

December 16, 2022 **VIA U.S. Mail**

Joe Rokala
DNR Lands and Minerals
Northeast Regional Operations Supervisor
1201 East Highway 2
Grand Rapids, MN 55744

Re: HVDC Modernization Project
St. Louis County, Minnesota
MPUC Docket No. E015/CN-22-607 and E015/TL-22-611

Dear Joe Rokala:

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Manager- Environmental
Strategic Initiatives
ALLETE Inc.

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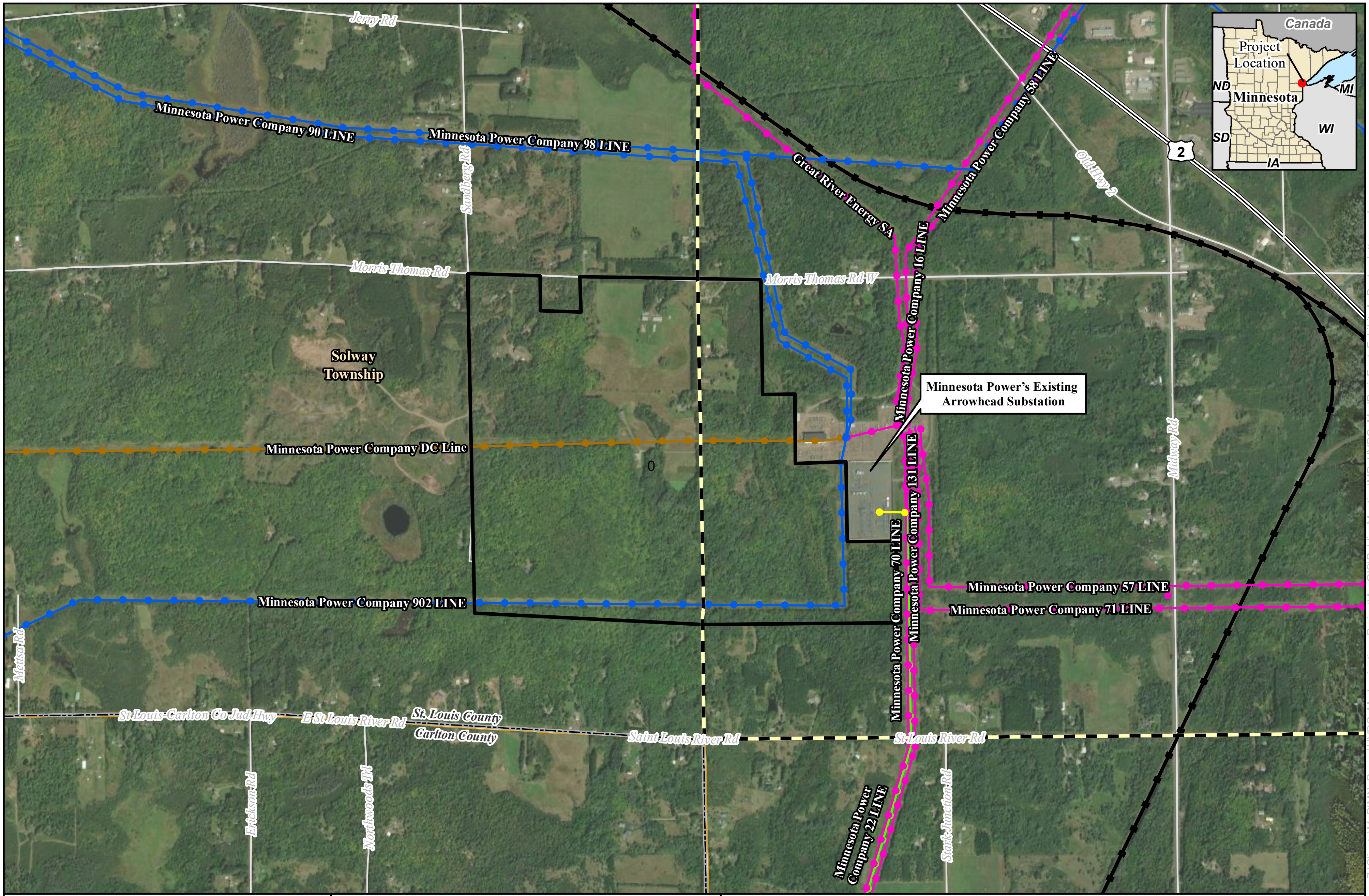

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For Environmental Review Purposes Only

HVDC Modernization Project

Minnesota Power

Project Area

St. Louis County, Minnesota

- ▭ Minnesota Power's Project Study Area
- ▭ County Boundary
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Appendix J
Page 40 of 126
MPUC Docket No. E015/TL-22-611
MPUC Docket No. E015/CN-22-607

Date: (11/30/2022) Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\ArcGIS\Public_Meeting\MP_HVDC_ModProj_East_Exhibit_A_Poster_letter.mxd

December 16, 2022 **VIA U.S. Mail**

John Voges
DNR Parks and Trails
Acting Northeast Regional Manager
1201 East Highway 2
Grand Rapids, MN 55744

Re: HVDC Modernization Project
St. Louis County, Minnesota
MPUC Docket No. E015/CN-22-607 and E015/TL-22-611

Dear John Voges:

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Manager- Environmental
Strategic Initiatives
ALLETE Inc.

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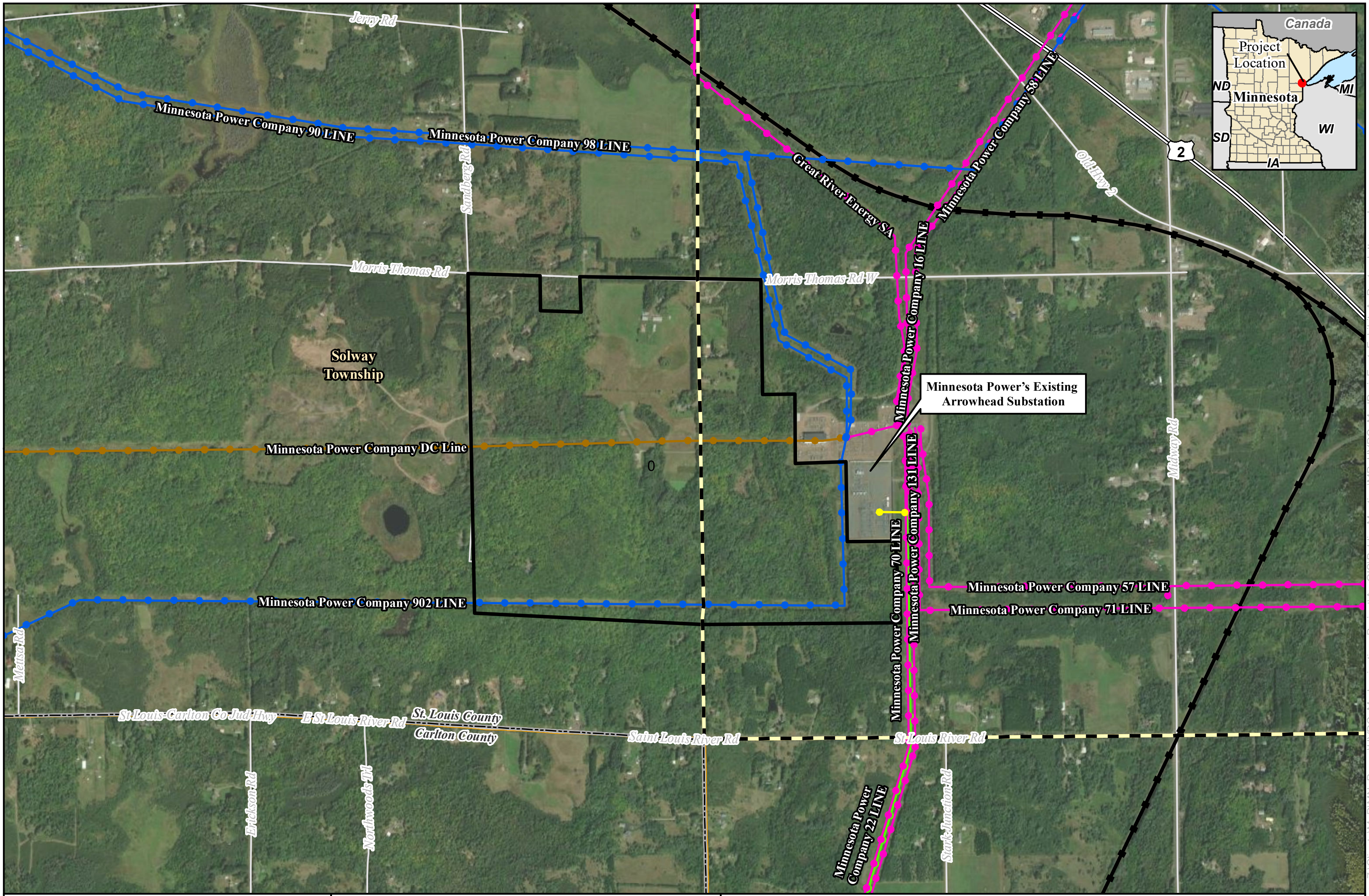

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For Environmental Review Purposes Only

HVDC Modernization Project

Minnesota Power

Project Area

St. Louis County, Minnesota

▭	Minnesota Power's Project Study Area
▭	County Boundary
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●	Existing 115 kV Transmission Line
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Date: (11/30/2022)

December 16, 2022 **VIA U.S. Mail**

Allison Praet
NRCS - Duluth Service Center
4850 Miller Trunk Hwy
Duluth, MN 55811-1506

Re: HVDC Modernization Project
St. Louis County, Minnesota
MPUC Docket No. E015/CN-22-607 and E015/TL-22-611

Dear Allison Praet:

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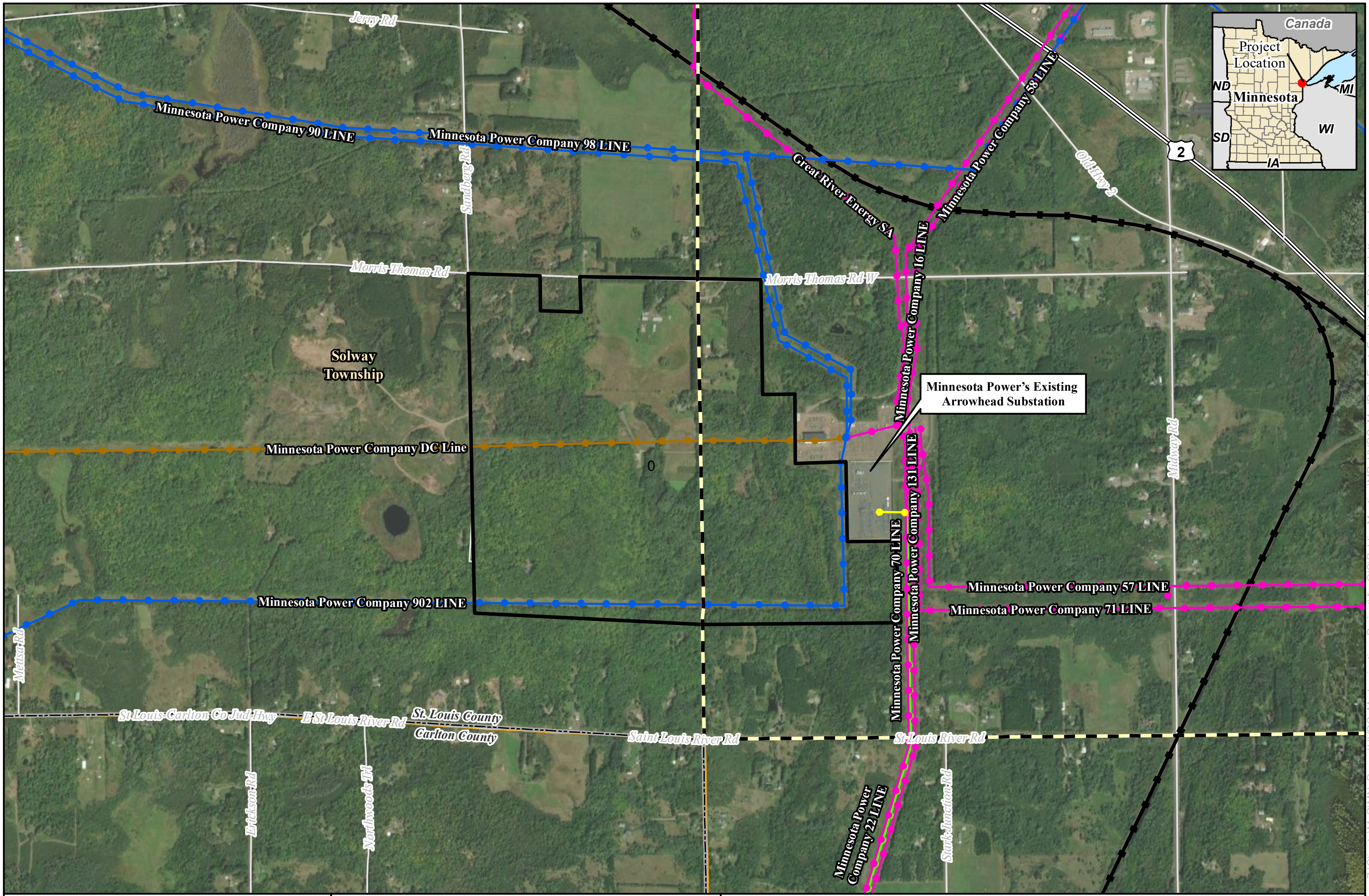

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HVDC Modernization Project

Minnesota Power

Project Area
St. Louis County, Minnesota

▭ Minnesota Power's Project Study Area

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● Existing 115 kV Transmission Line

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Date: (11/30/2022)

December 16, 2022 **VIA U.S. Mail**

R. C. Boheim
South St. Louis Soil and Water Conservation District
District Manager
4215 Enterprise Circle
Duluth, MN 55811

Re: HVDC Modernization Project
St. Louis County, Minnesota
MPUC Docket No. E015/CN-22-607 and E015/TL-22-611

Dear R. C. Boheim:

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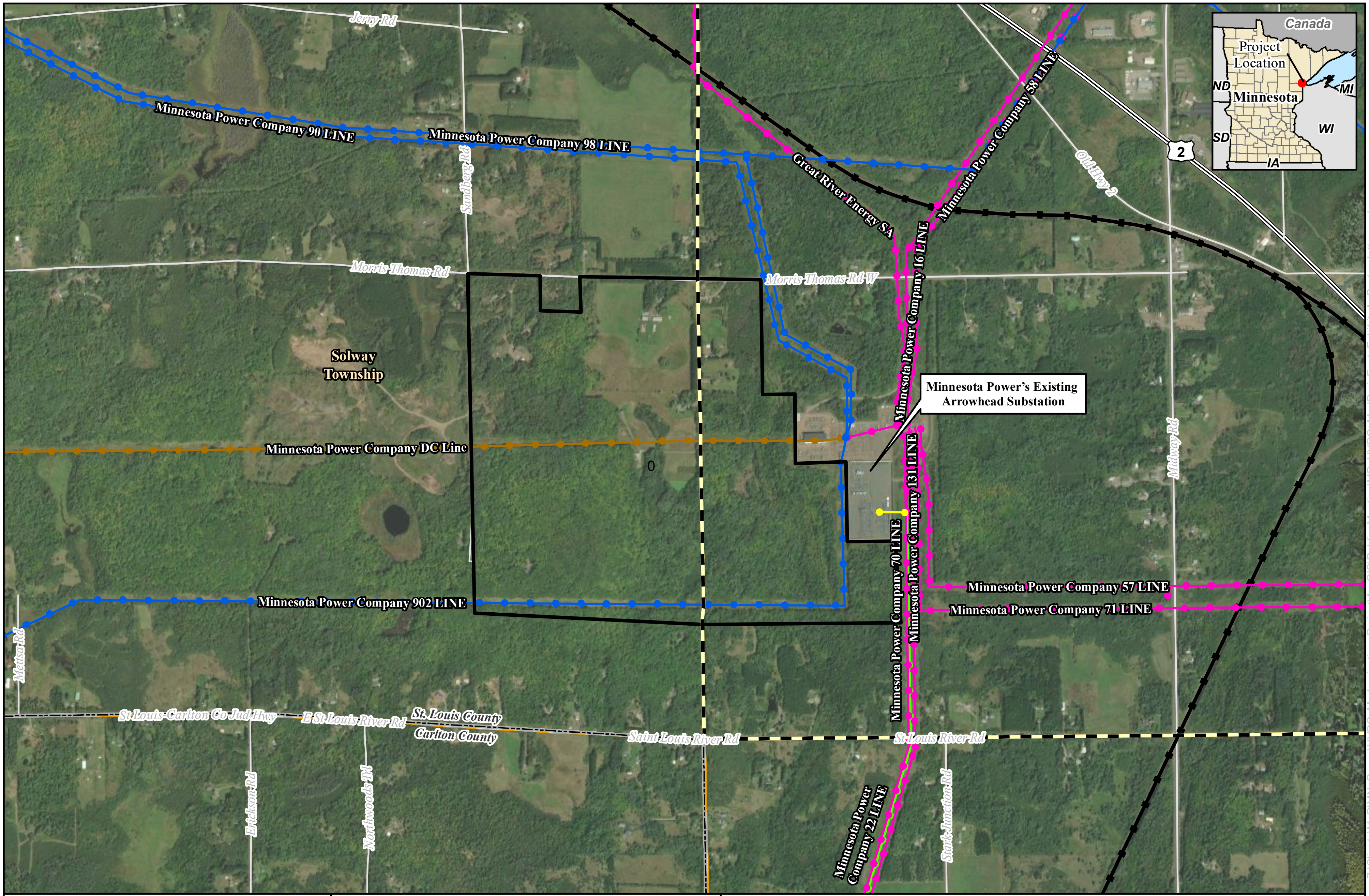

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Minnesota Power

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St. Louis County, Minnesota

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minnesota power
AN ALLETE COMPANY

December 16, 2022 **VIA U.S. Mail**

Shauna Marquardt
USFWS
Field Supervisor – Ecological Services
4101 American Boulevard East
Bloomington, MN 55425

Re: HVDC Modernization Project
St. Louis County, Minnesota
MPUC Docket No. E015/CN-22-607 and E015/TL-22-611

Dear Ms. Marquart:

Minnesota Power (also the "Company") is proposing to construct a project known as the HVDC Modernization Project (also the "Project"). The Project involves modernizing and upgrading the existing High Voltage Direct Current ("HVDC") terminals for Minnesota Power's HVDC Line, which are currently located near the existing Arrowhead Substation in Hermantown, Minnesota and the existing Center HVDC Substation in Center, North Dakota. This proposed modernization project will require the construction of new terminals and short transmission line segments in both States, near the existing stations. The Minnesota Portion of the HVDC Modernization Project is regulated by the Minnesota Public Utilities Commission ("Commission").

The HVDC Modernization Project is needed to modernize aging HVDC assets, continue to position the region's transmission grid for continued clean energy transition, and improve the reliability of the transmission system in Minnesota and North Dakota. The existing HVDC terminal has operated for 45 years, 15 years in excess of its 30-year design life. In recent years Minnesota Power has experienced HVDC terminal outages due to failures in the control system, power electronics, transformers, and other components. The orderly replacement of the HVDC terminal equipment is prudent to ensure continuous efficient delivery of Minnesota Power's renewable, carbon-free energy resources into the future.

In order to modernize the HVDC terminals and implement the latest technology, new electrical infrastructure would need to be constructed on a new site near the existing HVDC terminals. In Minnesota, to connect the new HVDC terminal to the existing AC system, the Project would require the construction of a new St Louis County 345 kilovolt ("kV")/230 kV substation located less than one mile west of the existing Arrowhead Substation. The new HVDC terminal would be connected to the St Louis County Substation by less than one mile of 345 kV large high-voltage transmission line ("LHVTL") and the new St Louis County Substation would be connected to the existing Arrowhead Substation by two parallel 230 kV LHVTLs less than one mile in length. Additionally, a short portion of the existing ±250 kV HVDC Line in Minnesota will need to be reconfigured to terminate at the new HVDC terminal. The Project is currently scheduled to be in service in 2027.

Two approvals must be obtained from the Commission before high voltage transmission lines and associated facilities like the proposed Project can be built: a Certificate of Need and a Route

Permit. Minnesota Power plans to submit a joint application for a Certificate of Need and Route Permit in accordance with Minnesota Rules (Minn. R.) 7849 and Minn. R. 7850 respectively, to the Commission for the Project. As part of this process, Minnesota Power has started gathering stakeholder, agency, tribal, and public input on the Project through letters, meetings, and open houses. We appreciate your assistance as we evaluate siting and routing information and work through the Commission's approval process.

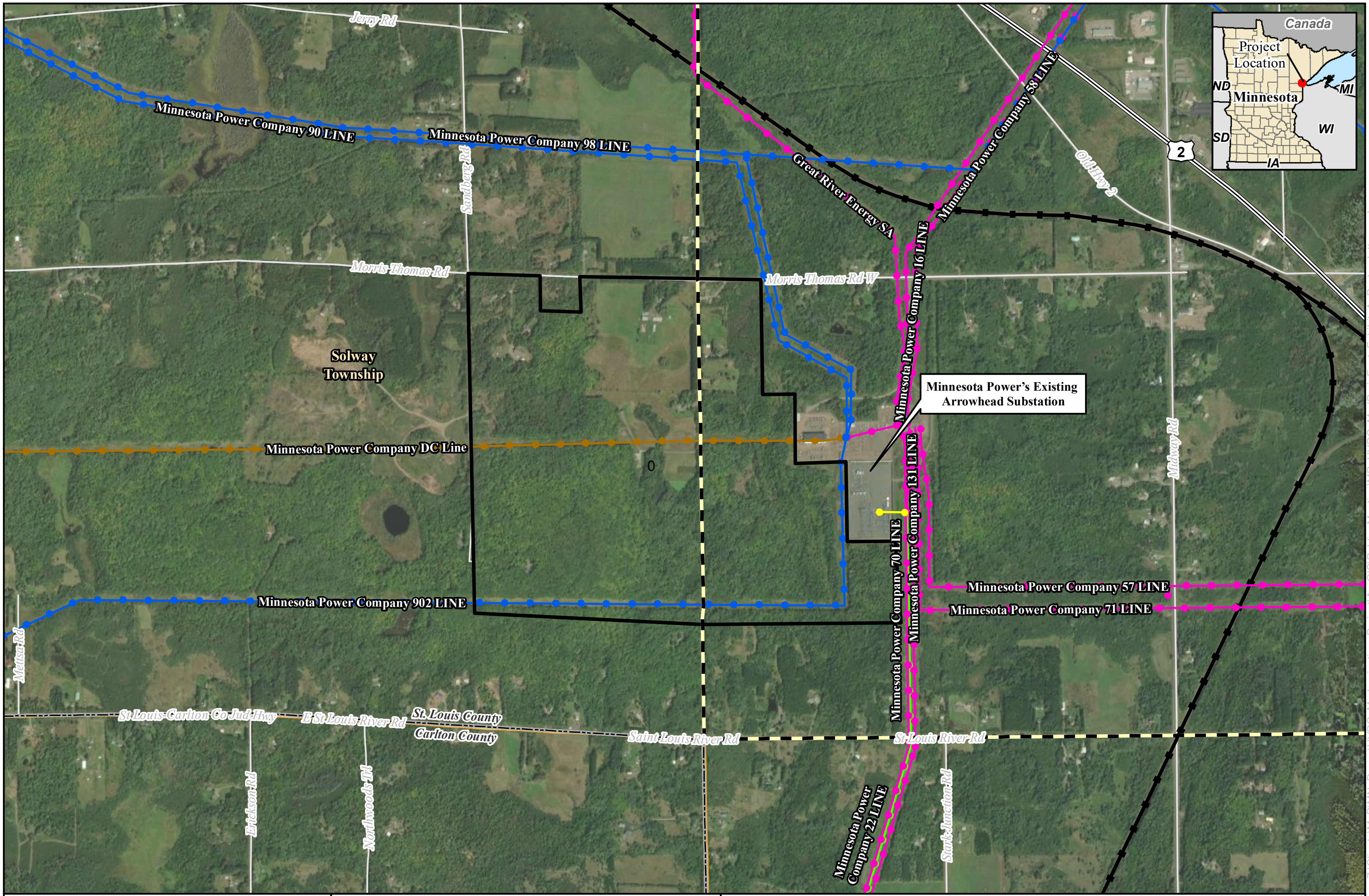
Minnesota Power will review the Project using the United States Fish and Wildlife Service's ("USFWS") Information for Planning and Consultation ("IPaC") tool and will evaluate the Project using Determination Keys ("D-Keys") available at the time. In the event that the available D-Keys are not applicable to the Project, Minnesota Power will coordinate with the USFWS Twin Cities Field Office.

Please let us know if you have information we should consider in evaluating the Project. If you would like to request a meeting, please contact me at (218) 355-3515 or dmccourtney@mnpower.com. I am happy to discuss any questions that you may have about the Project. Additional information about the Project can also be found on the Company's EnergyForward website at: https://www.mnpower.com/energyforward.

Sincerely,

Daniel McCourtney
Manager- Environmental
Strategic Initiatives
ALLETE Inc.

Enclosures Project Overview Map



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1 inch = 1,500 feet

N W E S

For Environmental Review Purposes Only

HVDC Modernization Project

Minnesota Power

Project Area

St. Louis County, Minnesota

- Minnesota Power's Project Study Area
- County Boundary
- Municipal Boundary
- Existing 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 250 kV Transmission Line
- Existing 345 kV Transmission Line
- Existing 345kV/115 kV Transmission Line
- Railroad

Date: (11/30/2022) Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\ArcGIS\Public_Meeting\MP_HVDC_ModProj_East_Exhibit_A_Poster_letter.mxd

minnesota power
AN ALLETE COMPANY

December 16, 2022 **VIA U.S. Mail**

Ms. Sam Bump
Endangered Resource Review Coordinator
Minnesota Department of Natural Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155

Re: HVDC Modernization Project
St. Louis County, Minnesota
MPUC Docket No. E015/CN-22-607 and E015/TL-22-611

Dear Ms. Bump:

Minnesota Power (also the “Company”) is proposing to construct a project known as the HVDC Modernization Project (also the “Project”). The Project involves modernizing and upgrading the existing High Voltage Direct Current (“HVDC”) terminals for Minnesota Power’s HVDC Line, which are currently located near the existing Arrowhead Substation in Hermantown, Minnesota and the existing Center HVDC Substation in Center, North Dakota. This proposed modernization project will require the construction of new terminals and short transmission line segments in both States, near the existing stations. The Minnesota Portion of the HVDC Modernization Project is regulated by the Minnesota Public Utilities Commission (“Commission”).

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Permit. Minnesota Power plans to submit a joint application for a Certificate of Need and Route Permit in accordance with Minnesota Rules (Minn. R.) 7849 and Minn. R. 7850 respectively, to the Commission for the Project. As part of this process, Minnesota Power has started gathering stakeholder, agency, tribal, and public input on the Project through letters, meetings, and open houses. We appreciate your assistance as we evaluate siting and routing information and work through the Commission's approval process.

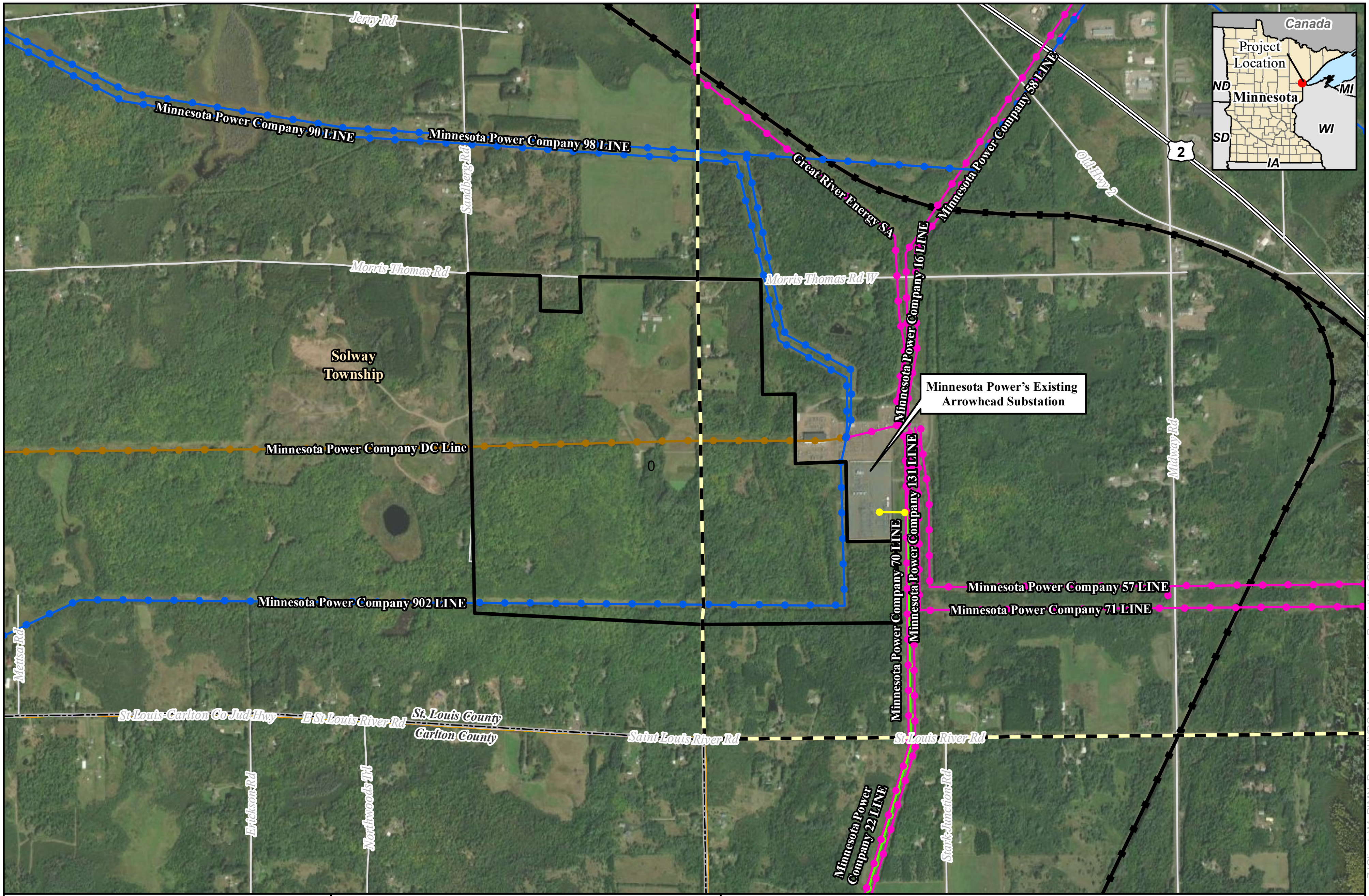
On behalf of Minnesota Power, Merjent submitted a formal Natural Heritage Review Request (2022-0070) on November 11, 2022 (enclosed) through the DNR's Minnesota Conservation Explorer ("MCE"). An automated response provided by the MnDNR on November 11, 2022 indicated that no state-listed endangered or threatened species have been documented within the vicinity of the Project Study Area

Please let us know if you have information we should consider in evaluating the Project. If you would like to request a meeting, please contact me at (218) 355-3515 or dmccourtney@mnpower.com. I am happy to discuss any questions that you may have about the Project. Additional information about the Project can also be found on the Company's EnergyForward website at: https://www.mnpower.com/energyforward.

Sincerely,

Daniel McCourtney
Manager- Environmental
Strategic Initiatives
ALLETE Inc.

Enclosures Project Overview Map
Natural Heritage Review Request (2022-0070)



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1 inch = 1,500 feet

For Environmental Review Purposes Only

HVDC Modernization Project

Minnesota Power

Project Area
St. Louis County, Minnesota

- ▭ Minnesota Power's Project Study Area
- ▭ County Boundary
- ▭ Municipal Boundary
- ● Existing 115 kV Transmission Line
- ● Existing 230 kV Transmission Line
- ● Existing 250 kV Transmission Line
- ● Existing 345 kV Transmission Line
- ● Existing 345kV/115 kV Transmission Line
- ▬ Railroad

Appendix J
Page 60 of 126
MPUC Docket No. E015/TL-22-611
MPUC Docket No. E015/CN-22-607

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\ArcGIS\Public_Meeting\MP_HVDC_ModProj_East_Exhibit_A_Poster_letter.mxd

Date: (11/30/2022)

DEPARTMENT OF NATURAL RESOURCES

Formal Natural Heritage Review - Cover Page

See next page for results of review. A draft watermark means the project details have not been finalized and the results are not official.

Project Name: HVDC Modernization Project

Project Proposer: Minnesota Power

Project Type: Utilities, Transmission (electric, cable, phone)

Project Type Activities: Tree Removal;Waterbody, watercourse, streambed impacts (e.g., discharge, runoff, sedimentation, fill, excavation);Wetland impacts (e.g., discharge, runoff, sedimentation, fill, excavation)

TRS: T50 R15 S31, T50 R16 S36

County(s): St. Louis

DNR Admin Region(s): Northeast

Reason Requested: PUC Site or Route Application

Project Description: Transmission line and substation

Existing Land Uses: Forested, wetlands, existing right-of-way, agricultural

Landcover / Habitat Impacted: TBD

Waterbodies Affected: TBD

Groundwater Resources Affected: TBD

Previous Natural Heritage Review: No

Previous Habitat Assessments / Surveys: No

SUMMARY OF AUTOMATED RESULTS

Category	Results	Response By Category
Project Details	No Comments	No Further Review Required
Ecologically Significant Area	No Comments	No Further Review Required
State-Listed Endangered or Threatened Species	No Comments	No Further Review Required
State-Listed Species of Special Concern	Comments	Recommendations
Federally Listed Species	No Records	Visit IPaC For Federal Review

DEPARTMENT OF
NATURAL RESOURCES

Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

November 11, 2022

Project ID: MCE #2022-00770

Mandy Bohnenblust
Merjent, Inc.
1 Main Street SE, Suite 300
Minneapolis, MN 55414

RE: Automated Natural Heritage Review of the proposed HVDC Modernization Project
See Cover Page for location and project details.

Dear Mandy Bohnenblust,

As requested, the above project has been reviewed for potential effects to rare features. Based on this review, the following rare features may be adversely affected by the proposed project:

Project Type and/or Project Type Activity Comments

- The Natural Heritage Information System (NHIS) tracks bat roost trees and hibernacula plus some acoustic data, but this information is not exhaustive. Even if there are no bat records listed below, all seven of Minnesota's bats, including the federally threatened northern long-eared bat (*Myotis septentrionalis*), can be found throughout Minnesota. Tree removal can negatively impact bats by destroying roosting habitat, especially during the pup rearing season when females are forming maternity roosting colonies and the pups cannot yet fly. To minimize these impacts, the DNR recommends that tree removal be avoided during the months of June and July.

Ecologically Significant Area

No ecologically significant areas have been documented in the vicinity of the project.

State-Listed Endangered or Threatened Species

No state-listed endangered or threatened species have been documented in the vicinity of the project.

State-Listed Species of Special Concern

Taxonomic Group	**Common Name**	**Scientific Name**	**Water Regime**	**Habitat**	**Federal Status**
Vertebrate Animal	Northern Goshawk	Accipiter gentilis		Mesic Hardwood Forest, Fire Dependent Forest	

- The above table identifies state-listed species of special concern that have been documented in the vicinity of your project. If suitable habitat for any of these species occurs within your project footprint or activity impact area, the project may negatively impact those species. To avoid impacting state-listed species of special concern, the DNR recommends modifying the location of project activities to avoid suitable habitat or modifying the timing of project activities to avoid the presence of the species. Please visit the DNR Rare Species Guide for more information on the habitat use of these species and recommended measures to avoid or minimize impacts. For further assistance, please contact the appropriate DNR Regional Nongame Specialist or Regional Ecologist. Species-specific comments, if any, appear below.

Federally Listed Species

The Natural Heritage Information System does not contain any records for federally listed species within one mile of the proposed project. However, to ensure compliance with federal law, please conduct a federal regulatory review using the U.S. Fish and Wildlife Service's online Information for Planning and Consultation (IPaC) tool.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area. If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location and the project description provided on the cover page. If project details change or construction has not occurred within one year, please resubmit the project for review.

The Natural Heritage Review does not constitute project approval by the Department of Natural Resources. Instead, it identifies issues regarding known occurrences of rare features and potential effects to these rare features. For information on the environmental review process or other natural resource concerns, you may contact your DNR Regional Environmental Assessment Ecologist.

Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources.

Sincerely,

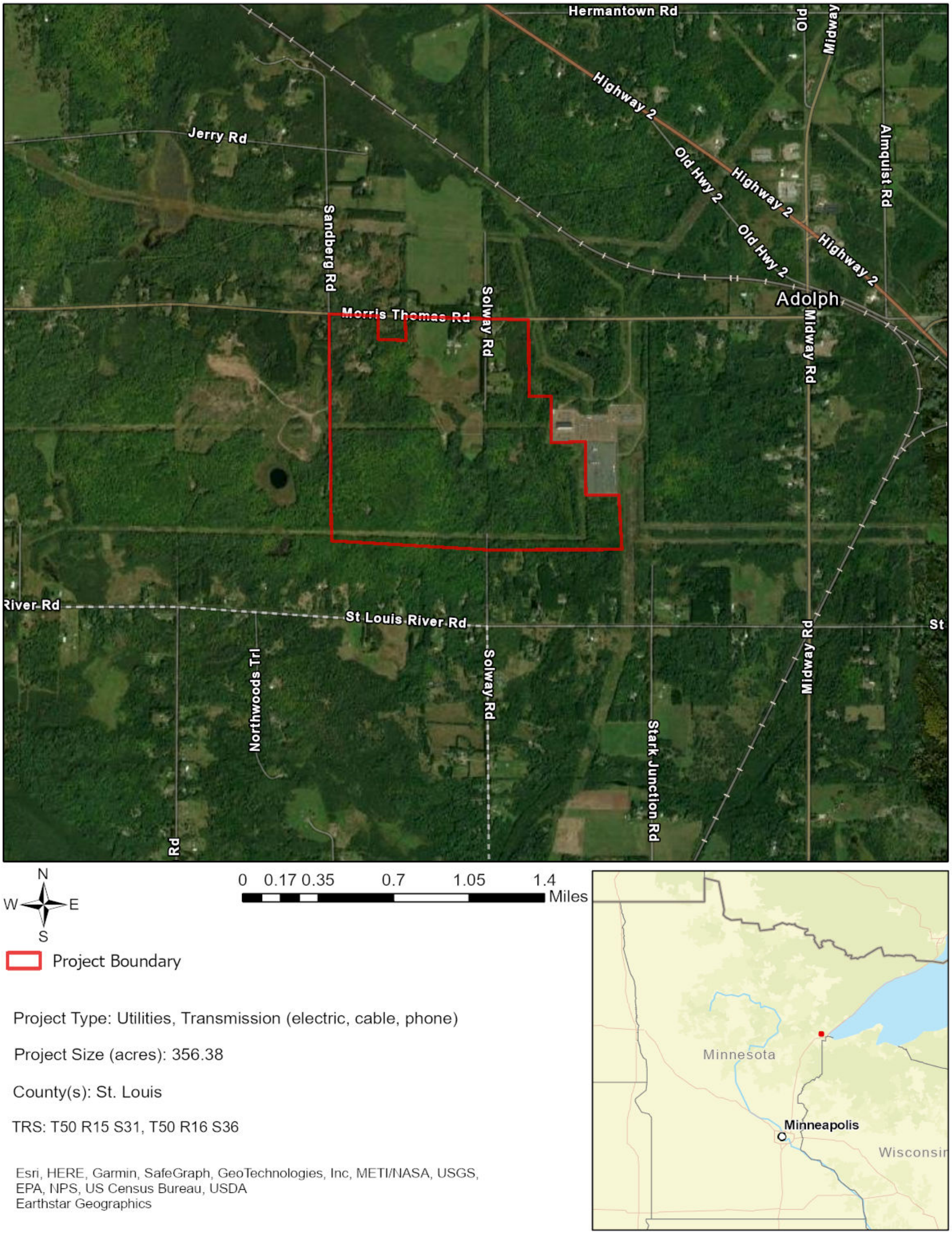
Samantha Bump

Samantha Bump
Natural Heritage Review Specialist
Samantha.Bump@state.mn.us

Links: USFWS Information for Planning and Consultation (IPaC) tool
[Information for Planning and Consultation (IPaC) tool]
DNR Regional Environmental Assessment Ecologist Contact Info
https://www.dnr.state.mn.us/eco/ereview/erp_regioncontacts.html

HVDC Modernization Project

Aerial Imagery With Locator Map



🟥 Project Boundary

Project Type: Utilities, Transmission (electric, cable, phone)

Project Size (acres): 356.38

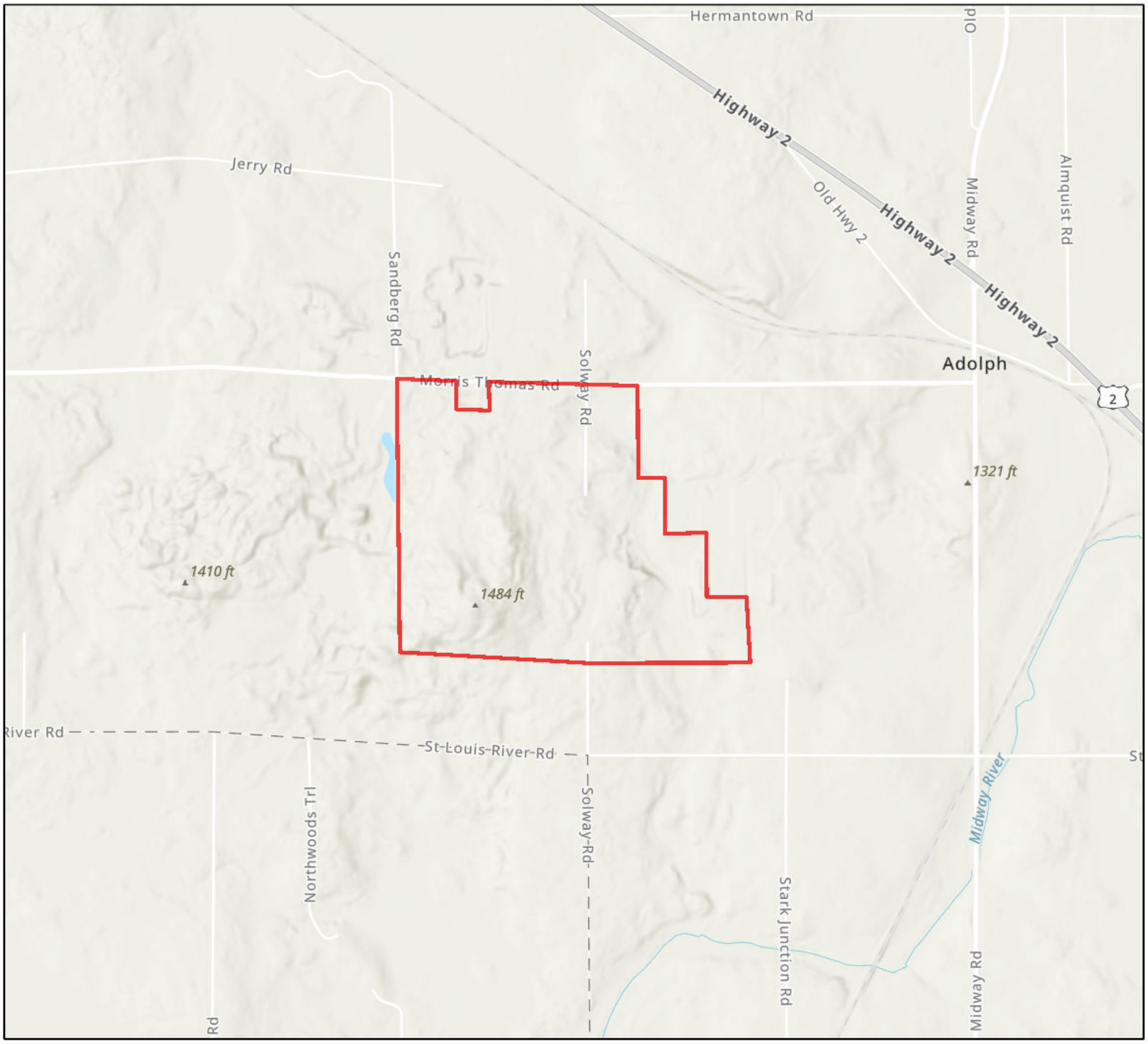
County(s): St. Louis

TRS: T50 R15 S31, T50 R16 S36

Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA
Earthstar Geographics

HVDC Modernization Project

USA Topo Basemap With Locator Map



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Esri, NASA, NGA, USGS, FEMA
Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

AFFIDAVIT OF MAILING

In the Matter of the Application for a Certificate of Need and Route Permit for the HVDC Modernization Project in St. Louis County

PUC Docket No. CN-22-607/TL-22-611

STATE OF MINNESOTA)
) SS.
COUNTY OF HENNEPIN)

I, Daniel S. Flo, hereby certify that on the 22nd day of December 2022, I directed to be sent via U.S. Mail a true and correct copy of the Project Introduction and Request to Initiate Coordination (Tribal Engagement) Letters, attached hereto as Exhibit 1, to all recipients on the attached service lists as maintained by the Minnesota Public Utilities Commission, attached hereto as Exhibit 2.

MELISSA ADELE DELLWO
NOTARY PUBLIC
MINNESOTA
My Commission Expires 1-31-24

Daniel S. Flo

Subscribed and sworn to before me
this 10th day of January 2023.

Notary Public

Month, Day, Year

Name
Tribal name
Title
Address
Address

Subject: HVDC Modernization Project, St. Louis County, Minnesota
Project Introduction and Request to Initiate Coordination
MPUC Docket No. E015/CN-22-607 and E015/TL-22-611

Dear Name:

Minnesota Power (also the "Company") is proposing to construct a project known as the HVDC Modernization Project (also the "Project"). The Project involves modernizing and upgrading the existing High Voltage Direct Current ("HVDC") terminals for Minnesota Power's HVDC Line, which are currently located near the existing Arrowhead Substation in Hermantown, Minnesota and the existing Center HVDC Substation in Center, North Dakota. This proposed modernization project will require the construction of new terminals and short transmission line segments near the existing stations in both States. The Minnesota Portion of the HVDC Modernization Project is regulated by the Minnesota Public Utilities Commission ("Commission") and is located in Section 31, Township 50 North, Range 15 West and Section 36, Township 50 North, Range 16 West, near Hermantown, in St. Louis County, Minnesota.

The HVDC Modernization Project is needed to modernize aging HVDC assets, continue to position the region's transmission grid for continued clean energy transition, and improve the reliability of the transmission system in Minnesota and North Dakota. The existing HVDC terminal has operated for 45 years, 15 years in excess of its 30-year design life. In recent years Minnesota Power has experienced HVDC terminal outages due to failures in the control system, power electronics, transformers, and other components. The orderly replacement of the HVDC terminal equipment is prudent to ensure continuous efficient delivery of Minnesota Power's renewable, carbon-free energy resources into the future.

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EXAMPLE

short portion of the existing ±250 kV HVDC Line in Minnesota will need to be reconfigured to terminate at the new HVDC terminal. The Project is currently scheduled to be in service in 2027.

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Cultural Resources Survey: Merjent, Inc. (Merjent) was contracted to complete a background records review and Phase I field survey of the proposed Project area in September 2022. The background records review identified no previously recorded archaeological sites or historic properties in the Project area. The irregular shaped Project area encompasses a total 356.6 acres; however, Phase I archaeological surveys were only completed on 126.6 acres due to limited access. Merjent identified one historic site dating from the early-mid 20th-century; it remains unevaluated for the National Register of Historic Places and avoidance is recommended. A USGS Topographic Map and aerial overview map depicting the Project location is attached. The remaining Phase I survey will be completed in 2023. A copy of the Phase I archaeological report is available upon request.

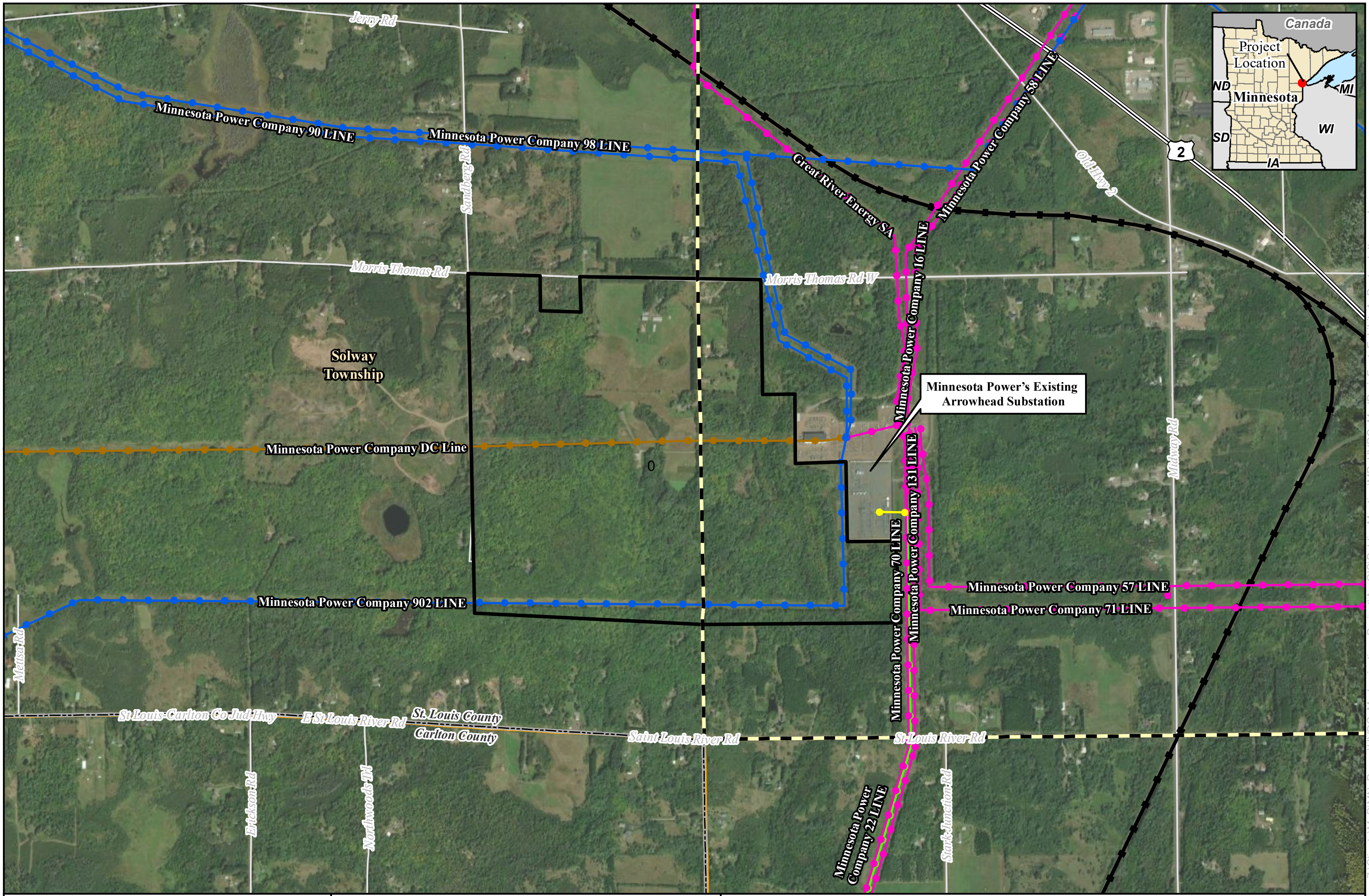
We respectfully request your assistance with the identification of any information we should consider in evaluating the proposed Project. If you would like to request a meeting, please contact me at (218) 355-3515 or dmccourtney@mnpower.com. I am happy to discuss any questions that you may have about the Project. Additional information about the Project can also be found on the Company's EnergyForward website at: https://www.mnpower.com/energyforward.

Sincerely,

Daniel McCourtney
Manager- Environmental
Strategic Initiatives
ALLETE Inc.

Enclosures: 7.5 USGS Topographic Project Location Map
Project Overview Aerial Map

EXAMPLE



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For Environmental Review Purposes Only

HVDC Modernization Project
Minnesota Power
Project Area
St. Louis County, Minnesota

Minnesota Power's Project Study Area

County Boundary

Municipal Boundary

Existing 115 kV Transmission Line

Existing 230 kV Transmission Line

Existing 250 kV Transmission Line

Existing 345 kV Transmission Line

Existing 345kV/115 kV Transmission Line

Railroad

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\ArcGIS\Public_Meeting\MP_HVDC_ModProj_East_Exhibit_A_Poster_letter.mxd

Date: (11/30/2022)

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Jaime	Arsenault	jaime.arsenault@whiteearth-nsn.gov	White Earth	PO BOX 418 White Earth, MN 56591	Electronic Service	No	SPL_SL__Tribal Historic Preservation Offices
Tommy	Brown	Tommy.brown@llojibwe.net	Leech Lake Band of Ojibwe	190 Sailstar Dr NW Cass Lake, MN 56633	Electronic Service	No	SPL_SL__Tribal Historic Preservation Offices
Kade	Ferris	kade.ferris@redlakenation.org	Red Lake Region	PO Box 274 Red Lake, MN 56671	Electronic Service	No	SPL_SL__Tribal Historic Preservation Offices
Mary Ann	Gagnon	maryanng@grandportage.com	Grand Portage Band of Ojibwe	PO Box 428 Grand Portage, MN 55605	Electronic Service	No	SPL_SL__Tribal Historic Preservation Offices
Jill	Hoppe	jillhoppe@fdlrez.com	Fond du Lac Band of Superior Chippewa	1720 Big Lake Road Cloquet, MN 55720	Electronic Service	No	SPL_SL__Tribal Historic Preservation Offices
Terry	Kemper	Terry.Kemper@millelacsband.com	Mille Lacs Band of Ojibwe	43408 Oodena Dr Onamia, MN 56359	Electronic Service	No	SPL_SL__Tribal Historic Preservation Offices
Samantha J	Odegard	samanthao@uppersiouxcommunity-nsn.gov	Upper Sioux Tribal Community	PO Box 147 Granite Falls, MN 56241	Electronic Service	No	SPL_SL__Tribal Historic Preservation Offices
Cheyanne	St. John	cheyanne.stjohn@lowersioux.com	Lower Sioux Tribal Community	39527 Reservation Hwy 1 Morton, MN 56270	Electronic Service	No	SPL_SL__Tribal Historic Preservation Offices
Leonard	Wabasha	leonard.wabasha@shakopeedakota.org	Shakopee Mdewakanton Sioux Community	2300 Tiwahe Circle Shakopee, MN 55379	Electronic Service	No	SPL_SL__Tribal Historic Preservation Offices
Noah	White	noah.white@piic.org	Prairie Island Indian Community	5636 Sturgeon Lake Road Welch, MN 55089	Electronic Service	No	SPL_SL__Tribal Historic Preservation Offices

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Steve	Albrecht	Steve.Albrecht@shakopeedakota.org	Shakopee Mdewakanton Sioux Community	Shakopee Mdewakanton Sioux Community 2330 Sioux Trail NW Prior Lake, MN 55372	Electronic Service	No	SPL_SL__Tribal Government Contacts
Keith	Anderson	keith.anderson@shakopeedakota.org	Shakopee Mdewakanton Sioux Community	Shakopee Mdewakanton Sioux Community 2330 Sioux Trail NW Prior Lake, MN 55372	Electronic Service	No	SPL_SL__Tribal Government Contacts
Agatha	Armstrong	agathaa@grandportage.com	Grand Portage Bank of Lake Superior Chippewa	PO BOX42 Grand Portage, MN 55605	Electronic Service	No	SPL_SL__Tribal Government Contacts
Melanie	Benjamin	melanie.benjamin@millelacsband.com	Mille Lacs Band of Ojibwe	43408 Oodena Drive Onamia, MN 56359	Electronic Service	No	SPL_SL__Tribal Government Contacts
Hunter	Boldt	hunterboldt@redlakenation.org	Red Lake Nation	15484 Migizi Drive Red Lake, MN 56671	Electronic Service	No	SPL_SL__Tribal Government Contacts
Sheldon	Boyd	sheldon.boyd@millelacsband.com	Mille Lacs Band of Ojibwe	43408 Oodena Drive Onamia, MN 56359	Electronic Service	No	SPL_SL__Tribal Government Contacts
Scott	Buchanan	ScottBuchanan@fdlrez.com	Fond du Lac Band of Lake Superior Chippewa	1720 Big Lake Road Cloquet, MN 55720	Electronic Service	No	SPL_SL__Tribal Government Contacts
Shelley	Buck	shelley.buck@piic.org	Prairie Island Indian Community	Prairie Island Indian Community 5636 Sturgeon Lake Road Welch, MN 55089	Electronic Service	No	SPL_SL__Tribal Government Contacts
Robert	Budreau	robert.budreau@llojibwe.net	Leech Lake Band of Ojibwe	190 Sailstar Drive NW Cass Lake, MN 56633	Electronic Service	No	SPL_SL__Tribal Government Contacts
Cathy	Chavers	cchavers@boisforte-nsn.gov	Bois Forte Band of Chippewa	Bois Forte Tribal Government 5344 Lakeshore Drive Nett Lake, MN 55772	Electronic Service	No	SPL_SL__Tribal Government Contacts

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Michael	Childs, Jr.	michael.childsjr@piic.org	Prairie Island Indian Community	Prairie Island Indian Community 5636 Sturgeon Lake Road Welch, MN 55089	Electronic Service	No	SPL_SL__Tribal Government Contacts
Sean	Copeland	seancopeland@fdlrez.com	Fond du Lac Band of Lake Superior Chippewa	1720 Big Lake Rd Cloquet, MN 55720	Electronic Service	No	SPL_SL__Tribal Government Contacts
Rebecca	Crooks Stratton	Rebecca.Crooks-Stratton@ShakopeeDakota.org	Shakopee Mdewakanton Sioux Community	Shakopee Mdewakanton Sioux Community 2330 Sioux Trail NW Prior Lake, MN 55372	Electronic Service	No	SPL_SL__Tribal Government Contacts
Miyah	Danielson	MiyahDanielson@FDLREZ.COM	Fond du Lac Band of Lake Superior Chippewa	1720 Big Lake Road Cloquet, MN 55720	Electronic Service	No	SPL_SL__Tribal Government Contacts
Harry	Davis	Harry.davis@millelacsband.com	Mille Lacs Band of Ojibwe	N/A	Electronic Service	No	SPL_SL__Tribal Government Contacts
Jason	Decker	jason.decker@llojibwe.net	Leech Lake Band of Ojibwe	190 Sailstar Drive NW Cass Lake, MN 56633	Electronic Service	No	SPL_SL__Tribal Government Contacts
Bobby	Deschampe	robertdeschampe@grandportage.com	Grand Portage Band of Lake Superior Chippewa	PO Box 428 Grand Portage, MN 55605	Electronic Service	No	SPL_SL__Tribal Government Contacts
Shane	Drift	sdrift@boisforte-nsn.gov	Bois Forte Band of Chippewa	Bois Forte Tribal Government 5344 Lakeshore Drive Nett Lake, MN 55772	Electronic Service	No	SPL_SL__Tribal Government Contacts
Wally	Dupuis	WallyDupuis@fdlrez.com	Fond du Lac Band of Lake Superior Chippewa	1720 Big Lake Road Cloquet, MN 55720	Electronic Service	No	SPL_SL__Tribal Government Contacts
Kevin	Dupuis, Sr.	kevindupuis@fdlrez.com	Fond du Lac Development Corp.	Reservation Business Committee 1720 Big Lake Rd Cloquet, MN 55720	Electronic Service	No	SPL_SL__Tribal Government Contacts

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Jamie	Edwards	jamie.edwards@millelacsband.com	Mille Lacs Band of Ojibwe	43408 Oodena Drive Onamia, MN 56358	Electronic Service	No	SPL_SL__Tribal Government Contacts
Laura	Erickson	Laura.Erickson@whiteearth-nsn.gov	White Earth Nation	N/A	Electronic Service	No	SPL_SL__Tribal Government Contacts
Michael	Fairbanks	Michael.Fairbanks@whiteearth-nsn.gov	White Earth Reservation Business Committee	PO Box 418 White Earth, MN 56591	Electronic Service	No	SPL_SL__Tribal Government Contacts
Kyle	Fairbanks	kyle.fairbanks@llojibwe.net	Leech Lake Band of Ojibwe	190 Sailstar Drive NW Cass Lake, MN 56633	Electronic Service	No	SPL_SL__Tribal Government Contacts
Irene	Folstrom	irene.folstrom@llojibwe.net	Leech Lake Band of Ojibwe	N/A	Electronic Service	No	SPL_SL__Tribal Government Contacts
Henry	Fox	henry.fox@whiteearth-nsn.gov	White Earth Nation	PO Box 418 White Earth, MN 56569	Electronic Service	No	SPL_SL__Tribal Government Contacts
Gary	Frazer	gfrazer@mnchippewatribe.org	Minnesota Chippewa Tribe	PO Box 217 Cass Lake, MN 56633	Electronic Service	No	SPL_SL__Tribal Government Contacts
Tara	Geshick	tgeshick@boisforte-nsn.gov	Bois Forte Reservation Tribal Council	5344 Lake Shore Drive, PO Box 16 Nett Lake, MN 55772	Electronic Service	No	SPL_SL__Tribal Government Contacts
Shannon	Geshick	shannon.geshick@state.mn.us	Minnesota Indian Affairs Council (MIAC)	N/A	Electronic Service	No	SPL_SL__Tribal Government Contacts
Robbie	Goggleye	rgoggleye@boisforte-nsn.gov	Bois Forte Band of Chippewa	Bois Forte Tribal Government 5344 Lakeshore Drive Nett Lake, MN 55772	Electronic Service	No	SPL_SL__Tribal Government Contacts
Jeremy	Hamilton	jhamilton@uppersiouxcommunity-nsn.gov	Upper Sioux Community	Upper Sioux Community PO Box 147 Granite Falls, MN 56241	Electronic Service	No	SPL_SL__Tribal Government Contacts

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Amy	Hastings	amyh@uppersiouxcommunity-nsn.gov	Upper Sioux Community	5722 Travers Lane PO Box 147 Granite Falls, MN 56241	Electronic Service	No	SPL_SL__Tribal Government Contacts
Annie	Jackson	Cheryl.Jackson@whiteearth-nsn.gov	White Earth Nation	White Earth Tribal Headquarters 35500 Eagle View Road Ogemo, MN 56569	Electronic Service	No	SPL_SL__Tribal Government Contacts
Faron	Jackson, Sr.	faron.jackson@llojibwe.net	Leech Lake Band of Ojibwe	190 Sailstar Drive NW Cass Lake, MN 56633	Electronic Service	No	SPL_SL__Tribal Government Contacts
Kevin	Jensvold	kevinj@uppersiouxcommunity-nsn.gov	Upper Sioux Community	PO Box 147 Granite Falls, MN 56241-0147	Electronic Service	No	SPL_SL__Tribal Government Contacts
Jody	Johnson	jody.johnson@piic.org	Prairie Island Indian Community	5636 Sturgeon Lake Rd Welch, MN 55089	Electronic Service	No	SPL_SL__Tribal Government Contacts
Johnny	Johnson	Johnny.Johnson@piic.org	Prairie Island Indian Community	5636 Sturgeon Lake Road Welch, MN 55089	Electronic Service	No	SPL_SL__Tribal Government Contacts
Mike	Laroque	mike.laroque@whiteearth-nsn.gov	White Earth Nation	PO Box 418 White Earth, MN 56591	Electronic Service	No	SPL_SL__Tribal Government Contacts
Robert L	Larsen	robert.larsen@lowersioux.com	Lower Sioux Indian Community	PO Box 308 39527 Reservation Highway 1 Morton, MN 56270	Electronic Service	No	SPL_SL__Tribal Government Contacts
Vernelle	Lussier	vernelle.lussier@redlakenation.org	Red Lake Nation	15484 Migizi Drive Red Lake, MN 56671	Electronic Service	No	SPL_SL__Tribal Government Contacts

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Shena	Matrious	Shena.Matrious@millelacsband.com	Mille Lacs Band of Ojibwe	43408 Oodena Drive Onamia, MN 56349	Electronic Service	No	SPL_SL__Tribal Government Contacts
April	McCormick	aprilm@grandportage.com	Grand Portage Band of Lake Superior Chippewa	PO Box 428 Grand Portage, MN 55605	Electronic Service	No	SPL_SL__Tribal Government Contacts
Wendy	Merrill	wendy.merrill@millelacsband.com	Mille Lacs Band of Ojibwe	N/A	Electronic Service	No	SPL_SL__Tribal Government Contacts
Valentina	Mgeni	Valentina.Mgeni@piic.org	Prairie Island Indian Community	Prairie Island Indian Community 5636 Sturgeon Lake Road Welch, MN 55089	Electronic Service	No	SPL_SL__Tribal Government Contacts
Cole W.	Miller	cole.miller@shakopeedakota.org	Shakopee Mdewakanton Sioux Community	Shakopee Mdewakanton Sioux Community 2330 Sioux Trail NW Prior Lake, MN 55372	Electronic Service	No	SPL_SL__Tribal Government Contacts
Allison	Mitchell	allisonmitchell@fdlrez.com	Fond du Lac Band of Lake Superior Chippewa	1720 Big Lake Road Cloquet, MN 55720	Electronic Service	No	SPL_SL__Tribal Government Contacts
Travis	Morrision	travis.morrison@boisforte-nsn.gov	Bois Forte Band of Chippewa	Bois Forte Tribal Government 5344 Lakeshore Drive Nett Lake, MN 55772	Electronic Service	No	SPL_SL__Tribal Government Contacts
Robert	Moyer, Jr.	rmoyer@boisforte-nsn.gov	Bois Forte Band of Chippewa Tribal Government	5344 Lakeshore Drive Nett Lake, MN 55772	Electronic Service	No	SPL_SL__Tribal Government Contacts
Sonny	Myers	smyers@1854treatyauthority.org	1854 Treaty Authority	4428 Haines Rd Duluth, MN 55811-1524	Electronic Service	No	SPL_SL__Tribal Government Contacts
Joseph	OBrien	joey.obrien@lowersioux.com	Lower Sioux Indian Community	39527 Highway 1 Morton, MN 56270	Electronic Service	No	SPL_SL__Tribal Government Contacts

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Kevin	OKeefe	kevin.okeefe@lowersioux.com	Lower Sioux Indian Community	39527 Highway 1 Morton, MN 56270	Electronic Service	No	SPL_SL__Tribal Government Contacts
Earl	Pendleton	earl.pendleton@lowersioux.com	Lower Sioux Indian Community	39527 Highway 1 Morton, MN 56270	Electronic Service	No	SPL_SL__Tribal Government Contacts
Joe	Plumer	joe.plumer@redlakenation.org	Red Lake Nation	15484 Migizi Drive Red Lake, MN 56671	Electronic Service	No	SPL_SL__Tribal Government Contacts
Robert	Prescott	robert.prescott@lowersioux.com	Lower Sioux Indian Community	39527 Highway 1 Morton, MN 56270	Electronic Service	No	SPL_SL__Tribal Government Contacts
Bill	Rudnicki	bill.rudnicki@shakopeedakota.org	Shakopee Mdewakanton Sioux Community	Shakopee Mdewakanton Sioux Community 2330 Sioux Trail NW Prior Lake, MN 55372	Electronic Service	No	SPL_SL__Tribal Government Contacts
Miranda	Sam	Miranda.Sam@lowersioux.com	Lower Sioux Indian Community	39527 Reservation Highway 1 PO Box 308 Morton, MN 56270	Electronic Service	No	SPL_SL__Tribal Government Contacts
Adam	Savariego	adams@uppersiouxcommunity-nsn.gov	Upper Sioux Community	5722 Travers Lane PO Box 147 Granite Falls, MN 56241	Electronic Service	No	SPL_SL__Tribal Government Contacts
Jessie	Seim	jessie.seim@piic.org	Prairie Island Indian Community	5636 Sturgeon Lake Rd Welch, MN 55089	Electronic Service	No	SPL_SL__Tribal Government Contacts
Darrell	Seki, Sr.	dseki@redlakenation.org	Red Lake Nation	15484 Migizi Drive Red Lake, MN 56671	Electronic Service	No	SPL_SL__Tribal Government Contacts

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Nizhoni	Smith	nizhoni.smith@lowersioux.com	Lower Sioux Indian Community	PO Box 308 39527 Reservation Highway 1 Morton, MN 56270	Electronic Service	No	SPL_SL__Tribal Government Contacts
Joel	Smith	jsmith@mnchippewatribe.org	Minnesota Chippewa Tribe	PO Box 217 Cass Lake, MN 56633	Electronic Service	No	SPL_SL__Tribal Government Contacts
Roger	Smith, Sr.	RogerMSmithSr@fdlrez.com	Fond du Lac Band of Lake Superior Chippewa	1720 Big Lake Road Cloquet, MN 55720	Electronic Service	No	SPL_SL__Tribal Government Contacts
Eugene	Sommers	eugene.sommers@whiteearth-nsn.gov	White Earth Nation	PO BOX 418 White Earth, MN 56591	Electronic Service	No	SPL_SL__Tribal Government Contacts
Marie	Spry	mariespry@grandportage.com	Grand Portage Band of Lake Superior Chippewa	PO Box 428 Grand Portage, MN 55605	Electronic Service	No	SPL_SL__Tribal Government Contacts
LeRoy	Staples Fairbanks III	leroy.fairbanks@llojibwe.net	Leech Lake Band of Ojibwe	190 Sailstar Drive NW Cass Lake, MN 56633	Electronic Service	No	SPL_SL__Tribal Government Contacts
Toby	Stephens	tobys@grandportage.com	Grand Portage Band of Lake Superior Chippewa	PO BOX 428 Grand Portage, MN 55605	Electronic Service	No	SPL_SL__Tribal Government Contacts
Samuel	Strong	Sam.strong@redlakenation.org	Red Lake Nation	15484 Migizi Drive Red Lake, MN 56671	Electronic Service	No	SPL_SL__Tribal Government Contacts
Camille	Tanhoff	kamip@uppersiouxcommunity-nsn.gov	Upper Sioux Community	5722 Travers Lane PO BOX 147 Granite Falls, MN 56241	Electronic Service	No	SPL_SL__Tribal Government Contacts
Caralyn	Trutna	carrie@uppersiouxcommunity-nsn.gov	Upper Sioux Community	Upper Sioux Community P.O. Box 147 Granite Falls, MN 55372	Electronic Service	No	SPL_SL__Tribal Government Contacts

First Name	Last Name	Email	Company Name	Address	Delivery Method	View Trade Secret	Service List Name
Heather	Westra	heather.westra@piic.org	Prairie Island Indian Community	5636 Sturgeon Lake Rd Welch, MN 55089	Electronic Service	No	SPL_SL__Tribal Government Contacts
Steve	White	steve.white@llojibwe.net	Leech Lake Band of Ojibwe	190 Sailstar Drive NW Cass Lake, MN 56633	Electronic Service	No	SPL_SL__Tribal Government Contacts
Cody	Whitebear	cody.whitebear@piic.org	Prairie Island Indian Community	5636 Sturgeon Lake Road Welch, MN 55089	Electronic Service	No	SPL_SL__Tribal Government Contacts
Virgil	Wind	virgil.wind@millelacsband.com	Mille Lacs Band of Ojibwe	43408 Oodena Drive Onamia, MN 56359	Electronic Service	No	SPL_SL__Tribal Government Contacts
Laurie	York	laurie.york@whiteearth-nsn.gov	White Earth Reservation Business Committee	PO Box 418 White Earth, MN 56591	Electronic Service	No	SPL_SL__Tribal Government Contacts
Ian	Young	IanYoung@FDLREZ.COM	Fond du Lac Band of Lake Superior Chippewa	1720 Big Lake Road Cloquet, MN 55720	Electronic Service	No	SPL_SL__Tribal Government Contacts

DEPARTMENT OF NATURAL RESOURCES

Formal Natural Heritage Review - Cover Page

See next page for results of review. A draft watermark means the project details have not been finalized and the results are not official.

Project Name: HVDC Modernization Project

Project Proposer: Minnesota Power

Project Type: Utilities, Transmission (electric, cable, phone)

Project Type Activities: Tree Removal;Waterbody, watercourse, streambed impacts (e.g., discharge, runoff, sedimentation, fill, excavation);Wetland impacts (e.g., discharge, runoff, sedimentation, fill, excavation)

TRS: T50 R15 S31, T50 R16 S36

County(s): St. Louis

DNR Admin Region(s): Northeast

Reason Requested: PUC Site or Route Application

Project Description: Transmission line and substation

Existing Land Uses: Forested, wetlands, existing right-of-way, agricultural

Landcover / Habitat Impacted: TBD

Waterbodies Affected: TBD

Groundwater Resources Affected: TBD

Previous Natural Heritage Review: No

Previous Habitat Assessments / Surveys: No

SUMMARY OF AUTOMATED RESULTS

Category	Results	Response By Category
Project Details	No Comments	No Further Review Required
Ecologically Significant Area	No Comments	No Further Review Required
State-Listed Endangered or Threatened Species	No Comments	No Further Review Required
State-Listed Species of Special Concern	Comments	Recommendations
Federally Listed Species	No Records	Visit IPaC For Federal Review

Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

November 11, 2022

Project ID: MCE #2022-00770

Mandy Bohnenblust
Merjent, Inc.
1 Main Street SE, Suite 300
Minneapolis, MN 55414

RE: Automated Natural Heritage Review of the proposed HVDC Modernization Project
See Cover Page for location and project details.

Dear Mandy Bohnenblust,

As requested, the above project has been reviewed for potential effects to rare features. Based on this review, the following rare features may be adversely affected by the proposed project:

Project Type and/or Project Type Activity Comments

- The Natural Heritage Information System (NHIS) tracks bat roost trees and hibernacula plus some acoustic data, but this information is not exhaustive. Even if there are no bat records listed below, all seven of Minnesota's bats, including the federally threatened northern long-eared bat (*Myotis septentrionalis*), can be found throughout Minnesota. Tree removal can negatively impact bats by destroying roosting habitat, especially during the pup rearing season when females are forming maternity roosting colonies and the pups cannot yet fly. To minimize these impacts, the DNR recommends that tree removal be avoided during the months of June and July.

Ecologically Significant Area

No ecologically significant areas have been documented in the vicinity of the project.

State-Listed Endangered or Threatened Species

No state-listed endangered or threatened species have been documented in the vicinity of the project.

State-Listed Species of Special Concern

Taxonomic Group	**Common Name**	**Scientific Name**	**Water Regime**	**Habitat**	**Federal Status**
Vertebrate Animal	Northern Goshawk	Accipiter gentilis		Mesic Hardwood Forest, Fire Dependent Forest	

- The above table identifies state-listed species of special concern that have been documented in the vicinity of your project. If suitable habitat for any of these species occurs within your project footprint or activity impact area, the project may negatively impact those species. To avoid impacting state-listed species of special concern, the DNR recommends modifying the location of project activities to avoid suitable habitat or modifying the timing of project activities to avoid the presence of the species. Please visit the DNR Rare Species Guide for more information on the habitat use of these species and recommended measures to avoid or minimize impacts. For further assistance, please contact the appropriate DNR Regional Nongame Specialist or Regional Ecologist. Species-specific comments, if any, appear below.

Federally Listed Species

The Natural Heritage Information System does not contain any records for federally listed species within one mile of the proposed project. However, to ensure compliance with federal law, please conduct a federal regulatory review using the U.S. Fish and Wildlife Service's online Information for Planning and Consultation (IPaC) tool.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area. If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location and the project description provided on the cover page. If project details change or construction has not occurred within one year, please resubmit the project for review.

The Natural Heritage Review does not constitute project approval by the Department of Natural Resources. Instead, it identifies issues regarding known occurrences of rare features and potential effects to these rare features. For information on the environmental review process or other natural resource concerns, you may contact your DNR Regional Environmental Assessment Ecologist.

Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources.

Sincerely,

Samantha Bump

Samantha Bump
Natural Heritage Review Specialist
Samantha.Bump@state.mn.us

Links: USFWS Information for Planning and Consultation (IPaC) tool
[Information for Planning and Consultation (IPaC) tool](https://ipac.ecosphere.fws.gov/)
DNR Regional Environmental Assessment Ecologist Contact Info
https://www.dnr.state.mn.us/eco/ereview/erp_regioncontacts.html

HVDC Modernization Project

Aerial Imagery With Locator Map

🟥 Project Boundary

Project Type: Utilities, Transmission (electric, cable, phone)

Project Size (acres): 356.38

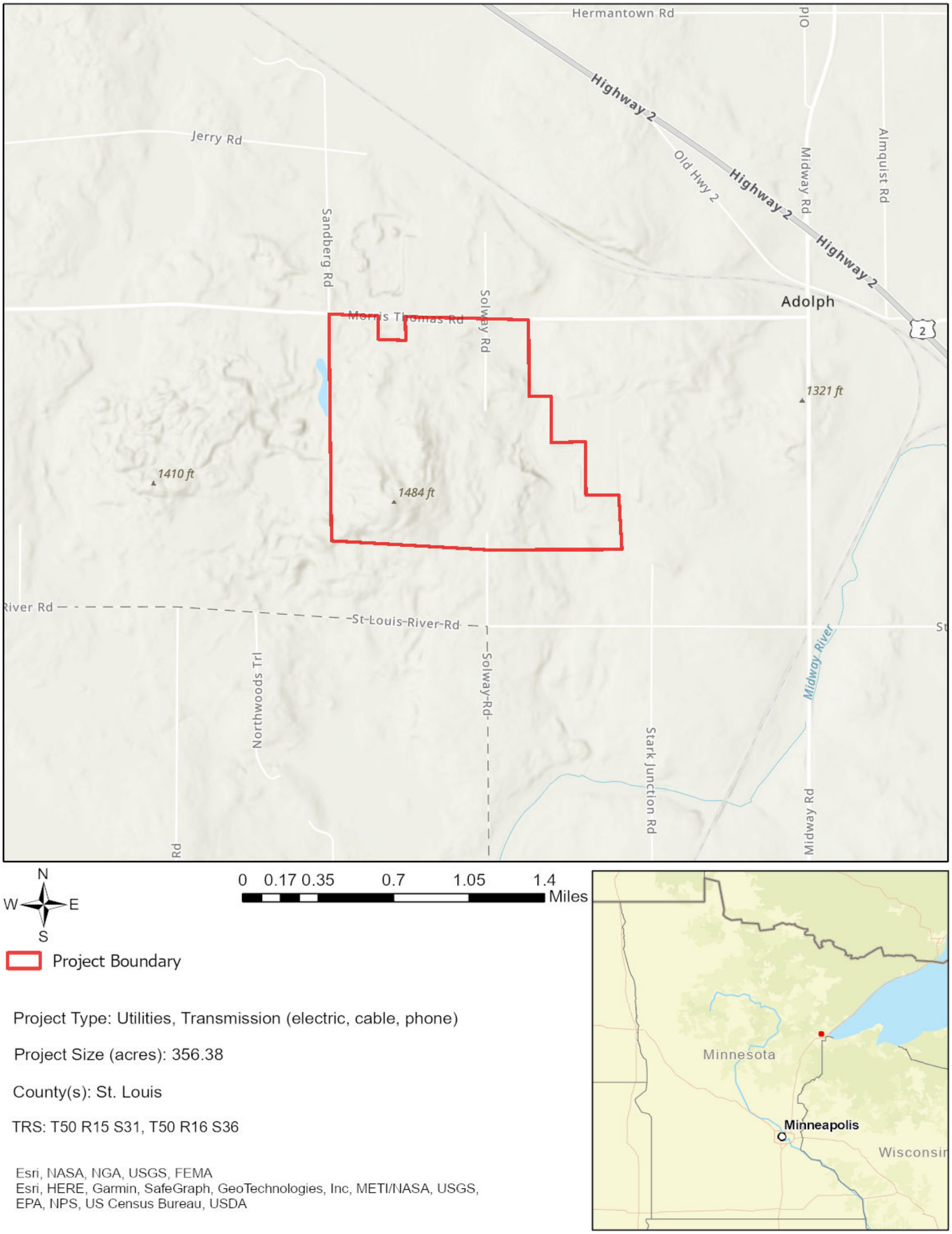
County(s): St. Louis

TRS: T50 R15 S31, T50 R16 S36

Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA
Earthstar Geographics

HVDC Modernization Project

USA Topo Basemap With Locator Map



🟥 Project Boundary

Project Type: Utilities, Transmission (electric, cable, phone)

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TRS: T50 R15 S31, T50 R16 S36

Esri, NASA, NGA, USGS, FEMA
Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793 Fax: (952) 646-2873

In Reply Refer To:
Project Code: 2023-0053398
Project Name: HVDC Modernization Project

April 17, 2023

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

This response has been generated by the Information, Planning, and Conservation (IPaC) system to provide information on natural resources that could be affected by your project. The U.S. Fish and Wildlife Service (Service) provides this response under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq.*).

Threatened and Endangered Species
The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and may be affected by your proposed project. The species list fulfills the requirement for obtaining a Technical Assistance Letter from the U.S. Fish and Wildlife Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the ECOS IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance
Please refer to refer to our Section 7 website for guidance and technical assistance, including step-by-step instructions for making effects determinations for each species that might be present and for specific guidance on the following types of projects: projects in developed areas, HUD, CDBG, EDA, USDA Rural Development projects, pipelines, buried utilities, telecommunications, and requests for a Conditional Letter of Map Revision (CLOMR) from FEMA.

We recommend running the project (if it qualifies) through our **Minnesota-Wisconsin Federal Endangered Species Determination Key (Minnesota-Wisconsin ("D-key"))**. A demonstration video showing how-to access and use the determination key is available. Please note that the Minnesota-Wisconsin D-key is the third option of 3 available d-keys. D-keys are tools to help Federal agencies and other project proponents determine if their proposed action has the potential to adversely affect federally listed species and designated critical habitat. The Minnesota-Wisconsin D-key includes a structured set of questions that assists a project proponent in determining whether a proposed project qualifies for a certain predetermined consultation outcome for all federally listed species found in Minnesota and Wisconsin (except for the northern long-eared bat- see below), which includes determinations of “no effect” or “may affect, not likely to adversely affect." In each case, the Service has compiled and analyzed the best available information on the species’ biology and the impacts of certain activities to support these determinations.

If your completed d-key output letter shows a "No Effect" (NE) determination for all listed species, print your IPaC output letter for your files to document your compliance with the Endangered Species Act.

For Federal projects with a “Not Likely to Adversely Affect” (NLAA) determination, our concurrence becomes valid if you do not hear otherwise from us after a 30-day review period, as indicated in your letter.

If your d-key output letter indicates additional coordination with the Minnesota-Wisconsin Ecological Services Field Office is necessary (i.e., you get a “May Affect” determination), you will be provided additional guidance on contacting the Service to continue ESA coordination outside of the key; ESA compliance cannot be concluded using the key for “May Affect” determinations unless otherwise indicated in your output letter.

Note: Once you obtain your official species list, you are not required to continue in IPaC with d-keys, although in most cases these tools should expedite your review. If you choose to make an effects determination on your own, you may do so. If the project is a Federal Action, you may want to review our section 7 step-by-step instructions before making your determinations.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of “There are no listed species found within the vicinity of the project,” then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **no effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.
2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project – other than bats (see below) – then project proponents must determine if proposed activities will have **no effect** on or **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain Life History Information for Listed and Candidate Species on our office website. If no impacts will occur to a species on the IPaC species list (e.g., there is no habitat present in the project area), the appropriate determination is **no effect**. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.

3. Should you determine that project activities **may affect** any federally listed, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

Northern Long-Eared Bats
Northern long-eared bats occur throughout Minnesota and Wisconsin and the information below may help in determining if your project may affect these species.

This species hibernates in caves or mines only during the winter. In Minnesota and Wisconsin, the hibernation season is considered to be November 1 to March 31. During the active season (April 1 to October 31) they roost in forest and woodland habitats. Suitable summer habitat for northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches dbh for northern long-eared bat that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat and evaluated for use by bats. If your project will impact caves or mines or will involve clearing forest or woodland habitat containing suitable roosting habitat, northern long-eared bats could be affected.

Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas,
- Trees found in highly developed urban areas (e.g., street trees, downtown areas),
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees, and
- A monoculture stand of shrubby vegetation with no potential roost trees.

If IPaC returns a result that northern long-eared bats are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** this species **IF** one or more of the following activities are proposed:

- Clearing or disturbing suitable roosting habitat, as defined above, at any time of year,
- Any activity in or near the entrance to a cave or mine,
- Mining, deep excavation, or underground work within 0.25 miles of a cave or mine,
- Construction of one or more wind turbines, or
- Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on the northern long-eared bat. Concurrence from the Service is not required for **No**

Effect determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.

If any of the above activities are proposed, and the northern long-eared bat appears on the user's species list, the federal project user will be directed to either the range-wide northern long-eared bat D-key or the Federal Highways Administration, Federal Railways Administration, and Federal Transit Administration Indiana bat/Northern long-eared bat D-key, depending on the type of project and federal agency involvement. Similar to the Minnesota-Wisconsin D-key, these d-keys helps to determine if prohibited take might occur and, if not, will generate an automated verification letter.

Please note: On November 30, 2022, the Service published a proposal final rule to reclassify the northern long-eared bat as endangered under the Endangered Species Act. On January 26, 2023, the Service published a 60-day extension for the final reclassification rule in the Federal Register, moving the effective listing date from January 30, 2023, to March 31, 2023. This extension will provide stakeholders and the public time to preview interim guidance and consultation tools before the rule becomes effective. When available, the tools will be available on the Service's northern long-eared bat website (https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis). Once the final rule goes into effect on March 31, 2023, the 4(d) D-key will no longer be available (4(d) rules are not available for federally endangered species) and will be replaced with a new Range-wide NLEB D-key (range-wide d-key). For projects not completed by March 31, 2023, that were previously reviewed under the 4(d) d-key, there may be a need for reinitiation of consultation. For these ongoing projects previously reviewed under the 4(d) d-key that may result in incidental take of the northern long-eared bat, we recommend you review your project using the new range-wide d-key once available. If your project does not comply with the range-wide d-key, it may be eligible for use of the Interim (formal) Consultation framework (framework). The framework is intended to facilitate the transition from the 4(d) rule to typical Section 7 consultation procedures for federally endangered species and will be available only until spring 2024. Again, when available, these tools (new range-wide d-key and framework) will be available on the Service's northern long-eared bat website.

Whooping Crane

Whooping crane is designated as a non-essential experimental population in Wisconsin and consultation under Section 7(a)(2) of the Endangered Species Act is only required if project activities will occur within a National Wildlife Refuge or National Park. If project activities are proposed on lands outside of a National Wildlife Refuge or National Park, then you are not required to consult. For additional information on this designation and consultation requirements, please review "Establishment of a Nonessential Experimental Population of Whooping Cranes in the Eastern United States."

Other Trust Resources and Activities

Bald and Golden Eagles - Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. Should bald or golden eagles occur within or near the project area please contact our office for further coordination. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds - The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA to proactively prevent the mortality of migratory birds whenever possible and we encourage implementation of recommendations that minimize potential impacts to migratory birds. Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers - Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed voluntary guidelines for minimizing impacts.

Transmission Lines - Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to guidelines developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy - To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's Wind Energy Guidelines. In addition, please refer to the Service's Eagle Conservation Plan Guidance, which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

State Department of Natural Resources Coordination
While it is not required for your Federal section 7 consultation, please note that additional state endangered or threatened species may also have the potential to be impacted. Please contact the Minnesota or Wisconsin Department of Natural Resources for information on state listed species that may be present in your proposed project area.

Minnesota
Minnesota Department of Natural Resources - Endangered Resources Review Homepage
Email: Review.NHIS@state.mn.us

Wisconsin
Wisconsin Department of Natural Resources - Endangered Resources Review Homepage
Email: DNRERReview@wi.gov

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
(952) 858-0793

PROJECT SUMMARY

Project Code:	2023-0053398
Project Name:	HVDC Modernization Project
Project Type:	Power Gen - Other
Project Description:	Substation and transmission line upgrades

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@46.77392155,-92.30419799352683,14z

Counties: St. Louis County, Minnesota

ENDANGERED SPECIES ACT SPECIES

There is a total of 6 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Canada Lynx *Lynx canadensis* Population: Wherever Found in Contiguous U.S. There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3652	Threatened
Gray Wolf *Canis lupus* Population: MN There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4488	Threatened
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Piping Plover *Charadrius melodus* Population: [Great Lakes watershed DPS] - Great Lakes, watershed in States of IL, IN, MI, MN, NY, OH, PA, and WI and Canada (Ont.) There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10

NAME	BREEDING SEASON
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Canada Warbler *Cardellina canadensis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Evening Grosbeak *Coccothraustes vespertinus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Aug 10
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31
Golden-winged Warbler *Vermivora chrysoptera* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (🟩)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

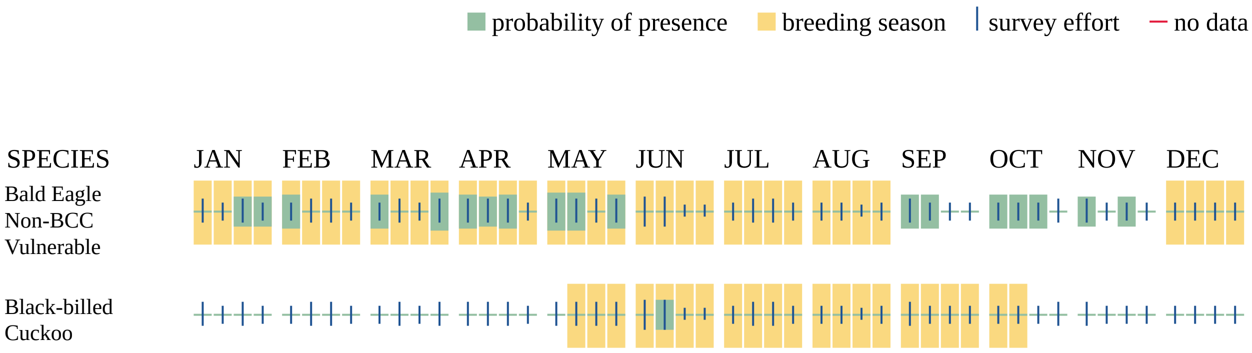
1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (🟨)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

MIGRATORY BIRDS FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and

3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER EMERGENT WETLAND

- PEM1A
- PEM1D
- PEM1C

FRESHWATER POND

- PUBGx
- PABG

FRESHWATER FORESTED/SHRUB WETLAND

- PSS1D
- PSS1C
- PSS1/EM1A

RIVERINE

- R3UBH

IPAC USER CONTACT INFORMATION

Agency: Merjent Inc.
Name: Mandy Bohnenblust
Address: 1 Main St SE, Suite 300
City: Minneapolis
State: MN
Zip: 55414
Email mandy.bohnenblust@merjent.com
Phone: 6127463677

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Army Corps of Engineers

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793 Fax: (952) 646-2873

In Reply Refer To: April 18, 2023
Project code: 2023-0053398
Project Name: HVDC Modernization Project

Federal Nexus: yes
Federal Action Agency (if applicable): Army Corps of Engineers

Subject: Technical assistance for 'HVDC Modernization Project'

Dear Mandy Bohnenblust:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on April 18, 2023, for 'HVDC Modernization Project' (here forward, Project). This project has been assigned Project Code 2023-0053398 and all future correspondence should clearly reference this number. **Please carefully review this letter. Your Endangered Species Act (Act) requirements are not complete.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into the IPaC must accurately represent the full scope and details of the Project. Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat Rangewide Determination Key (Dkey), invalidates this letter.

Determination for the Northern Long-Eared Bat

Based upon your IPaC submission and a standing analysis, your project is not reasonably certain to cause incidental take of the northern long-eared bat. Unless the Service advises you within 15 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the Action is not likely to result in unauthorized take of the northern long-eared bat.

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination for the northern long-eared bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Canada Lynx *Lynx canadensis* Threatened
- Gray Wolf *Canis lupus* Threatened
- Monarch Butterfly *Danaus plexippus* Candidate
- Piping Plover *Charadrius melodus* Endangered
- Tricolored Bat *Perimyotis subflavus* Proposed Endangered

You may coordinate with our Office to determine whether the Action may cause prohibited take of the animal species listed above. Note that if a new species is listed that may be affected by the identified action before it is complete, additional review is recommended to ensure compliance with the Endangered Species Act.

Next Step

Consultation with the Service is necessary. The project has a federal nexus (e.g., Federal funds, permit, etc.), but you are not the federal action agency or its designated (in writing) non-federal representative. Therefore, the ESA consultation status is incomplete and no project activities should occur until consultation between the Service and the Federal action agency (or designated non-federal representative), is completed.

As the federal agency or designated non-federal representative deems appropriate, they should submit their determination of effects to the Service by doing the following.

1. Log into IPaC using an agency email account and click on My Projects, click "Search by record locator" to find this Project using **610-124710504**. (Alternatively, the originator of the project in IPaC can add the agency representative to the project by using the Add Member button on the project home page.)
2. Review the answers to the Northern Long-eared Bat Range-wide Determination Key to ensure that they are accurate.
3. Click on Review/Finalize to convert the ‘not likely to adversely affect’ consistency letter to a concurrence letter. Download the concurrence letter for your files if needed.

If no changes occur with the Project or there are no updates on listed species, no further consultation/coordination for this project is required for the northern long-eared bat. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions occurs, additional coordination with the Service should take place before project implements any changes which are final or commits additional resources.

If you have any questions regarding this letter or need further assistance, please contact the Minnesota-Wisconsin Ecological Services Field Office and reference Project Code 2023-0053398 associated with this Project.

Action Description

You provided to IPaC the following name and description for the subject Action.

1. Name

HVDC Modernization Project

2. Description

The following description was provided for the project 'HVDC Modernization Project':

> Substation and transmission line upgrades

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@46.77392155,-92.30419799352683,14z

DETERMINATION KEY RESULT

Based on the answers provided, the proposed Action is consistent with a determination of "may affect, but not likely to adversely affect" for the Endangered northern long-eared bat (*Myotis septentrionalis*).

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of the northern long-eared bat or any other listed species?

   Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

   No

2. Do you have post-white nose syndrome occurrence data that indicates that northern long-eared bats (NLEB) are likely to be present in the action area?

   Bat occurrence data may include identification of NLEBs in hibernacula, capture of NLEBs, tracking of NLEBs to roost trees, or confirmed acoustic detections. With this question, we are looking for data that, for some reason, may have not yet been made available to U.S. Fish and Wildlife Service.

   No

3. Does any component of the action involve construction or operation of wind turbines?

   Note: For federal actions, answer 'yes' if the construction or operation of wind power facilities is either (1) part of the federal action or (2) would not occur but for a federal agency action (federal permit, funding, etc.).

   No

4. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

   Yes

5. Is the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), or Federal Transit Administration (FTA) funding or authorizing the proposed action, in whole or in part?

   No

6. Are you an employee of the federal action agency or have you been officially designated in writing by the agency as its designated non-federal representative for the purposes of Endangered Species Act Section 7 informal consultation per 50 CFR § 402.08?

   Note: This key may be used for federal actions and for non-federal actions to facilitate section 7 consultation and to help determine whether an incidental take permit may be needed, respectively. This question is for information purposes only.

   No

7. Is the lead federal action agency the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC)? Is the Environmental Protection Agency (EPA) or Federal Communications Commission (FCC) funding or authorizing the proposed action, in whole or in part?

   No

8. Have you determined that your proposed action will have no effect on the northern long-eared bat? Remember to consider the effects of any activities that would not occur but for the proposed action.

   If you think that the northern long-eared bat may be affected by your project or if you would like assistance in deciding, answer “No” below and continue through the key. If you have determined that the northern long-eared bat does not occur in your project’s action area and/or that your project will have no effects whatsoever on the species despite the potential for it to occur in the action area, you may make a “no effect” determination for the northern long-eared bat.

   Note: Federal agencies (or their designated non-federal representatives) must consult with USFWS on federal agency actions that may affect listed species [50 CFR 402.14(a)]. Consultation is not required for actions that will not affect listed species or critical habitat. Therefore, this determination key will not provide a consistency or verification letter for actions that will not affect listed species. If you believe that the northern long-eared bat may be affected by your project or if you would like assistance in deciding, please answer “No” and continue through the key. Remember that this key addresses only effects to the northern long-eared bat. Consultation with USFWS would be required if your action may affect another listed species or critical habitat. The definition of Effects of the Action can be found here: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

   No

9. Does the action area contain any caves (or associated sinkholes, fissures, or other karst features), mines, rocky outcroppings, or tunnels that could provide habitat for hibernating northern long-eared bats?

   No

10. Does the action area contain or occur within 0.5 miles of (1) talus or (2) anthropogenic or naturally formed rock crevices in rocky outcrops, rock faces or cliffs?

    No

11. Is suitable summer habitat for the northern long-eared bat present within 1000 feet of project activities?
    (If unsure, answer "Yes.")

    Note: If there are trees within the action area that are of a sufficient size to be potential roosts for bats (i.e., live trees and/or snags ≥3 inches (12.7 centimeter) dbh), answer "Yes". If unsure, additional information defining suitable summer habitat for the northern long-eared bat can be found at: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

    Yes
12. Will the action cause effects to a bridge?

    No
13. Will the action result in effects to a culvert or tunnel?

    No
14. Does the action include the intentional exclusion of northern long-eared bats from a building or structure?

    Note: Exclusion is conducted to deny bats' entry or reentry into a building. To be effective and to avoid harming bats, it should be done according to established standards. If your action includes bat exclusion and you are unsure whether northern long-eared bats are present, answer "Yes." Answer "No" if there are no signs of bat use in the building/structure. If unsure, contact your local U.S. Fish and Wildlife Services Ecological Services Field Office to help assess whether northern long-eared bats may be present. Contact a Nuisance Wildlife Control Operator (NWCO) for help in how to exclude bats from a structure safely without causing harm to the bats (to find a NWCO certified in bat standards, search the Internet using the search term "National Wildlife Control Operators Association bats"). Also see the White-Nose Syndrome Response Team's guide for bat control in structures

    No
15. Does the action involve removal, modification, or maintenance of a human-made structure (barn, house, or other building) **known or suspected to contain roosting bats?**

    No
16. Will the action cause construction of one or more new roads open to the public?

    For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.).

    No
17. Will the action include or cause any construction or other activity that is reasonably certain to increase average daily traffic on one or more existing roads?

    Note: For federal actions, answer 'yes' when the construction or operation of these facilities is either (1) part of the federal action or (2) would not occur but for an action taken by a federal agency (federal permit, funding, etc.). .

    Yes

18. Will the increased vehicle traffic occur on any road that lies between any two areas of contiguous forest that are each greater than or equal to 10 acres in extent and are separated by less than 1,000 feet? Northern long-eared bats may cross a road by flying between forest patches that are up to 1,000 feet apart.

    Note: "Contiguous forest" of 10 acres or more may includes areas where multiple forest patches are separated by less than 1,000 feet of non-forested area if the forested patches, added together, comprise at least 10 acres.

    Yes

19. For every 1,000 feet of new road that crosses between contiguous forest patches, will there be at least one place where bats could cross the road corridor by flying less than 33 feet (10 meters) between trees whose tops are at least 66 feet (20 meters) higher than the road surface?

    Yes

20. Will the proposed action involve the creation of a new water-borne contaminant source (e.g., leachate pond pits containing chemicals that are not NSF/ANSI 60 compliant)?

    No

21. Will the proposed action involve the creation of a new point source discharge from a facility other than a water treatment plant or storm water system?

    No

22. Will the action include drilling or blasting?

    No

23. Will the action involve military training (e.g., smoke operations, obscurant operations, exploding munitions, artillery fire, range use, helicopter or fixed wing aircraft use)?

    No

24. Will the proposed action involve the use of herbicides or pesticides other than herbicides (e.g., fungicides, insecticides, or rodenticides)?

    No

25. Will the action include or cause activities that are reasonably certain to cause chronic nighttime noise in suitable summer habitat for the northern long-eared bat? Chronic noise is noise that is continuous or occurs repeatedly again and again for a long time.

    Note: Additional information defining suitable summer habitat for the northern long-eared bat can be found at: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

    No

26. Does the action include, or is it reasonably certain to cause, the use of artificial lighting within 1000 feet of suitable northern long-eared bat roosting habitat?

    Note: Additional information defining suitable roosting habitat for the northern long-eared bat can be found at: https://www.fws.gov/media/northern-long-eared-bat-assisted-determination-key-selected-definitions

    Yes

27. Will the action use only downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting)
    when installing new or replacing existing permanent lights? Or for those transportation agencies using the Backlight, Uplight, Glare (BUG) system developed by the Illuminating Engineering Society, will all three ratings (backlight, uplight, and glare) be as close to zero as is possible, with a priority of "uplight" of 0?

    Yes

28. Will the action direct any temporary lighting away from suitable northern long-eared bat roosting habitat during the active season?

    Note: Active season dates for northern long-eared bat can be found here: https://www.fws.gov/media/inactive-season-dates-swarming-and-staging-areas.

    Yes

29. Will the action include tree cutting or other means of knocking down or bringing down trees, tree topping, or tree trimming?

    Yes

30. Has a presence/probable absence summer bat survey targeting the northern long-eared bat following the Service's Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines been conducted within the project area? If unsure, answer "No."

    No

31. Does the action include emergency cutting or trimming of hazard trees in order to remove an imminent threat to human safety or property? See hazard tree note at the bottom of the key for text that will be added to response letters

    Note: A "hazard tree" is a tree that is an immediate threat to lives, public health and safety, or improved property and has a diameter breast height of six inches or greater.

    No

32. Are any of the trees proposed for cutting or other means of knocking down, bringing down, topping, or trimming suitable for northern long-eared bat roosting (i.e., live trees and/or snags ≥3 inches dbh that have exfoliating bark, cracks, crevices, and/or cavities)?

    Yes

33. [Semantic] Does your project intersect a known sensitive area for the northern long-eared bat?

    Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your state agency or USFWS field office

    Automatically answered
    No

34. Will all tree cutting/trimming or other knocking or bringing down of trees be restricted to the inactive season for the northern long-eared bat?

    Note: Inactive Season dates for summer habitat outside of staging and swarming areas can be found here: https://www.fws.gov/media/inactive-season-dates-swarming-and-staging-areas.

    Yes

35. Will the action cause trees to be cut, knocked down, or otherwise brought down across an area greater than 10 acres?

    Yes

PROJECT QUESTIONNAIRE

Enter the extent of the action area (in acres) from which trees will be removed - round up to the nearest tenth of an acre. For this question, include the entire area where tree removal will take place, even if some live or dead trees will be left standing.

100

In what extent of the area (in acres) will trees be cut, knocked down, or trimmed during the inactive (hibernation) season for northern long-eared bat? **Note:** Inactive Season dates for spring staging/fall swarming areas can be found here: https://www.fws.gov/media/inactive-season-dates-swarming-and-staging-areas

50

In what extent of the area (in acres) will trees be cut, knocked down, or trimmed during the active (non-hibernation) season for northern long-eared bat? **Note:** Inactive Season dates for spring staging/fall swarming areas can be found here: https://www.fws.gov/media/inactive-season-dates-swarming-and-staging-areas

0

Will all potential northern long-eared bat (NLEB) roost trees (trees ≥3 inches diameter at breast height, dbh) be cut, knocked, or brought down from any portion of the action area greater than or equal to 0.1 acre? If all NLEB roost trees will be removed from multiple areas, select ‘Yes’ if the cumulative extent of those areas meets or exceeds 0.1 acre.

Yes

Enter the extent of the action area (in acres) from which all potential NLEB roost trees will be removed. If all NLEB roost trees will be removed from multiple areas, entire the total extent of those areas. Round up to the nearest tenth of an acre.

50

For the area from which all potential northern long-eared bat (NLEB) roost trees will be removed, on how many acres (round to the nearest tenth of an acre) will trees be allowed to regrow? Enter ‘0’ if the entire area from which all potential NLEB roost trees are removed will be developed or otherwise converted to non-forest for the foreseeable future.

0

Will any snags (standing dead trees) ≥3 inches dbh be left standing in the area(s) in which all northern long-eared bat roost trees will be cut, knocked down, or otherwise brought down?

No

Will all project activities by completed by April 1, 2024?

No

IPAC USER CONTACT INFORMATION

Agency:	Merjent Inc.
Name:	Mandy Bohnenblust
Address:	1 Main St SE, Suite 300
City:	Minneapolis
State:	MN
Zip:	55414
Email	mandy.bohnenblust@merjent.com
Phone:	6127463677

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Army Corps of Engineers

AFFIDAVIT OF MAILING

In the Matter of the Application for a Certificate of Need and Route Permit for the HVDC Modernization Project in St. Louis County

PUC Docket No. CN-22-607/TL-22-611

STATE OF MINNESOTA)
) SS.
COUNTY OF HENNEPIN)

I, Daniel S. Flo, hereby certify that on the 3rd day of April 2023, I directed to be sent via U.S. Mail a true and correct copy of the Direct Mail Notice Letter attached hereto as Exhibit 1 to all Tribal Government Officials and Local Governments and Government Officials on the mailing list attached hereto as Exhibit 2.

MELISSA ADELE DELLWO
NOTARY PUBLIC
MINNESOTA
My Commission Expires 1-31-24

Daniel S. Flo

Subscribed and sworn to before me
this 6 day of April 2023.

Notary Public

EXHIBIT 1

April 3, 2023

NOTICE OF PROPOSED TRANSMISSION LINE PROJECT

Re: In the Matter of the Application for a Certificate of Need and Route Permit for the HVDC Modernization Project
MPUC Docket Nos. E015/CN-22-607; E015/TL-22-611

PLEASE TAKE NOTICE that Minnesota Power ("Company") is applying to the Minnesota Public Utilities Commission ("Commission") for a Certificate of Need and Route Permit to modernize and upgrade its existing High-Voltage Direct-Current ("HVDC") terminal near the Arrowhead Substation in Hermantown Minnesota ("HVDC Modernization Project," or "Project").

<u>Project Description</u>

Minnesota Power intends to submit a combined application for a Certificate of Need and a Route Permit to modernize and upgrade its existing High-Voltage Direct-Current ("HVDC") terminal near the Arrowhead Substation located in Hermantown Minnesota ("HVDC Modernization Project" or "Project"). The Project would require modernizing and upgrading both HVDC terminals for the 465-mile-long HVDC transmission line ("HVDC Line") and interconnecting the upgraded HVDC terminals to the existing alternating-current ("AC") transmission system. These HVDC terminals are currently located near the Arrowhead Substation in Hermantown, Minnesota and the Center Substation in Center, North Dakota. In order to modernize the HVDC terminals and implement the latest technology, new buildings and electrical infrastructure need to be constructed on a new site near the existing HVDC terminals. In Minnesota, to connect the new HVDC terminal to the existing AC system, the Project would require the construction of a new St Louis County 345-kilovolt ("kV")/230-kV substation located less than one mile west of the current Arrowhead Substation. The new HVDC terminal would be connected to the St Louis County Substation by less than one mile of 345-kV large high-voltage transmission line ("LHVTL")[1] and the new St Louis County Substation would be connected to the existing Arrowhead Substation by two parallel 230-kV LHVTLs less than one mile in length. Additionally, a short portion of the existing ±250-kV HVDC Line in Minnesota will need to be reconfigured to terminate at the new HVDC terminal.

The Project will be designed to provide voltage regulation, frequency response, blackstart capability, and bidirectional power transfer capability; all of which will enable

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[1] As defined by Minn. Stat. § 216B.2421, subd. 2(2); Minn. R. 7849.0010, subp. 14. The exemption found in Minn. Stat. 216B.243, subd. 8(a)(4) for "a high-voltage transmission line of one mile or less required to connect a new or upgraded substation to an existing, new, or upgraded high-voltage transmission line" does not apply because the proposed LHVTL in Minnesota is greater than one mile in length.

EXHIBIT 1

Minnesota Power and the region to continue to support our clean energy transition. The Project is currently scheduled to be in service in 2027.

A map of the area under consideration for the proposed Project is attached to this letter as **Figure 1**.

Project Need

The HVDC Modernization Project is needed to modernize aging HVDC assets, continue to position the transmission grid for clean energy transition, and improve the reliability of the transmission system in Minnesota and North Dakota. The existing HVDC terminal has operated for 45 years, 15 years over its 30-year design life. In recent years, Minnesota Power has experienced HVDC terminal outages due to failures in the control system, power electronics, transformers, and other components. Based on experience with other electric system components, the failure rate is expected to increase in both frequency and duration, which is of particular concern for the existing HVDC system because of limited parts availability. The orderly replacement of the HVDC terminal equipment is prudent to ensure continuous efficient delivery (and potential expansion) of Minnesota Power's renewable, carbon-free energy resources into the future.

Further information on the Project need is available on Minnesota Power's website: https://www.mnpower.com/Company/Transmission.

Regulatory Review Process

Before Minnesota Power can construct the Project, the Commission must determine whether the Project is needed (Certificate of Need) and if so, will determine the route along which the Project will be built (Route Permit).

The Certificate of Need process is governed by Minnesota law, including Minnesota Statutes section 216B.243, and Minnesota Rules Chapter 7849, specifically Rules 7849.0010 to 7849.0400 and 7849.1000 to 7849.2100. A copy of the Certificate of Need application, once submitted, can be obtained by visiting the Commission's website at https://mn.gov/puc/ in Docket No. E015/CN-22-607.

In addition to certifying the need for the Project, the Commission must also grant a Route Permit for the Project. The routing of the Project is governed by Minnesota law, including Minnesota Statutes Chapter 216E, and Minnesota Rules Chapters 4410 and 7850. A copy of the Route Permit application, once submitted, can be obtained by visiting the Commission's website (above) in Docket No. E015/TL-22-611.

The Commission will not make these determinations until it has completed a thorough review process that encourages public involvement and analyzes the impacts of the Project and various route alternatives. This process includes preparation of an Environmental Assessment ("EA") on the Project by the Minnesota Department of Commerce's Energy Environmental Review and Analysis ("EERA") staff.

Minnesota Power will submit an application for a Route Permit with one proposed route for the terminal and associated transmission lines. Other routes can be proposed to be evaluated during the scoping process. The Commission and the EERA staff will decide which routes get studied and considered for approval. Routes that have been shown at public meetings are preliminary and subject to change. In addition, other, new routes may also be studied and considered for approval.

The Commission will review all of the data from the public process and will decide if the Project is needed and which route should be approved. Selection of a final route by the Commission will be based on an evaluation of the routes guided by the factors identified in Minnesota Statutes section 216E.03, Minnesota Rules part 7850.4100, and stakeholder input received during the regulatory process.

The table below provides a high-level summary of the major steps in the regulatory process.

Summary of Regulatory Schedule Following Minnesota Law

Action	Approximate Date
Pre-Application study and public meetings and stakeholder outreach	Fall 2022 to Spring 2023
Certificate of Need and Route Permit Applications submitted to Commission	Spring 2023
Informational and Scoping Meetings (public meeting and comment)	Summer 2023
Draft Environmental Assessment Issued (public meeting and comment period)	Summer 2023
Public Hearings (public meeting and comment period)	Summer 2023
Commission Decision	Fall 2023

Right-of-Way for the Project

Before beginning construction, Minnesota Power will acquire property rights for the right-of-way, through either fee acquisition of property or an easement that will be negotiated with the landowner for each parcel. Minnesota Power anticipates acquiring easements with a typical right-of-way approximately 150 feet wide for the 345-kV transmission line, 130 feet wide for each 230-kV transmission line, and 150 feet wide for the ±250-kV HVDC Line. Where these transmission lines parallel existing lines, less new right-of-way may be required because the new transmission line may share a portion of the existing right-of-way.

EXHIBIT 1

Additional Information and Mailing Lists

To subscribe to the Project's Certificate of Need docket and to receive email notifications when information is filed in that docket, please visit https://mn.gov/puc/, click on "eDockets," then click on "Go to eDockets Project Database," and then click on "eFiling Home/Login" in the left menu. Then, click on the "Subscribe to Dockets" button, enter your email address, and select "Docket Number" from the Type of Subscriptions dropdown box, and select "[22]" from the first Docket number drop down box and enter "[607]" 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 (22-611).

If you would like to have your name added to the Project Route Permit proceeding mailing list (MPUC Docket No. E015/TL-22-611) you 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 (regular mail or email) and 2) your complete mailing or email address. You may also find information about the Project on the Department of Commerce's webpage at https://mn.gov/eera/web/page/home/ by clicking "Transmission Lines" and locating the Project in the list. Please be aware that the Project may not be listed at this location until the Route Permit application is submitted.

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. E015/CN-22-607), mail, fax, or email Robin Benson at Minnesota Public Utilities Commission, 121 7th Place E., Suite 350, St. Paul, MN 55101-2147, Fax: 651-297-7073 or robin.benson@state.mn.us.

If you have questions about the state regulatory process, you may contact the Minnesota state regulatory staff listed below:

Minnesota Public Utilities Commission
Mike Kaluzniak
121 7th Place East, Suite 350
St. Paul, Minnesota 55101
(651) 296-7124
1-800-657-3782
mike.kaluzniak@state.mn.us
https://mn.gov/puc/

Minnesota Department of Commerce EERA
Jenna Ness
85 7th Place East, Suite 280
St. Paul, Minnesota 55101
(651) 539-1844
1-800-657-3710
jenna.ness@state.mn.us
https://mn.gov/eera/

Please visit the Minnesota Power's website at: https://www.mnpower.com/Company/Transmission for more information.

EXHIBIT 1

Project phone and e-mail addresses are:

Project Phone Number – (218) 355-3515

Project E-mail Address – askus@mnpower.com

Transmission Planning Process in Minnesota

Minnesota Statutes section 216B.2425 requires that each electric transmission-owning utility in the state file a biennial transmission planning report with the Commission in the fall of odd-numbered years. These reports provide information on the transmission planning process used by utilities in the state of Minnesota and information about other transmission line projects. The 2021 Biennial Transmission Planning Report is available at: www.minnelectrans.com. The 2021 Biennial Transmission Planning Report was submitted on October 29, 2021.

Sincerely,

Dan McCourtney
Environmental & Land Manager
Minnesota Power

EXHIBIT 1

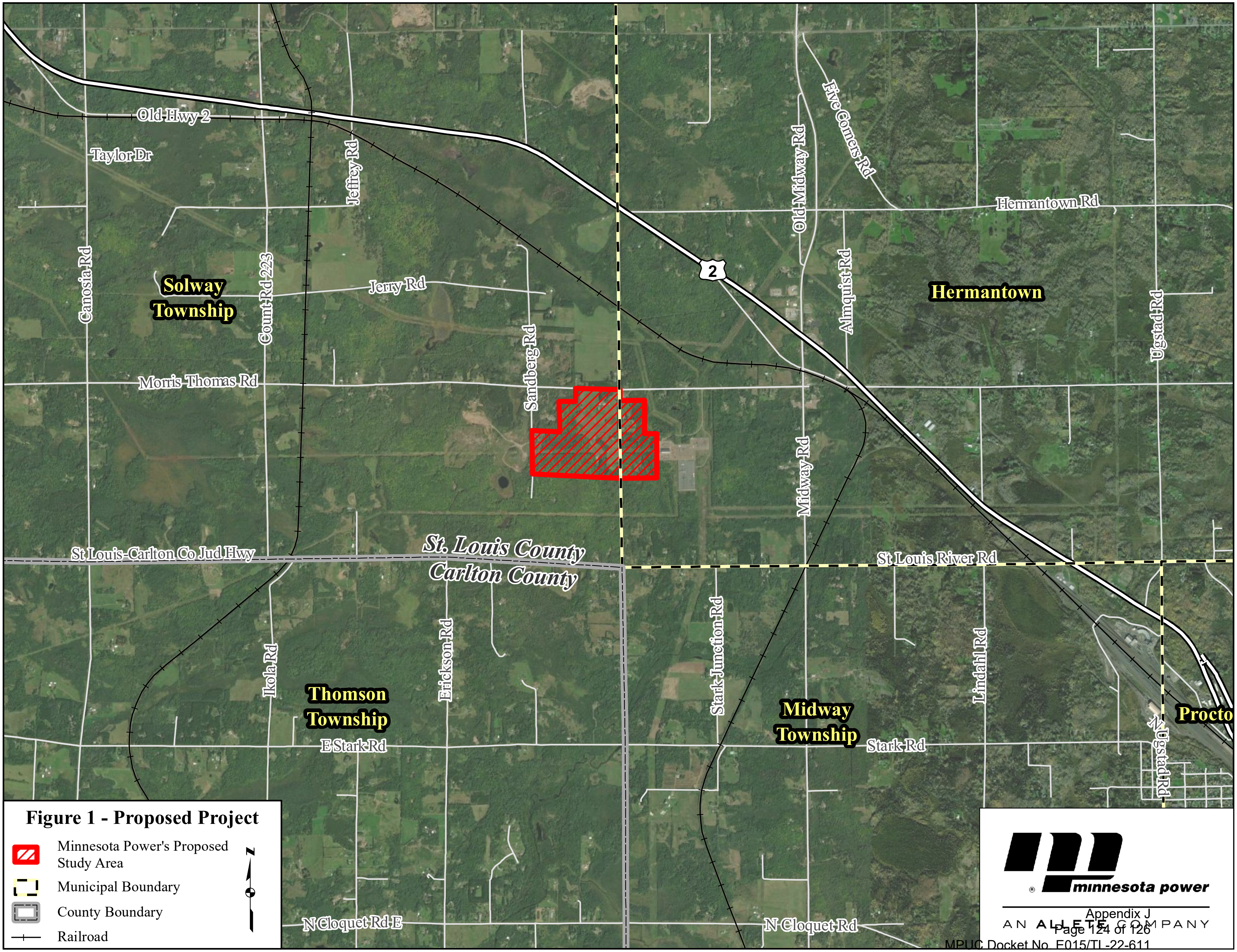


Figure 1 - Proposed Project

EXHIBIT 2

ORGANIZATION	NAME	TITLE	ADDRESS	CITY	STATE	ZIP CODE
U.S. Bureau of Indian Affairs	Alan Fogarty	Acting Superintendent	5600 American Blvd West, Suite 500	Bloomington	MN	55437
Office of the State Archaeologist	Amanda Gronhovd	State Archaeologist	328 West Kellogg Blvd	St. Paul	MN	55102
Leech Lake Band of Ojibwe	Amy Burnette	Tribate Historic Preservation Officer	115 6th Street NW, Suite E	Cass Lake	MN	56633
US Senate	Amy Klobuchar	US Senator	Olcott Plaza, Room 105820 9th Street North	Virginia	MN	55792
St. Louis County	Annie Harala	Commissioner (1st District)	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County	Ashley Grimm	Commissioner (3rd District)	100 North 5th Avenue West, Room 202	Duluth	MN	55802
Minnesota Department of Commerce	Bill Storm	Project Manager	85 7th Place, Suite 500	St. Paul	MN	55101-2198
City of Hermantown	Bonnie Engseth	City Clerk	5105 Maple Grove Road	Hermantown	MN	55811
St. Louis County Courthouse	Bradely Gustafson	Community Development Planning Manager	100 North 5th Ave West, Duluth MN 55802	Duluth	MN	55802
Minnesota Public Utilities Commission	Bret Eknes	Energy Facilities Supervisor	121 7th Place East, Suite 350	St. Paul	MN	55101
Bois Forte Band of Chippewa	Cathy Chavers	Chairwoman	5344 Lakeshore Drive	Nett Lake	MN	55772
Minnesota Department of Natural Resources	Cynthia Warzecha	Energy Projects Review	500 Lafayette Road	St. Paul	MN	55155
Red Lake Nation	Darrell Seki	Chairman	PO Box 550	Red Lake	MN	56671
Minnesota Board of Water and Soil Resources	David Demmer	Wetland Specialist	394 South Lake Avenue, Room 403	Duluth	MN	55802
Minnesota Office of State Archaeologist	David Mather	National Register Archaeologist	State Historic Preservation Office Administration Bu	St. Paul	MN	55155
Minnesota Department of Transportation	Don Berre	Office of Aeronautics	395 John Ireland Blvd	St. Paul	MN	55155
City of Hermantown	Eric Johnson	Community Development Director	5105 Maple Grove Road	Hermantown	MN	55811
Leech Lake Band of Ojibwe	Faron Jackson	Chairman	190 Sailstar Drive NW	Cass Lake	MN	56633
City of Hermantown	Gloria Nelson	Council Members	5105 Maple Grove Road	Hermantown	MN	55811
State Senator	Grant Hauschild	Senate District 03	Minnesota Senate Bldg, Room 222195 University A	St. Paul	MN	55155
Minnesota Pollution Control Agency	Hans Neve	Pollution Control Program Adminstrator	520 Lafayette Road North	St. Paul	MN	55155
City of Hermantown	Jackie Dolentz	City Clerk	5106 Maple Grove Rd	Hermantown	MN	55811
Federal Aviation Administration	Jacob Martin	Program Manager for the District	6020 28th Avenue South, Suite 102	Minneapolis	MN	55450-2700
White Earth Nation	Jaime Arsenault	Tribate Historic Preservation Officer	PO Box 418	White Earth	MN	56591
Bois Forte Band of Chippewa	Jaylen Strong	Tribate Historic Preservation Officer	206 West 4th Street #204	Duluth	MN	55806
Minnesota Pollution Control Agency	Jeff Udd	Duluth Region Manager	525 Lake Avenue South, Suite 400	Duluth	MN	55802
St. Louis County Courthouse	Jenny Bourbonais	Land Use Planning Manager	100 North 5th Ave West, Duluth MN 55802	Duluth	MN	55802
Fond du Lac Band of Lake Superior Chippewa	Jill Hoppe	Tribate Historic Preservation Officer	1720 Big Lake Road	Cloquet	MN	55720
St. Louis County	Jim Foldesi	Public Works Director/Highway Engineer	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County Historical Society	JoAnne Coombe	Executive Director	506 West Michigan Street	Duluth	MN	55802
City of Hermantown	Joe Wicklund	Communications & Community Engagement Mgr.	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	John Geiessler	Council Member	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	John Mulder	City Manager / Administrator	5105 Maple Grove Road	Hermantown	MN	55811
City of Hermantown	Josh Bergstad	Wetland LGU	5105 Maple Grove Road	Hermantown	MN	55811
Red Lake Nation	Kade Ferris	Archaeologist	PO Box 274	Red Lake	MN	56671
Office of Attorney General	Keith Ellison	Attorney General	445 Minnesota Street, Suite 1400	St. Paul	MN	55101
St. Louis County	Keith Musolf	Commissioner (5th District)	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County	Keith Nelson	Commissioner (6th District)	100 North 5th Avenue West	Duluth	MN	55802
Fond du Lac Band of Lake Superior Chippewa	Kevin Dupuis	Chairman	1720 Big Lake Road	Cloquet	MN	55720
St. Louis County	Kevin Gray	Administrator	100 North 5th Avenue West, Room 202	Duluth	MN	55802
U.S. Army Corps of Engineers	Kris Laman	Project Manager - Regulatory Office	600 South Lake Avenue, Suite 211	Duluth	MN	55802
Minnesota Department of Natural Resources	Margi Coyle	Regional Environmental Assessment Ecologists	500 Lafayette Road	St. Paul	MN	55155
1854 Treaty Authority	Marne Kaeske	Cultural Preservation Specialist	4428 Haines Road	Duluth	MN	55811
Grand Portage Band of Lake Superior Chippewa	Mary Ann Gagnon	Tribate Historic Preservation Officer	PO Box 428	Grand Portage	MN	55605
St. Louis County	Matthew Johnson	Economic Development Director	320 West 2nd Street, Suite 301	Duluth	MN	55802
St. Louis County Courthouse	Matthew Johnson	Planning & Community Development Director	100 North 5th Avenue West	Duluth	MN	55802
Mille Lacs Band of Ojibwe	Melanie Benjamin	Chief Executive	43408 Oodena Drive	Onamia	MN	56359
Minnesota Indian Affairs Council	Melissa Cerda	Sr Cultural Resources Specialist	1819 Bemidji Avenue North, Suite 2	Bemidji	MN	56601
White Earth Nation	Michael Fairbanks	Chairman	35500 Eagle View Road	Ogema	MN	56569
Minnesota Public Utilities Commission	Mike Kaluzniak	Energy Facilities Permitting	121 7th Place East, Suite 350	St. Paul	MN	55101
City of Hermantown	Natalie Peterson	Council Member	5105 Maple Grove Road	Hermantown	MN	55811
State Representative	Natalie Zeleznikar	House District 03B	343 State Office Building	St. Paul	MN	55155
St. Louis County	Patrick Boyle	Commissioner (2nd District)	100 North 5th Avenue West	Duluth	MN	55802
St. Louis County	Paul McDonald	Commissioner (4th District)	100 North 5th Avenue West	Duluth	MN	55802
City of Hermantown	Paul Senst	Public Works Director	5105 Maple Grove Road	Hermantown	MN	55811
US House of Representatives	Pete Stauber	Representative - MN 8th District	5094 Miller Trunk Hwy, Suite 900	Hermantown	MN	55811
South St. Louis County Soil and Water Conservation District	R.C. Boheim	District Manager	215 North 1st Avenue East, Room 301	Duluth	MN	55802

EXHIBIT 2

ORGANIZATION	NAME	TITLE	ADDRESS	CITY	STATE	ZIP CODE
Grand Portage Band of Lake Superior Chippewa	Robert Deschampe	Chairman	PO Box 428	Grand Portage	MN	55605
Minnesota Board of Water and Soil Resources	Ryan Hughes	Northern Region Manager	394 South Lake Avenue, Room 403	Duluth	MN	55802
Minnesota State Historic Preservation Office	Sarah Beimers	Environmental Review Manager	50 Sherburne Avenue #203	St. Paul	MN	55155
Minnesota Public Utilities Commission	Scott Ek	Energy Facilities Permitting	121 7th Place East, Suite 350	St. Paul	MN	55101
Solway Township	Scott Welsh	Town Board Chair	4029 Munger Shaw Road	Cloquet	MN	55720
U.S. Fish and Wildlife Service	Shauna Marquardt	Ecological Services Field Office	4101 American Blvd East	Bloomington	MN	55425
1854 Treaty Authority	Sonny Myers	Executive Director	4428 Haines Road	Duluth	MN	55811
Minnesota Department of Transportation	Stacy Kotch-Egstad	Utility Routing and Siting Coordinator	395 John Ireland Blvd	St. Paul	MN	55155
Duluth Indigenous Commission	Susanne Kelly	Senior Planner	411 West First Street, Room 160	Duluth	MN	55802
Solway Township	Tami McGregor	Township Clerk	4029 Munger Shaw Road	Cloquet	MN	55720
Mille Lacs Band of Ojibwe	Terry Kemper	THPO	43408 Oodena Drive	Onamia	MN	56359
South St. Louis County Soil and Water Conservation District	Tim Beaster	Conservation Specialist	100 North 5th Avenue West	Duluth	MN	55802
US Senate	Tina Smith	US Senator	60 Plato Blvd, Suite #220	St. Paul	MN	55107
City of Hermantown	Wayne Boucher	Mayor	5105 Maple Grove Road	Hermantown	MN	55811
Fond du Lac Band of Chippewa	Wayne Dupuis	Environmental Program Manager	28 University Rd	Cloquet	MN	55720

Appendix K

Public Outreach Materials

HVDC Modernization Project

OPEN HOUSE

minnesota power®

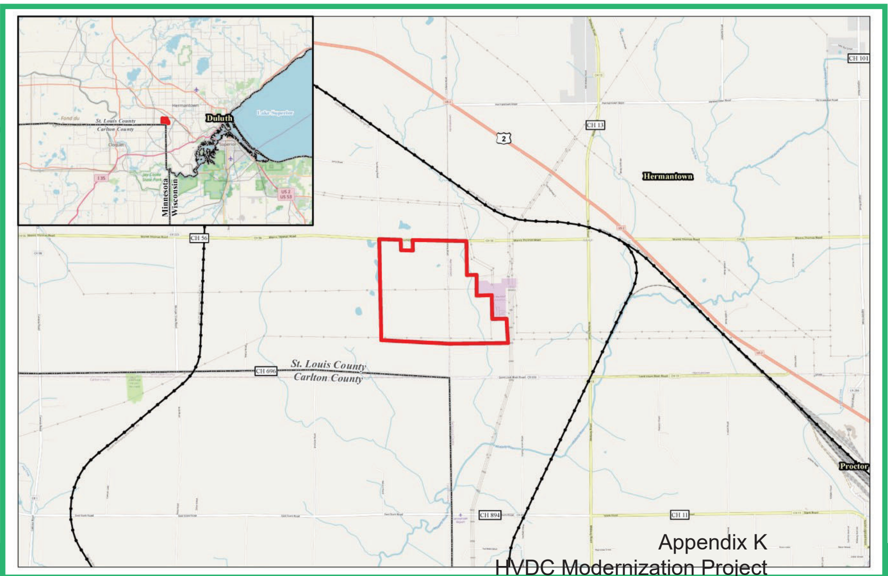
AN ALLETE COMPANY

Join Minnesota Power at an Open House to learn more about the HVDC Modernization Project. You can ask questions and provide comments about the proposed project.

OPEN HOUSE DETAILS

When: November 22, 2022
6:00 - 8:00 PM

Where: **MIDWAY TOWNSHIP TOWN HALL**
3230 Midway Road
Duluth, MN 55810



Minnesota Power

30 West Superior St.
Duluth, MN 55802

PLEASE
PLACE
STAMP
HERE

Mailing Address Line 1
Mailing Address Line 2
Mailing Address Line 3
Mailing Address Line 4
Mailing Address Line 5

minnesota power

AN ALLETE COMPANY

UMEx Landowner List

PARCELID	OWNAME	TXNAME	TXADR1	TXADR2	PHYSADDR	PHYSCITY	PHYSZIP
78-020-0010	BENEDICT, ROSS E & NYLA J	BENEDICT, ROSS E & NYLA J	292 ST LOUIS RIVER RD E	DULUTH MN 55810	292 ST LOUIS RIVER RD E	DULUTH MN	55810
78-020-0020	JOHNSON, JUDD A & SARA C	JOHNSON, JUDD A & SARA C	282 ST LOUIS RIVER RD E	DULUTH MN 55810	282 ST LOUIS RIVER RD E	DULUTH MN	55810
78-020-0040	KANTOLA, RAYMOND E	KANTOLA, RAYMOND E	254 ST LOUIS RIVER RD E	DULUTH MN 55810	254 ST LOUIS RIVER RD E	DULUTH MN	55810
78-020-0082	FOUCAULT, M ANNETTE	FOUCAULT, M ANNETTE	726 4TH ST; PO BOX 1015	PROCTOR MN 55810			
395-0010-09352	KOHLMEIER ROBERT I & CATHERINE S	KOHLMEIER ROBERT & CATHERINE	5757 ST LOUIS RIVER RD	DULUTH MN 55810			0
395-0010-09290	RALPH MICHAEL P	RALPH MICHAEL P ETUX	5781 ST LOUIS RIVER RD	HERMANTOWN MN 55810	5781 SAINT LOUIS RIVER RD	HERMANTOWN	55810
395-0010-09291	RUNYAN CHRISTOPHER A	RUNYAN CHRISTOOPHER A & MARIA J	5821 S ST LOUIS RIVER RD	HERMANTOWN MN 55811	5821 SAINT LOUIS RIVER RD	HERMANTOWN	55810
395-0010-09360	KOSKI MICHAEL G JR	KOSKI MICHAEL G JR	PO BOX 7216	DULUTH MN 55807-0216	5775 SAINT LOUIS RIVER RD	HERMANTOWN	55810
395-0010-09210	SANDSTEDT JULIANN K	SANDSTEDT JULIANN K	3612 SOLWAY RD	HERMANTOWN MN 55810			0
395-0010-09270	FLYNN DENNIS M SR ETUX	FLYNN DENNIS M SR & DEBBRA	5867 ST LOUIS RIVER RD	HERMANTOWN MN 55810			0
395-0010-09320	UMPIERRE CARRIE A	UMPIERRE CARRIE A	5747 ST LOUIS RIVER RD	HERMANTOWN MN 55810			0
395-0010-09280	OPDAHL-FRALICK DEBORAH L	FRALICK ROBERT D	2208 COUNTRY LANE	MINNETONKA MN 55305-3113			0
395-0010-09297	PELLAND ANDREW J	PELLAND ANDREW J & SAMMIE	5831 ST LOUIS RIVER RD	HERMANTOWN MN 55811	5831 SAINT LOUIS RIVER RD	HERMANTOWN	55810
395-0010-09362	THOMPSON SCOTT	THOMPSON SCOTT & NICOLE	5771 ST LOUIS RIVER ROAD	HERMANTOWN MN 55810	5771 SAINT LOUIS RIVER RD	HERMANTOWN	55810
395-0010-09285	NORLUND RUTH M	NORLUND RUTH M	3506 SOLWAY RD	HERMANTOWN MN 55810	3506 SOLWAY RD	HERMANTOWN	55810
395-0010-09261	ESTEP MATTHEW	ESTEP MATTHEW & ANNA	5861 ST LOUIS RIVER RD	HERMANTOWN MN 55810	5861 SAINT LOUIS RIVER RD	HERMANTOWN	55810
450-0010-00820	SCHMINSKI JARED DANIEL	SCHMINSKI JARED D & BREA BROOKE	3483 STARK JUNCTION RD	DULUTH MN 55810	3483 STARK JUNCTION RD	DULUTH	55810
450-0010-00840	YOST BARBARA J	YOST BARBARA J	5866 ST LOUIS RIVER RD	DULUTH MN 55810	5866 SAINT LOUIS RIVER RD	DULUTH	55810
450-0010-00830	TAYLOR JEREMY	TAYLOR JEREMY	5836 ST LOUIS RIVER RD	PROCTOR MN 55810	5836 SAINT LOUIS RIVER RD	DULUTH	55810
395-0010-09190	WIETMAN BRANDON THOMAS	WIETMAN BRANDON THOMAS	5850 MORRIS THOMAS RD	DULUTH MN 55811	5850 MORRIS THOMAS RD	HERMANTOWN	55810
395-0010-09000	GARRICK GAIL	GARRICK GAIL	3738 SOLWAY RD	HERMANTOWN MN 55810	3738 SOLWAY RD	HERMANTOWN	55810
395-0010-09202	BERG WILLIAM P ETUX	BERG WILLIAM P	3602 SOLWAY RD	DULUTH MN 55810	3602 SOLWAY RD	HERMANTOWN	55810
395-0010-09200	FREMLING TINA M	FREMLING TINA M	5890 MORRIS THOMAS RD	HERMANTOWN MN 55811	5890 MORRIS THOMAS RD	HERMANTOWN	55810
395-0010-09140	UMPIERRE MANNY	UMPIERRE MANNY & SHARON	18 LOIS LANE	ESKO MN 55733			0
395-0010-09014	HANSEN BRYCE ROBERT	HANSEN BRYCE ROBERT &	A SUSANNE; 5833 MORRIS THO	HERMANTOWN MN 55810	5833 MORRIS THOMAS RD	HERMANTOWN	55810
395-0010-09183	AMES ELIZABETH R	AMES ELIZABETH R & MARK A	7874 165TH ST E	HASTINGS MN 55033	5842 MORRIS THOMAS RD	HERMANTOWN	55810
395-0010-09207	SANDSTEDT THOMAS ETAL	SANDSTEDT THOMAS	3612 SOLWAY RD	HERMANTOWN MN 55810	3612 SOLWAY RD	HERMANTOWN	55810
395-0010-09005	PEYTON BARBARA J	PEYTON BARBARA	5891 MORRIS THOMAS RD	HERMANTOWN MN 55810	5891 MORRIS THOMAS RD	HERMANTOWN	55810
395-0010-09016	GUSTAFSON KEITH	GUSTAFSON ANGELA & KEITH	4629 AIRPARK BLVD	DULUTH MN 55811	5829 MORRIS THOMAS RD	HERMANTOWN	55810
395-0010-09180	VAH SAMANTHA	VAH SAMANTHA & JONATHAN	5828 MORRIS THOMAS RD	HERMANTOWN MN 55810	5828 MORRIS THOMAS RD	HERMANTOWN	55810
395-0010-09010	GARRICK GAIL J	GARRICK GAIL	3738 SOLWAY RD	HERMANTOWN MN 55810			0
530-0010-06684	WILLIAMS SAMUEL P	WILLIAMS SAMUEL P & MORRIS HANNAH J	3537 SOLWAY RD	DULUTH MN 55810	3537 SOLWAY RD	DULUTH	55810
530-0010-06772	LALIBERTE RONALD G	LALIBERTE RONALD G & DIANE M	6041 ST LOUIS RIVER RD	DULUTH MN 55810	6041 SAINT LOUIS RIVER RD	DULUTH	55810
530-0010-06780	SMITH MARC	SMITH MARC	850 4TH AVE	PROCTOR MN 55810			0
530-0010-04820	HEDQUIST JOY	HEDQUIST JOY	5581 LILAC HILL RD	DULUTH MN 55810	5963 MORRIS THOMAS RD	DULUTH	55810
530-0010-04823	BECK TED	BECK TED	PO BOX 281	CLOQUET MN 55720	3704 SANDBERG RD	DULUTH	55810
530-0010-06776	GVESRUDE LEE R	GVESRUDE LEE R	6015 ST LOUIS RIVER RD	DULUTH MN 55810			0
530-0010-06790	NARTNIK DAVID G	NARTNIK DAVID	3594 SANDBERG RD	PROCTOR MN 55810	3594 SANDBERG RD	DULUTH	55810
530-0010-06740	O'CONNOR PATRICK	O'CONNOR PATRICK & JULIE	3603 SANDBERG RD	PROCTOR MN 55810	3603 SANDBERG RD	DULUTH	55810
530-0010-06681	SOBCZAK BRANDON J	SOBCZAK BRANDON J & DANIELLE M	3535 SOLWAY RD	PROCTOR MN 55810			0
530-0010-06770	KUHLMEY SCOTT	KUHLMEY SCOTT	6031 SAINT LOUIS RIVER RD E	PROCTOR MN 55810	6031 SAINT LOUIS RIVER RD	DULUTH	55810
530-0010-06775	GIERSDORF DUSTIN B	GIERSDORF DUSTIN B	6007 ST LOUIS RIVER RD	DULUTH MN 55810	6007 SAINT LOUIS RIVER RD	DULUTH	55810
530-0010-04780	MAKI THOMAS J SR	MAKI JAMES M	6005 MORRIS THOMAS RD	PROCTOR MN 55810	6005 MORRIS THOMAS RD	DULUTH	55810
530-0010-04830	EDEN THOMAS G	EDEN THOMAS G	3709 SOLWAY RD	DULUTH MN 55811	3709 SOLWAY RD	DULUTH	55810
530-0010-06691	ROGALLA SARAH	ROGALLA SARAH	6060 MORRIS THOMAS RD	DULUTH MN 55810			0
530-0010-06750	ISABELL JAMES E	ISABELL JAMES E	6099 ST LOUIS RIVER RD	PROCTOR MN 55810	6099 SAINT LOUIS RIVER RD	DULUTH	55810
530-0010-06680	BOYER MARK R	BOYER MARK R	3539 SOLWAY RD	PROCTOR MN 55810			0
530-0010-06802	VANDERSCHEUREN DALE	VANDERSCHEUREN DALE & NANCY	5989 ST LOUIS RIVER RD E	DULUTH MN 55810	5989 SAINT LOUIS RIVER RD	DULUTH	55810
530-0010-06660	KRATT MICHAEL RAY	KRATT MICHAEL RAY	5972 MORRIS THOMAS RD	DULUTH MN 55810	5972 MORRIS THOMAS RD	DULUTH	55810
530-0010-06806	DIETER CANDIS M	DIETER CANDIS M	N MARK A; 5993 SAINT LOUIS R	PROCTOR MN 55810	5993 SAINT LOUIS RIVER RD	DULUTH	55810
530-0010-04786	MAKI THOMAS J SR	MAKI JAMES M	6005 MORRIS THOMAS RD	PROCTOR MN 55810			0
530-0010-04822	ST LOUIS COUNTY	ST LOUIS COUNTY PUBLIC WORKS	100 N 5TH AVE W # 1	DULUTH MN 55802	3726 SANDBERG RD	DULUTH	55810
530-0010-06765	WARREN MICHAEL DENNIS	WARREN DALE RICHARD	6067 ST LOUIS RIVER RD	DULUTH MN 55810	6067 SAINT LOUIS RIVER RD	DULUTH	55810
530-0010-06810	BRADFORD LYNN R	BRADFORD LYNN	3525 SOLWAY RD	HERMANTOWN MN 55810	3525 SOLWAY RD	HERMANTOWN	55810
530-0010-04832	SHEEHAN SHAYNA	SHEEHAN SHAYNA & NEVADA R	5949 MORRIS THOMAS RD	DULUTH MN 55810	5949 MORRIS THOMAS RD	DULUTH	55810
530-0010-06730	ROGALLA SARAH LYNN	ROGALLA SARAH	6060 MORRIS THOMAS RD	DULUTH MN 55810			0
530-0010-06815	EK CLARISSA L M	EK CLARISSA L M	3505 SOLWAY RD	HERMANTOWN MN 55810	3505 SOLWAY RD	HERMANTOWN	55810
530-0010-06820	WARD MARK B ETUX	WARD MARK B	5947 ST LOUIS RIVER RD	DULUTH MN 55810	5947 SAINT LOUIS RIVER RD	DULUTH	55810

PARCELID	OWNAME	TXNAME	TXADR1	TXADR2	PHYSADDR	PHYSCITY	PHYSZIP
530-0010-06801	HAFFTEN PETER C	HAFFTEN PETER C & ALLISON J	5971 ST LOUIS RIVER RD	PROCTOR MN 55810	5971 SAINT LOUIS RIVER RD	DULUTH	55810
530-0010-04821	HAEDRICH SCOTT	HAEDRICH SCOTT & SHELLEY	3738 SANDBERG RD	DULUTH MN 55810	3738 SANDBERG RD	DULUTH	55810
530-0010-06690	GRADY SHANE E	GRADY SHANE E	3699 S SANDBERG RD	DULUTH MN 55810	3699 SANDBERG RD	DULUTH	55810
530-0010-06800	RAIHO REVOCABLE TRUST	RAIHO ROBERT J & DONNA M	5959 ST LOUIS RIVER RD	DULUTH MN 55810	5959 SAINT LOUIS RIVER RD	DULUTH	55810
530-0010-06825	GRAY ALEXANDER W	GRAY ALEXANDER W	5392 FISH LAKE DAM RD	DULUTH MN 55803	5925 SAINT LOUIS RIVER RD	DULUTH	55810

Mailing Group	Company	Name	Title	Email Address	Address	City	State	Zip Code
Local Tribal Entities	Fond du Lac Band of Chippewa	Wayne Dupuis	Environmental Program Manager	waynedupuis@fdlrez.com	28 University Rd	Cloquet	MN	55720
Local Government Units	Solway Township	Scott Welsh	Town Board Chair		4029 Munger Shaw Rd	Cloquet	MN	55720
Local Government Units	Solway Township	Tami Mcgregor	Town Clerk	solwayclerk@hotmail.com	4030 Munger Shaw Rd	Cloquet	MN	55720
Local Government Units	City of Hermantown	John Mulder	City Admnistrator	jmulder@hermantown.com	5105 Maple Grove Rd	Hermantown	MN	55811
Local Government Units	City of Hermantown	Jackie Dolentz	City Clerk	jdolentz@hermantown.com	5106 Maple Grove Rd	Hermantown	MN	55811
St. Louis County	St. Louis County Courthouse	Matthew Johnson	Planning and Community Development Director	JohnsonM12@stlouiscountymn.gov	100 North 5th Ave West, Duluth MN 55802	Duluth	MN	55802
St. Louis County	St. Louis County Courthouse	Bradely Gustafson	Community Development Planning Manager	GustafsonB@StLouisCountyMN.gov	100 North 5th Ave West, Duluth MN 55802	Duluth	MN	55802
St. Louis County	St. Louis County Courthouse	Jenny Bourbonais	Land Use Planning Manager	bourbonaisj@stlouiscountymn.gov	100 North 5th Ave West, Duluth MN 55802	Duluth	MN	55802

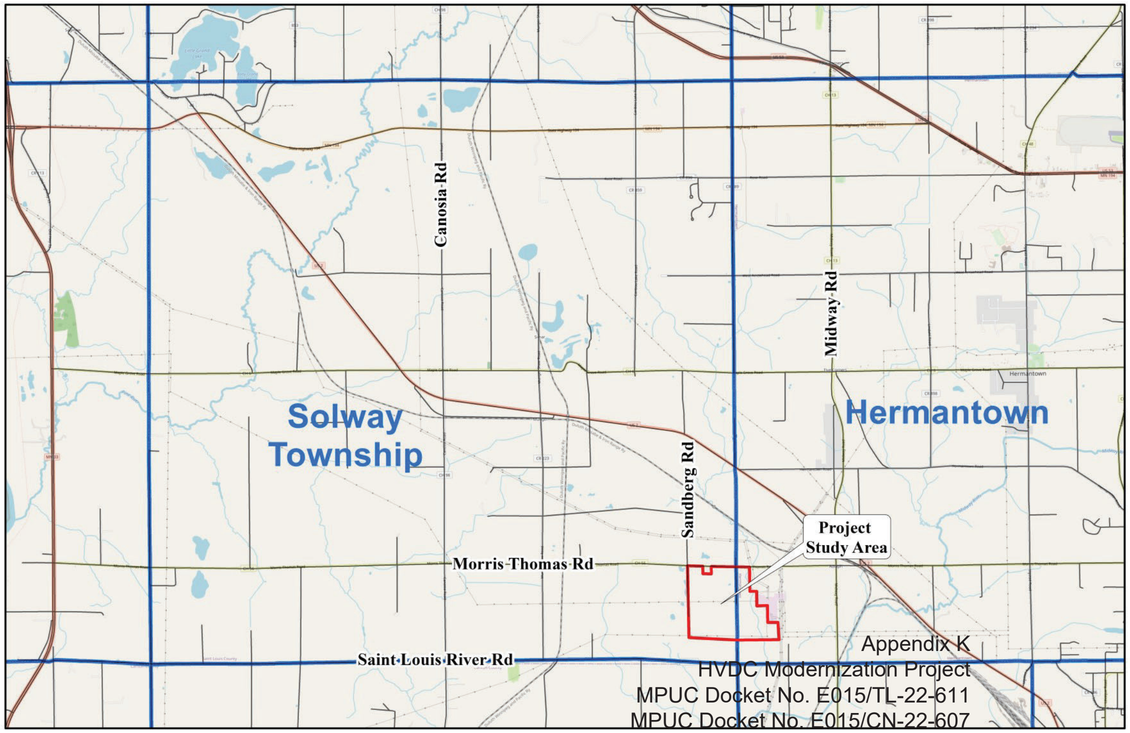
HVDC Modernization Project

OPEN HOUSE

minnesota power

AN ALLETE COMPANY

Join Minnesota Power at an Open House to learn more about the HVDC Modernization Project. You can ask questions and provide comments about the proposed project.



OPEN HOUSE DETAILS

When:

January 11, 2023
6:00 - 7:30 PM

Where:

SOLWAY TOWN HALL
4029 Munger Shaw Road
Cloquet, MN 55720

Minnesota Power
30 West Superior St.
Duluth, MN 55802

PLEASE
PLACE
STAMP
HERE

Mailing Address Line 1
Mailing Address Line 2
Mailing Address Line 3
Mailing Address Line 4
Mailing Address Line 5

minnesota power
AN ALLETE COMPANY

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
PROCTOR CITY HALL	100 PIONK DR.		PROCTOR	MN - MINNESOTA	55810	1705	C005	6	103		YES	YES	99	05/01/2022
KERRY JUNTUNEN	131 9th Ave		PROCTOR	MN - MINNESOTA	55810	2741	C005	902	103		YES	YES	31	
JOHN ENGELKING	425 Boundary Ave S		PROCTOR	MN - MINNESOTA	55810	2424	C025	1831	105		NO	YES	25	
JAMES SCHWARZBAUER	827 Almac Dr		PROCTOR	MN - MINNESOTA	55810	2744	R022	2182	112		YES	YES	27	07/15/2023
BILL & PEG SWEENEY	826 Almac Dr		PROCTOR	MN - MINNESOTA	55810	2743	R022	2183	112		YES	YES	26	07/14/2023
KARL RUTHENBECK	815 Almac Dr		PROCTOR	MN - MINNESOTA	55810	2744	R022	2190	112		NO	YES	15	
RORY & SHERRI JOHNSON	801 Almac Dr		PROCTOR	MN - MINNESOTA	55810	2744	R022	2199	112		YES	YES	01	08/27/2022
CURRENT RESIDENT OR POPOVICH	6406 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9247	R002	2453	181		NO	YES	06	
CURRENT RESIDENT OR NELSON	6416 Arrowhead Rd E		CLOQUET	MN - MINNESOTA	55720	9247	R002	2454	181		NO	YES	16	
CURRENT RESIDENT OR NELSON	6436 Arrowhead Rd E		CLOQUET	MN - MINNESOTA	55720	9247	R002	2455	181		NO	YES	36	
CURRENT RESIDENT OR AXTELL	6461 Arrowhead Rd E		CLOQUET	MN - MINNESOTA	55720	9247	R002	2457	181		NO	YES	61	
GAIL BOATMAN	6542 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9246	R002	2458	181		YES	YES	42	08/08/2022
CURRENT RESIDENT OR CARLSON	6535 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9246	R002	2460	181		NO	YES	35	
CURRENT RESIDENT OR HEDMAN	6575 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9246	R002	2461	181		NO	YES	75	
CURRENT RESIDENT OR KIRSCH	6580 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9246	R002	2462	181		NO	YES	80	
CURRENT RESIDENT OR MCVEAN	6588 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9246	R002	2463	181		NO	YES	88	
SHARON & LARRY VANDENHEUVEL	6589 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9246	R002	2464	181		NO	YES	89	
BRIANNE JOHNSON	6607 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9692	R002	2468	181		YES	YES	07	10/15/2023
CURRENT RESIDENT OR KRAUSE	6635 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9692	R002	2469	181		NO	YES	35	
CURRENT RESIDENT OR SHENETT	6649 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9692	R002	2470	181		NO	YES	49	
CURRENT RESIDENT OR BENNETT	6656 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9692	R002	2471	181		NO	YES	56	
CURRENT RESIDENT OR POHJOLA	6662 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9692	R002	2472	181		NO	YES	62	
CURRENT RESIDENT OR WEILER	3528 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9297	R002	2474	181		NO	YES	28	
CURRENT RESIDENT OR LESLIE	3535 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9297	R002	2475	181		NO	YES	35	
CURRENT RESIDENT OR LINDQUIST	3588 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9297	R002	2476	181		NO	YES	88	
CURRENT RESIDENT OR HOLTE	3602 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9268	R002	2477	181		NO	YES	02	
CURRENT RESIDENT OR SIEVERS	3644 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9268	R002	2479	181		NO	YES	44	
DRAKE JONAS	3659 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9268	R002	2481	181		NO	YES	59	
CURRENT RESIDENT OR PETERS	3662 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9268	R002	2482	181		NO	YES	62	
TREY GAULT	3670 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9268	R002	2483	181		NO	YES	70	
CURRENT RESIDENT OR MARKUS	3677 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9268	R002	2484	181		NO	YES	77	
CURRENT RESIDENT OR MOLDENHAUER	3735 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9264	R002	2485	181		NO	YES	35	
CURRENT RESIDENT OR MOSER	3793 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9264	R002	2489	181		NO	YES	93	
CURRENT RESIDENT OR KACZMARK	3868 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9298	R002	2492	181		NO	YES	68	
CURRENT RESIDENT OR JOHNSON	3871 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9298	R002	2493	181		NO	YES	71	
CURRENT RESIDENT OR MARKKULA	3962 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9262	R002	2494	181		NO	YES	62	
CURRENT RESIDENT	3977 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9262	R002	2497	181		NO	YES	77	
CURRENT RESIDENT OR KOLLASCH	4057 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9258	R002	2499	181		NO	YES	57	
LEON FORSTROM	4073 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9258	R002	2500	181		NO	YES	73	
CURRENT RESIDENT OR KRAUSE	4131 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9244	R002	2501	181		NO	YES	31	
CURRENT RESIDENT OR KRAUSE	4111 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9244	R002	2502	181		NO	YES	11	
CURRENT RESIDENT OR EARLS	4288 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	8200	R002	2505	181		NO	YES	88	
CURRENT RESIDENT OR FOUCAULT	4311 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9245	R002	2506	181		NO	YES	11	
KRIS FOUCAULT	4333 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9245	R002	2507	181		YES	YES	33	09/15/2022
CURRENT RESIDENT OR BJORKLUND	3644 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9285	R002	2512	181		NO	YES	44	
CURRENT RESIDENT OR BERG	3652 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9285	R002	2513	181		NO	YES	52	
CURRENT RESIDENT OR	3664 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9285	R002	2514	181		NO	YES	64	
CURRENT RESIDENT OR OLSON	3674 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9285	R002	2516	181		NO	YES	74	
CURRENT RESIDENT OR BUCZYNSKI	3752 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9294	R002	2517	181		NO	YES	52	
CURRENT RESIDENT OR WENNER	3794 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9294	R002	2519	181		NO	YES	94	
CURRENT RESIDENT OR COCCIE	3802 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9295	R002	2520	181		NO	YES	02	
CURRENT RESIDENT OR BIRCH	3868 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9295	R002	2521	181		NO	YES	68	
CURRENT RESIDENT OR KETTLEHUT	3904 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9282	R002	2522	181		NO	YES	04	
CURRENT RESIDENT OR MENINGER	3928 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9282	R002	2524	181		NO	YES	28	
MARY JANE & DAVID ANDERSON	4171 Gaus Rd		CLOQUET	MN - MINNESOTA	55720	9239	R002	2526	181		NO	YES	71	
CURRENT RESIDENT OR HILSON	7044 Heine Rd		CLOQUET	MN - MINNESOTA	55720	9279	R002	2528	181		NO	YES	44	
KELLY MITCHELL	7043 Heine Rd		CLOQUET	MN - MINNESOTA	55720	9279	R002	2529	181		NO	YES	43	
BRIAN GAUS	4239 Gaus Rd		CLOQUET	MN - MINNESOTA	55720	9238	R002	2530	181		YES	YES	39	03/03/2023
CURRENT RESIDENT OR NEWMAN	7081 Heine Rd W		CLOQUET	MN - MINNESOTA	55720	9280	R002	2532	181		NO	YES	81	
JAMES WOZNIAK	6505 Hermantown Rd		CLOQUET	MN - MINNESOTA	55720	9263	R002	2534	181		YES	YES	05	03/20/2022
CURRENT RESIDENT	6510 Hermantown Rd		CLOQUET	MN - MINNESOTA	55720	9263	R002	2535	181		NO	YES	10	
CURRENT RESIDENT OR SMITH	6573 Hermantown Rd W		CLOQUET	MN - MINNESOTA	55720	9263	R002	2537	181		NO	YES	73	

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
CURRENT RESIDENT OR HANNINEN	6559 Highway 2		CLOQUET	MN - MINNESOTA	55720	9259	R002	2539	181		NO	YES	59	
CLARE STROMLUND	6351 Hwy 2 E		CLOQUET	MN - MINNESOTA	55720	9257	R002	2540	181		YES	YES	51	09/30/2022
JOHN CHILDERS	6383 Hwy 2 E		CLOQUET	MN - MINNESOTA	55720	9257	R002	2542	181		YES	YES	83	12/31/2021
CURRENT RESIDENT OR MICHAEL	6401 Hwy 2 E		CLOQUET	MN - MINNESOTA	55720	9242	R002	2543	181		NO	YES	01	
CURRENT RESIDENT OR CARLSON	6511 Hwy 2 W		CLOQUET	MN - MINNESOTA	55720	9259	R002	2544	181		NO	YES	11	
CURRENT RESIDENT OR FALLANG	3543 Hwy 33 N		CLOQUET	MN - MINNESOTA	55720	9208	R004	2546	181		NO	YES	43	
CURRENT RESIDENT OR LANGLEY	3567 Jackson Rd		CLOQUET	MN - MINNESOTA	55720	9229	R002	2547	181		NO	YES	67	
CURRENT RESIDENT OR EILEFSON	3922 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	8207	R002	2551	181		NO	YES	22	
LILY SHUBITZKE	3958 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	8207	R002	2552	181		NO	YES	58	
CURRENT RESIDENT OR BRADBURY	3965 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	8207	R002	2553	181		NO	YES	65	
FRANK SIIRO	3982 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	8207	R002	2554	181		YES	YES	82	07/28/2024
CURRENT RESIDENT OR LORENTZSON	3999 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	8207	R002	2555	181		NO	YES	99	
	4007 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	9240	R002	2556	181		NO	YES	07	
CURRENT RESIDENT OR DAHLSTROM	4012 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	9240	R002	2557	181		NO	YES	12	
RANDY JULIN	4040 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	9240	R002	2558	181		YES	YES	40	03/31/2023
CURRENT RESIDENT	4074 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	9240	R002	2559	181		NO	YES	74	
CURRENT RESIDENT OR RANNILA	4088 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	9240	R002	2560	181		NO	YES	88	
CURRENT RESIDENT OR HULTGREN	3561 Lindrose Rd		CLOQUET	MN - MINNESOTA	55720	9274	R002	2562	181		NO	YES	61	
CURRENT RESIDENT OR SALINE	3630 Lindrose Rd		CLOQUET	MN - MINNESOTA	55720	8208	R002	2565	181		NO	YES	30	
CURRENT RESIDENT OR LEHENBAUER	6310 Maple Grove Rd E		CLOQUET	MN - MINNESOTA	55720	9250	R002	2566	181		NO	YES	10	
CURRENT RESIDENT OR ANDERSON	6315 Maple Grove Rd E		CLOQUET	MN - MINNESOTA	55720	9250	R002	2567	181		NO	YES	15	
CURRENT RESIDENT OR AMUNDSON	6328 Maple Grove Rd E		CLOQUET	MN - MINNESOTA	55720	9250	R002	2568	181		NO	YES	28	
CURRENT RESIDENT OR MOE	6338 Maple Grove Rd		CLOQUET	MN - MINNESOTA	55720	9250	R002	2569	181		NO	YES	38	
CURRENT RESIDENT OR LARSON	6379 Maple Grove Rd E		CLOQUET	MN - MINNESOTA	55720	9250	R002	2571	181		NO	YES	79	
CURRENT RESIDENT OR LEISTE	6414 Maple Grove Rd E		CLOQUET	MN - MINNESOTA	55720	9209	R002	2572	181		NO	YES	14	
CURRENT RESIDENT OR PETERSON	6419 Maple Grove Rd E		CLOQUET	MN - MINNESOTA	55720	9209	R002	2573	181		NO	YES	19	
CURRENT RESIDENT OR BAUBLITZ	6514 Maple Grove Rd		CLOQUET	MN - MINNESOTA	55720	9243	R002	2575	181		NO	YES	14	
CURRENT RESIDENT OR JOHNSON	6530 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9243	R002	2576	181		NO	YES	30	
CURRENT RESIDENT OR JACOBSON	6537 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9243	R002	2577	181		NO	YES	37	
LAURA MCCUSKEY	6639 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9241	R002	2578	181		YES	YES	39	07/11/2022
VAL FOX	6640 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9241	R002	2579	181		YES	YES	40	06/30/2023
CURRENT RESIDENT OR HOLLAND	6658 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9241	R002	2580	181		NO	YES	58	
CURRENT RESIDENT	6667 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9241	R002	2581	181		NO	NO	67	
JAMES ZIELLS	6823 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9216	R002	2582	181		YES	YES	23	01/02/2023
CURRENT RESIDENT OR STERLING	6958 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9237	R002	2585	181		NO	YES	58	
BARB KUNELIS	6966 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9237	R002	2586	181		YES	YES	66	12/02/2021
CURRENT RESIDENT OR NELSON	6982 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9237	R002	2587	181		NO	YES	82	
CURRENT RESIDENT OR WASS	6998 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9237	R002	2588	181		NO	YES	98	
CURRENT RESIDENT OR HANSEN	7018 Maple Grove Rd		CLOQUET	MN - MINNESOTA	55720	9235	R002	2591	181		NO	YES	18	
CURRENT RESIDENT OR SEDOR	7034 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9235	R002	2592	181		NO	YES	34	
CURRENT RESIDENT OR SCHUTT	7042 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9235	R002	2593	181		NO	YES	42	
MELVIN W FREMLING	3597 Mattson Rd		CLOQUET	MN - MINNESOTA	55720	8209	R002	2594	181		NO	YES	97	
CURRENT RESIDENT OR BJONSKAAS	3654 Mattson Rd		CLOQUET	MN - MINNESOTA	55720	9271	R002	2596	181		NO	YES	54	
CURRENT RESIDENT OR SKOG	3760 Mattson Rd		CLOQUET	MN - MINNESOTA	55720	9270	R002	2598	181		NO	YES	60	
CURRENT RESIDENT OR GREENE	6314 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	8210	R002	2601	181		NO	YES	14	
CURRENT RESIDENT OR ESSIG	6365 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	8210	R002	2602	181		NO	YES	65	
CURRENT RESIDENT OR BAILEY	6368 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	8210	R002	2603	181		NO	YES	68	
BYRON G HELLAND	6431 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	9265	R002	2604	181		YES	YES	31	12/11/2021
THERESA & GORDY JENSEN	6410 Morris Thomas Rd		CLOQUET	MN - MINNESOTA	55720	9265	R002	2605	181		NO	YES	10	
CURRENT RESIDENT SWIERCESKI	6434 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	9265	R002	2606	181		NO	NO	34	
CURRENT RESIDENT OR JOHNSON	6442 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	9265	R002	2608	181		NO	YES	42	
CURRENT RESIDENT OR AKEY	6455 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	9265	R002	2609	181		NO	YES	55	
CURRENT RESIDENT OR WALDRIFF	6456 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	9265	R002	2610	181		NO	YES	56	
CURRENT RESIDENT OR MUNTHE	6551 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9269	R002	2611	181		NO	YES	51	
CURRENT RESIDENT OR HESTER	6556 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9269	R002	2612	181		NO	YES	56	
CURRENT RESIDENT OR KOHNE	6559 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9269	R002	2613	181		NO	YES	59	
TERRY & JOANNE ANDREWS	6603 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9272	R002	2614	181		NO	YES	03	
MARLIN FORSTROM	6625 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9272	R002	2615	181		NO	YES	25	
CURRENT RESIDENT OR JACKSON	6707 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9273	R002	2617	181		NO	YES	07	
CURRENT RESIDENT OR JACKSON	6711 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9273	R002	2618	181		NO	YES	11	
CURRENT RESIDENT OR SALINE	6718 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9273	R002	2620	181		NO	YES	18	
CURRENT RESIDENT OR JACKSON	6719 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9273	R002	2621	181		NO	YES	19	

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
CURRENT RESIDENT OR BLOOMER	6749 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9273	R002	2622	181		NO	YES	49	
CURRENT RESIDENT OR SALINE	6760 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9273	R002	2623	181		NO	YES	60	
CURRENT RESIDENT OR MONETTE	6908 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2632	181		NO	YES	08	
CURRENT RESIDENT OR ROY	6910 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2633	181		NO	YES	10	
CURRENT RESIDENT OR HEIKKILA	6926 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2634	181		NO	YES	26	
CURRENT RESIDENT OR SYKES	6931 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2635	181		NO	YES	31	
CURRENT RESIDENT OR HEIKKILA	6936 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2636	181		NO	YES	36	
ELIZABETH BERGLUND	6965 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2637	181		NO	YES	65	
CURRENT RESIDENT OR SUNDIN	6983 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2638	181		NO	YES	83	
CURRENT RESIDENT OR HUGHES	6995 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2639	181		NO	YES	95	
CURRENT RESIDENT OR HUGHES	7035 Morris Thomas Rd		CLOQUET	MN - MINNESOTA	55720	9281	R002	2643	181		NO	YES	35	
CURRENT RESIDENT OR VIEBAHN	7045 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9281	R002	2644	181		NO	YES	45	
CURRENT RESIDENT OR LUOMA	7076 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9281	R002	2648	181		NO	YES	76	
CURRENT RESIDENT OR VERMEERSCH	7090 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9281	R002	2649	181		NO	YES	90	
CURRENT RESIDENT OR WIITA	3581 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9266	R002	2651	181		NO	YES	81	
CURRENT RESIDENT OR ZIELLS	3584 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9266	R002	2652	181		NO	YES	84	
CURRENT RESIDENT OR LAFLAMME	3930 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9254	R002	2655	181		NO	YES	30	
CURRENT RESIDENT	3986 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9254	R002	2656	181		NO	YES	86	
TYLER JOHNSON	3996 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9254	R002	2658	181		NO	YES	96	
MUNGER TAVERN	4003 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9255	R002	2659	181		NO	YES	03	
CURRENT RESIDENT OR LYES	4026 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9255	R002	2660	181		NO	YES	26	
CURRENT RESIDENT OR HOPE LUTHERAN CHURCH	4093 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9255	R002	2661	181		NO	YES	93	
CURRENT RESIDENT OR ROBARGE	4103 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9251	R002	2662	181		NO	YES	03	
CURRENT RESIDENT OR HENNESSEY	4138 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9251	R002	2663	181		NO	YES	38	
CURRENT RESIDENT OR FLEISCHER	4213 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9252	R002	2664	181		NO	YES	13	
CURRENT RESIDENT OR CHERNE	4282 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9252	R002	2665	181		NO	YES	82	
CURRENT RESIDENT OR BERGLIN	4293 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9252	R002	2666	181		NO	YES	93	
CURRENT RESIDENT OR TVERBERG	4294 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9252	R002	2667	181		NO	YES	94	
CURRENT RESIDENT OR WILLIS	4302 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9253	R002	2669	181		NO	YES	02	
CURRENT RESIDENT OR COZZI	4309 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9253	R002	2670	181		NO	YES	09	
CURRENT RESIDENT OR RUONA	6546 Old Hwy 2		CLOQUET	MN - MINNESOTA	55720	9261	R002	2672	181		NO	YES	46	
JODY KARG	6592 Old Hwy 2 W		CLOQUET	MN - MINNESOTA	55720	9261	R002	2674	181		YES	YES	92	10/24/2021
CURRENT RESIDENT OR BALLARD	7071 St. Louis River Rd W		CLOQUET	MN - MINNESOTA	55720	9218	R002	2679	181		NO	YES	71	
CURRENT RESIDENT OR WALDBILLIG	7091 St. Louis River Rd W		CLOQUET	MN - MINNESOTA	55720	9218	R002	2680	181		NO	YES	91	
CURRENT RESIDENT OR ALTONEN	6513 St. Louis River Rd		ESKO	MN - MINNESOTA	55733	9301	R001	2684	180		NO	YES	13	
CURRENT RESIDENT OR WHITTINGTON	7019 St. Louis River Rd W		CLOQUET	MN - MINNESOTA	55720	9218	R002	2685	181		NO	YES	19	
CURRENT RESIDENT OR LUND	3578 Stonelake Rd		CLOQUET	MN - MINNESOTA	55720	9287	R002	2686	181		NO	YES	78	
CURRENT RESIDENT OR LUNDGREN	4110 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	9249	R002	2687	181		NO	YES	10	
JACE ROCKSTAD	4160 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	9249	R002	2688	181		NO	YES	60	
CURRENT RESIDENT OR LARSON	4173 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	9249	R002	2689	181		NO	YES	73	
CURRENT RESIDENT OR GREENE	4196 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	9249	R002	2691	181		NO	YES	96	
CURRENT RESIDENT OR WARD	4201 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	8212	R002	2692	181		NO	YES	01	
LAWRENCE G SHELTON	7061 Klimek Rd		SAGINAW	MN - MINNESOTA	55779	9763	R003	2712	182		YES	NO	61	06/01/2022
CURRENT RESIDENT OR OLSON	4315 Tondryk Rd		SAGINAW	MN - MINNESOTA	55779	9695	R001	2759	182		NO	YES	15	
CURRENT RESIDENT OR NYNAS	4318 Tondryk Rd		SAGINAW	MN - MINNESOTA	55779	9695	R001	2760	182		NO	YES	18	
WADE OLSON	4396 Tondryk Rd		SAGINAW	MN - MINNESOTA	55779	9695	R001	2761	182		NO	YES	96	
JENNIFER THOMPSON	6732 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9776	R003	2768	182		NO	YES	32	
CURRENT RESIDENT OR SAWYER	6931 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9771	R003	2771	182		NO	YES	31	
CURRENT RESIDENT OR YOUNG	6992 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9771	R003	2772	182		NO	YES	92	
CURRENT RESIDENT OR BECKWITH	6999 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9709	R003	2773	182		NO	YES	99	
CURRENT RESIDENT OR SATHER	7005 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9765	R003	2774	182		NO	YES	05	
CURRENT RESIDENT OR GREENWOOD	7007 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9765	R003	2775	182		NO	YES	07	
CURRENT RESIDENT OR WHERLEY	7017 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9765	R003	2776	182		NO	YES	17	
JOSEPH MILLER	4722 Old Seville Rd		SAGINAW	MN - MINNESOTA	55779	9772	R003	2779	182		NO	YES	22	
CURRENT RESIDENT OR SWANSTROM	4724 Old Seville Rd		SAGINAW	MN - MINNESOTA	55779	9774	R003	2781	182		NO	YES	24	
CURRENT RESIDENT OR MAHNKE	7036 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9690	R001	2783	182		NO	YES	36	
CURRENT RESIDENT OR LAASE	4610 Jackson Rd N		SAGINAW	MN - MINNESOTA	55779	9700	R002	2784	182		NO	YES	10	
RONALD R NYLUND	6789 W Arrowhead Rd		SAGINAW	MN - MINNESOTA	55779	9696	R001	2795	182		YES	YES	89	07/27/2022
CURRENT RESIDENT OR GILBERTSON	6690 W Arrowhead Rd		SAGINAW	MN - MINNESOTA	55779	9696	R001	2796	182		NO	YES	90	
CURRENT RESIDENT OR HATINEN	4691 Ayers Rd		SAGINAW	MN - MINNESOTA	55779	9766	R003	2799	182		NO	YES	91	
CURRENT RESIDENT OR JOHNSON	4693 Ayers Rd		SAGINAW	MN - MINNESOTA	55779	9766	R003	2800	182		NO	YES	93	
KEVIN MAKI	4713 Ayers Rd		SAGINAW	MN - MINNESOTA	55779	9768	R003	2814	182		NO	YES	13	

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
CURRENT RESIDENT OR MAKI	4534 Bergquist Rd		SAGINAW	MN - MINNESOTA	55779	9794	R003	2833	182		NO	YES	34	
CURRENT RESIDENT OR SCHUBITZKE	6332 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9703	R003	2880	182		NO	YES	32	
CURRENT RESIDENT OR SELL	6262 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	2881	182		NO	YES	62	
LINDA STEPHENSON	6254 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	2882	182		NO	YES	54	
CURRENT RESIDENT OR CASKEY	6204 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	2883	182		NO	YES	04	
CURRENT RESIDENT	6177 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9793	R003	2884	182		NO	YES	77	
CURRENT RESIDENT OR SOBCZAK	6191 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9793	R003	2886	182		NO	YES	91	
CURRENT RESIDENT OR JACOBSON	6195 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9793	R003	2888	182		NO	YES	95	
CURRENT RESIDENT OR SEVERSON	6211 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	2889	182		NO	YES	11	
DAVID ROSSITER	6267 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	2893	182		YES	YES	67	03/09/2023
LEAH SPICER	6329 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9703	R003	2894	182		NO	YES	29	
CURRENT RESIDENT OR ROSSITER	6365 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9703	R003	2895	182		NO	YES	65	
GLORIA HANSON	6401 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9795	R003	2897	182		NO	YES	01	
CURRENT RESIDENT OR NELSON	6423 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9795	R003	2899	182		NO	YES	23	
CURRENT RESIDENT OR COPISKEY	6930 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9692	R001	2900	182		NO	YES	30	
DAMIAN HUFFER	6720 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9694	R001	2901	182		NO	YES	20	
CURRENT RESIDENT OR VITTORIO	6712 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9694	R001	2902	182		NO	YES	12	
CURRENT RESIDENT	6651 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9694	R001	2903	182		NO	YES	51	
CURRENT RESIDENT OR PALMI	6703 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9694	R001	2905	182		NO	YES	03	
ADAM AHO	6725 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9694	R001	2906	182		YES	YES	25	03/08/2023
CURRENT RESIDENT OR STROM	6803 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9692	R001	2908	182		NO	YES	03	
CURRENT RESIDENT OR KNUTSON	6863 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9692	R001	2910	182		NO	YES	63	
CURRENT RESIDENT OR SIEBER	6871 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9692	R001	2911	182		NO	YES	71	
CURRENT RESIDENT OR ERCEG	6993 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9692	R001	2912	182		NO	YES	93	
CURRENT RESIDENT OR HENKE	6735 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9503	R003	2917	182		NO	YES	35	
CURRENT RESIDENT OR RISDON	6733 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9504	R003	2918	182		NO	YES	33	
CURRENT RESIDENT OR	6344 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9507	R003	2925	182		NO	YES	44	
CURRENT RESIDENT OR BETZLER	6312 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9507	R003	2927	182		NO	YES	12	
CURRENT RESIDENT OR VANVALKENBURG	6234 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9510	R003	2939	182		NO	YES	34	
KEITH & SHARON OLSON	6565 Bergstrom Rd		SAGINAW	MN - MINNESOTA	55779	9573	R002	3149	182		NO	YES	65	
CURRENT RESIDENT OR HARNELL	6794 Industrial Rd		SAGINAW	MN - MINNESOTA	55779	9437	R002	3232	182		NO	YES	94	
DUAYNE A ANDERSON	6834 Industrial Rd		SAGINAW	MN - MINNESOTA	55779	9444	R001	3249	182		YES	YES	34	08/31/2022
CURRENT RESIDENT OR WARNER	7062 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9469	R003	3282	182		NO	YES	62	
CURRENT RESIDENT OR FABBRO	7057 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9469	R003	3284	182		NO	YES	57	
CURRENT RESIDENT OR PALYOK	7048 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9469	R003	3286	182		NO	YES	48	
CURRENT RESIDENT OR KLEJESKI	3519 Lindrose Rd		ESKO	MN - MINNESOTA	55733	9302	R001	3295	180		NO	YES	19	
CURRENT RESIDENT OR ZIELLS	6529 St. Louis River Rd		ESKO	MN - MINNESOTA	55733	9301	R001	3306	180		NO	YES	29	
CURRENT RESIDENT OR NIEMI	6557 St. Louis River Rd		ESKO	MN - MINNESOTA	55733	9301	R001	3308	180		NO	YES	57	
CURRENT RESIDENT OR ROBERTS	6583 St. Louis River Rd		ESKO	MN - MINNESOTA	55733	9301	R001	3309	180		NO	YES	83	
STEPHANIE FORSLUND	6673 St. Louis River Rd		ESKO	MN - MINNESOTA	55733	9304	R001	3311	180		YES	YES	73	08/19/2021
CURRENT RESIDENT OR CRANDALL	6785 St. Louis River Rd		ESKO	MN - MINNESOTA	55733	9305	R001	3312	180		NO	YES	85	
CURRENT RESIDENT OR MACDONALD	6459 Old Hwy 2		DULUTH	MN - MINNESOTA	55810	9571	R005	3352	109		NO	YES	59	
WLSSD	2626 COURTLAND ST		DULUTH	MN - MINNESOTA	55806	1813	C042	3433	119		YES	NO	26	03/31/2022
MARY MURPHY	5180 ARROWHEAD RD		HERMANTOWN	MN - MINNESOTA	55811	1327	C042	3479	122		YES	YES	80	12/23/2021
CURRENT RESIDENT OR LEPAGE	5628 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9711	R022	3584	112		NO	YES	28	
PAUL FISH	3935 Solway Rd		DULUTH	MN - MINNESOTA	55810	9725	R007	3587	110		YES	YES	35	11/01/2022
ROBERT SHULTZ	6336 Rose Rd		DULUTH	MN - MINNESOTA	55810	9723	R007	3588	110		YES	YES	36	11/21/2022
CURRENT RESIDENT OR BREIMON JR	6248 Rose Rd		DULUTH	MN - MINNESOTA	55810	9723	R007	3589	110		NO	YES	48	
CURRENT RESIDENT OR DALTON	6230 Rose Rd		DULUTH	MN - MINNESOTA	55810	4515	R007	3591	110		NO	YES	30	
CURRENT RESIDENT OR HANSON	6207 Rose Rd		DULUTH	MN - MINNESOTA	55810	4515	R007	3593	110		NO	YES	07	
TYESHAWN BRODIN	6138 Rose Rd		DULUTH	MN - MINNESOTA	55810	4514	R007	3595	110		NO	YES	38	
CURRENT RESIDENT OR PAPPAS	6114 Rose Rd		DULUTH	MN - MINNESOTA	55810	4514	R007	3596	110		NO	YES	14	
CURRENT RESIDENT OR RANDS	6113 Rose Rd		DULUTH	MN - MINNESOTA	55810	4514	R007	3597	110		NO	YES	13	
CURRENT RESIDENT OR AXTELL	4445 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9764	R007	3599	110		NO	YES	45	
HANK SEPPALA	4156 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9730	R007	3600	110		YES	YES	56	09/10/2021
CURRENT RESIDENT OR CLARK	4187 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9730	R007	3601	110		NO	YES	87	
CURRENT RESIDENT OR HANSON	4190 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9730	R007	3602	110		NO	YES	90	
CURRENT RESIDENT OR DUNAISKI	4212 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9762	R007	3603	110		NO	YES	12	
CURRENT RESIDENT OR DOMAGALA	4230 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9762	R007	3604	110		NO	YES	30	
CURRENT RESIDENT OR PANFIL	4240 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9762	R007	3605	110		NO	YES	40	
CURRENT RESIDENT OR DUNBAR	4243 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9762	R007	3606	110		NO	YES	43	
CURRENT RESIDENT OR SCHILLING	4266 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9762	R007	3607	110		NO	YES	66	

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
LEROY AND KATHLEEN HANSON	4294 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9762	R007	3608	110		YES	YES	94	08/18/2023
CURRENT RESIDENT OR NOVAK	4308 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9763	R007	3609	110		NO	YES	08	
CURRENT RESIDENT OR WARWICK	4330 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9763	R007	3610	110		NO	YES	30	
CURRENT RESIDENT OR SCHILLING	4381 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9763	R007	3611	110		NO	YES	81	
CURRENT RESIDENT OR GRICE	4315 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9763	R007	3612	110		NO	YES	15	
CURRENT RESIDENT OR CIESIELSKI	6078 Rose Rd		DULUTH	MN - MINNESOTA	55810	9731	R007	3613	110		NO	YES	78	
CURRENT RESIDENT OR GEVING	6073 Rose Rd		DULUTH	MN - MINNESOTA	55810	9731	R007	3614	110		NO	YES	73	
KAITLYN HALVERSON	6018 Rose Rd		DULUTH	MN - MINNESOTA	55810	9731	R007	3617	110		NO	YES	18	
CURRENT RESIDENT OR IVERSON	5985 Rose Rd		DULUTH	MN - MINNESOTA	55810	9731	R007	3618	110		NO	YES	85	
CURRENT RESIDENT OR PETERSON	4460 Woodgate Rd		DULUTH	MN - MINNESOTA	55810	9755	R007	3620	110		NO	YES	60	
CURRENT RESIDENT OR HILL	4458 Aspen Way		DULUTH	MN - MINNESOTA	55810	9733	R007	3621	110		NO	NO	58	
CURRENT RESIDENT OR SCHILLA	5965 Rose Rd		DULUTH	MN - MINNESOTA	55810	9734	R007	3622	110		NO	YES	65	
CURRENT RESIDENT OR BRADLEY	5959 Rose Rd		DULUTH	MN - MINNESOTA	55810	9734	R007	3623	110		NO	YES	59	
CURRENT RESIDENT OR VENNEVOLD	5953 Rose Rd		DULUTH	MN - MINNESOTA	55810	9734	R007	3626	110		NO	YES	53	
CURRENT RESIDENT OR BENSON	5942 Rose Rd		DULUTH	MN - MINNESOTA	55810	9734	R007	3628	110		NO	YES	42	
CURRENT RESIDENT OR KRAUSE	5939 Rose Rd		DULUTH	MN - MINNESOTA	55810	9734	R007	3629	110		NO	YES	39	
CURRENT RESIDENT OR HUGHES	5917 Rose Rd		DULUTH	MN - MINNESOTA	55810	9734	R007	3630	110		NO	YES	17	
CURRENT RESIDENT OR SUNDQUIST	4439 Solway Rd		DULUTH	MN - MINNESOTA	55810	9735	R007	3631	110		NO	YES	39	
CURRENT RESIDENT OR FAHRION	4425 Solway Rd		DULUTH	MN - MINNESOTA	55810	9735	R007	3632	110		NO	YES	25	
CURRENT RESIDENT OR SCANLON	4415 Solway Rd		DULUTH	MN - MINNESOTA	55810	9735	R007	3633	110		NO	YES	15	
CURRENT RESIDENT OR STONE	5903 Arrowhead Rd W		DULUTH	MN - MINNESOTA	55810	9736	R007	3635	110		NO	YES	03	
CURRENT RESIDENT OR JACKSON	5917 Arrowhead Rd W		DULUTH	MN - MINNESOTA	55810	9736	R007	3636	110		NO	YES	17	
CURRENT RESIDENT OR SKIBINSKI	5941 Arrowhead Rd W		DULUTH	MN - MINNESOTA	55810	9736	R007	3637	110		NO	YES	41	
KYLE PETERSON	5942 Arrowhead Rd W		DULUTH	MN - MINNESOTA	55810	9736	R007	3638	110		NO	YES	42	
STEVEN S WARREN	5954 Arrowhead Rd W		PROCTOR	MN - MINNESOTA	55810	9736	R007	3639	110		YES	YES	54	07/01/2022
CURRENT RESIDENT OR FLEURY	5964 Arrowhead Rd W		DULUTH	MN - MINNESOTA	55810	9736	R007	3640	110		NO	YES	64	
CURRENT RESIDENT OR BURKMAN	5976 Arrowhead Rd W		DULUTH	MN - MINNESOTA	55810	9736	R007	3641	110		NO	YES	76	
ANTHONY BANKS	4253 Solway Rd		DULUTH	MN - MINNESOTA	55810	9737	R007	3642	110		NO	NO	53	
CURRENT RESIDENT OR HARJU	4233 Solway Rd		DULUTH	MN - MINNESOTA	55810	9737	R007	3643	110		NO	YES	33	
LAURA NORDBERG	5927 Wargin Rd		DULUTH	MN - MINNESOTA	55810	9732	R007	3644	110		YES	YES	27	
RONALD G GAJEWSKI	5939 Wargin Rd		DULUTH	MN - MINNESOTA	55810	9732	R007	3645	110		YES	YES	39	03/21/2023
CURRENT RESIDENT OR HAJEK	5951 Wargin Rd		DULUTH	MN - MINNESOTA	55810	9732	R007	3646	110		NO	YES	51	
CURRENT RESIDENT OR WILSON	6002 Wargin Rd		DULUTH	MN - MINNESOTA	55810	9732	R007	3647	110		NO	YES	02	
CURRENT RESIDENT OR IDE	4149 Solway Rd		DULUTH	MN - MINNESOTA	55810	9739	R007	3648	110		NO	YES	49	
MARY HAGBERG	4117 Solway Rd		DULUTH	MN - MINNESOTA	55810	9739	R007	3649	110		YES	YES	17	09/23/2022
CURRENT RESIDENT OR BOYER	3539 Solway Rd		DULUTH	MN - MINNESOTA	55810	9503	R005	3682	109		NO	YES	39	
CURRENT RESIDENT OR CHILES	5963 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9506	R005	3687	109		NO	YES	63	
EVAN O'CONNOR	3603 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9507	R005	3688	109		NO	YES	03	
JOHN ROGALLA	3699 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9507	R005	3689	109		NO	YES	99	
CURRENT RESIDENT OR HASHEY	3849 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9510	R005	3691	109		NO	YES	49	
CURRENT RESIDENT OR PARROTT	3869 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9510	R005	3692	109		NO	YES	69	
CURRENT RESIDENT OR SCHMIDT	5987 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9578	R005	3693	109		NO	YES	87	
CURRENT RESIDENT OR MORGAN	6024 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9511	R005	3694	109		NO	YES	24	
CURRENT RESIDENT OR PARKER	6029 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9511	R005	3695	109		NO	YES	29	
CURRENT RESIDENT OR PARROTT	6087 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9511	R005	3696	109		NO	YES	87	
CURRENT RESIDENT OR SCHILLING	6043 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9511	R005	3697	109		NO	YES	43	
CURRENT RESIDENT OR MERCIER	6214 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9580	R005	3698	109		NO	YES	14	
CURRENT RESIDENT OR PILEGAARD	6064 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9511	R005	3699	109		NO	NO	64	
CURRENT RESIDENT OR WEYANDT	3780 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9512	R005	3702	109		NO	YES	80	
CURRENT RESIDENT OR PRIOLO	3763 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9512	R005	3704	109		NO	YES	63	
SCOTT HAEDRICH	3738 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9512	R005	3706	109		YES	YES	3838	08/07/2021
JESSICA PATNAUDE	3751 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9512	R005	3707	109		NO	NO	3131	
CURRENT RESIDENT OR MAKI	6005 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9583	R005	3708	109		NO	YES	0505	
CURRENT RESIDENT OR GULBRANSON	6049 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9583	R005	3709	109		NO	YES	49	
JOHN & KAREN ROGALLA	6063 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9583	R005	3710	109		NO	YES	6363	
CURRENT RESIDENT OR BARNARD	6090 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9583	R005	3712	109		NO	YES	9090	
DEANNA PRIOLA	6102 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9584	R005	3714	109		YES	YES	0202	03/28/2023
CURRENT RESIDENT OR WHITMAN	6121 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9584	R005	3715	109		NO	YES	2121	
CURRENT RESIDENT OR VANARMAN	6123 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9584	R005	3716	109		NO	YES	2323	
CURRENT RESIDENT OR ELLISON	6131 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9584	R005	3717	109		NO	YES	31	
GAYLE & JOEL ZIELLS	6164 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9584	R005	3721	109		YES	NO	64	10/01/2021
CURRENT RESIDENT OR FAINT	6171 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9584	R005	3722	109		NO	YES	71	

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
CURRENT RESIDENT OR NELSON	6195 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9584	R005	3723	109		NO	YES	95	
CURRENT RESIDENT OR BAKKEN	6207 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9513	R005	3726	109		NO	YES	07	
CURRENT RESIDENT OR KING	6214 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9513	R005	3729	109		NO	YES	14	
CURRENT RESIDENT OR WOOD	6215 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9513	R005	3730	109		NO	YES	15	
CURRENT RESIDENT OR O'CONNOR	3740 Bailey Rd		DULUTH	MN - MINNESOTA	55810	9500	R005	3732	109		NO	YES	40	
CURRENT RESIDENT OR CARLSON	3721 Bailey Rd		DULUTH	MN - MINNESOTA	55810	9500	R005	3734	109		NO	YES	21	
CURRENT RESIDENT OR GUTHRIE	3730 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9514	R005	3740	109		NO	YES	30	
CURRENT RESIDENT OR CARLSON	3761 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9514	R005	3741	109		NO	YES	61	
CURRENT RESIDENT OR CARROLL	6264 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9581	R005	3746	109		NO	YES	64	
CURRENT RESIDENT OR SUOMELA	6328 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9515	R005	3747	109		NO	YES	28	
CURRENT RESIDENT OR CARROLL	6356 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9515	R005	3748	109		NO	YES	56	
CURRENT RESIDENT OR HARTLEY	6415 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9582	R005	3749	109		NO	YES	15	
CURRENT RESIDENT OR MCGREGOR	3821 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9516	R005	3750	109		NO	YES	21	
JAMES L MILLER	3880 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9516	R005	3751	109		YES	YES	80	12/24/2022
CURRENT RESIDENT OR BERG	3892 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9516	R005	3752	109		NO	YES	92	
CURRENT RESIDENT OR MOE	3887 Pine Ridge Dr		DULUTH	MN - MINNESOTA	55810	9517	R005	3753	109		NO	YES	87	
SCOTT MOE	3878 Pine Ridge Dr		DULUTH	MN - MINNESOTA	55810	9517	R005	3754	109		YES	YES	78	08/24/2023
CURRENT RESIDENT OR MANDERUD	6241 Hermantown Rd		DULUTH	MN - MINNESOTA	55810	9569	R005	3755	109		NO	YES	41	
CURRENT RESIDENT OR WARGIN	6186 Hermantown Rd		DULUTH	MN - MINNESOTA	55810	9569	R005	3756	109		NO	YES	86	
CURRENT RESIDENT OR	3913 JEFFREY RD		DULUTH	MN - MINNESOTA	55810	9533	R005	3757	109		NO	YES	13	
CURRENT RESIDENT OR ADRIAN HANSON	3951 Jeffrey Rd		DULUTH	MN - MINNESOTA	55810	9533	R005	3758	109		NO	YES	51	
CURRENT RESIDENT OR SAVO	6357 Old Hwy 2		DULUTH	MN - MINNESOTA	55810	9520	R005	3762	109		NO	YES	57	
CURRENT RESIDENT OR STENBERG	4042 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9521	R005	3764	109		NO	YES	42	
CURRENT RESIDENT OR BUSCH JR	4069 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9521	R005	3765	109		NO	YES	69	
CURRENT RESIDENT OR THOMPSON	4083 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9521	R005	3766	109		NO	YES	83	
CURRENT RESIDENT OR VOGEL	6287 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9592	R005	3768	109		NO	YES	87	
CURRENT RESIDENT OR FOURNIER	6219 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9592	R005	3769	109		NO	YES	19	
CURRENT RESIDENT OR WELSH	4134 Jeffrey Rd		DULUTH	MN - MINNESOTA	55810	9523	R005	3773	109		NO	YES	34	
CURRENT RESIDENT OR SORENSON	4129 Jeffrey Rd		DULUTH	MN - MINNESOTA	55810	9523	R005	3774	109		NO	YES	29	
CURRENT RESIDENT OR LARSON	4105 Jeffrey Rd		DULUTH	MN - MINNESOTA	55810	9523	R005	3775	109		NO	YES	05	
CURRENT RESIDENT OR JOHNSON	6128 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9524	R005	3778	109		NO	YES	28	
CURRENT RESIDENT OR WINDUS	6090 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9525	R005	3779	109		NO	YES	90	
CURRENT RESIDENT OR KOLENDA	6071 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9525	R005	3780	109		NO	YES	71	
CURRENT RESIDENT OR OSWALD	6059 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9525	R005	3781	109		NO	YES	59	
CURRENT RESIDENT OR CHERNEY	6047 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9525	R005	3782	109		NO	YES	47	
CURRENT RESIDENT OR CLARK	6035 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9525	R005	3783	109		NO	YES	35	
CURRENT RESIDENT OR HEWETT	5995 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9526	R005	3786	109		NO	YES	95	
CURRENT RESIDENT OR SWANSON	5961 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9526	R005	3788	109		NO	YES	61	
CURRENT RESIDENT OR CARDINAL	5912 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9526	R005	3790	109		NO	YES	12	
TERRANCE R JOHNSON	4037 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9527	R005	3792	109		NO	YES	37	10/23/2021
BRAD & TONYA KOLENDA	4012 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9527	R005	3793	109		YES	YES	12	07/08/2023
CHAD LOWREY	4000 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9527	R005	3794	109		YES	YES	00	04/14/2023
LEXI OLIVER	3977 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	1687	R005	3795	109		NO	YES	77	
CURRENT RESIDENT OR LEVEILLE	6007 Hwy 2		DULUTH	MN - MINNESOTA	55810	9588	R005	3796	109		NO	YES	07	
TAMMY LOFDAHL	6099 Hwy 2		DULUTH	MN - MINNESOTA	55810	9508	R005	3798	109		YES	YES	99	10/17/2020
MARCIE & JEFF KEPPERS	6115 Hwy 2		PROCTOR	MN - MINNESOTA	55810	9587	R005	3799	109		YES	YES	15	01/03/2023
CURRENT RESIDENT OR LEMIRE	6127 Hwy 2		DULUTH	MN - MINNESOTA	55810	9591	R005	3800	109		NO	YES	27	
SAGE HENDERSON	6084 Hwy 2		DULUTH	MN - MINNESOTA	55810	9531	R005	3802	109		NO	YES	84	
CURRENT RESIDENT OR LUNKE	6066 Hwy 2		DULUTH	MN - MINNESOTA	55810	9531	R005	3803	109		NO	YES	66	
CURRENT RESIDENT OR LAFLAMME	6016 Hwy 2		DULUTH	MN - MINNESOTA	55810	9531	R005	3804	109		NO	YES	16	
MICAH ROSEEN	5987 Hwy 2		DULUTH	MN - MINNESOTA	55810	9528	R005	3805	109		NO	YES	87	
CURRENT RESIDENT OR PETERSON	5911 Hwy 2		DULUTH	MN - MINNESOTA	55810	9528	R005	3806	109		NO	YES	11	
FRANKIE DEDOMINCES	1405 ROBERT AVE		CLOQUET	MN - MINNESOTA	55720			3808	181		YES	YES		02/02/2023
MARK WARD	5947 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9568	R005	3818	109		YES	YES	47	12/22/2022
CURRENT RESIDENT OR RAIHO	5959 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9568	R005	3819	109		NO	YES	59	
PETER & ALLIE HAFFTEN	5971 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9568	R005	3820	109		YES	YES	71	06/11/2020
CURRENT RESIDENT OR CARLSON	5993 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9568	R005	3822	109		NO	YES	93	
CURRENT RESIDENT OR JOHANSON	6087 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9539	R005	3823	109		NO	YES	87	
CURRENT RESIDENT OR BROWN	6117 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9540	R005	3824	109		NO	YES	17	
CURRENT RESIDENT OR DINCAU	6177 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9540	R005	3825	109		NO	YES	77	
CURRENT RESIDENT OR CHILDS	3523 Mettsa Rd		DULUTH	MN - MINNESOTA	55810	9554	R005	3826	109		NO	YES	23	
CURRENT RESIDENT OR WOODS	3556 Mettsa Rd		DULUTH	MN - MINNESOTA	55810	9541	R005	3827	109		NO	YES	56	

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CURRENT RESIDENT OR WOODS	3557 Mettsa Rd		DULUTH	MN - MINNESOTA	55810	9554	R005	3828	109		NO	YES	57	
CURRENT RESIDENT OR CHILDS	6207 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9553	R005	3829	109		NO	YES	07	
TOWN OF MIDWAY C/0 LOIS LENNARTSON	3302 Midway Rd		DULUTH	MN - MINNESOTA	55810	9546	R005	3847	109		NO	YES	02	
PAUL SNEIDE	5331 Ugstad Jct Rd		DULUTH	MN - MINNESOTA	55810	9768	R022	3933	112		YES	YES	31	09/10/2022
CURRENT RESIDENT OR DAVEAU	6260 SEVILLE RD		SAGINAW	MN - MINNESOTA	55779	9510	R003	3948	182		NO	YES	60	
GENE CLARK	4222 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9762	R007	3959	110		NO	YES	22	
CURRENT RESIDENT OR FERRAZZI	4447 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9764	R007	3961	110		NO	YES	47	
CURRENT RESIDENT OR SWANSON	4458 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9764	R007	3962	110		NO	YES	58	
CURRENT RESIDENT OR RANDS	4535 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55811	9607	R002	3963	122		NO	YES	35	
CURRENT RESIDENT OR SHELTON	4536 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55811	9607	R002	3964	122		NO	YES	36	
CURRENT RESIDENT OR SIEVERS	4549 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55811	9607	R002	3965	122		NO	YES	49	
CURRENT RESIDENT OR KNAFFLA	4624 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55811	9607	R002	3967	122		NO	YES	24	
CURRENT RESIDENT OR KYLLONEN	4646 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55811	9607	R002	3968	122		NO	YES	46	
CURRENT RESIDENT OR BEAUDIN	4666 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55811	9607	R002	3970	122		NO	YES	66	
CURRENT RESIDENT OR BUSH	4678 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55811	9607	R002	3971	122		NO	YES	78	
CURRENT RESIDENT OR SATHERS	4643 Hanson Rd		DULUTH	MN - MINNESOTA	55811	9609	R002	4033	122		NO	YES	43	
CURRENT RESIDENT OR JACKSON	4515 HANSON Rd		DULUTH	MN - MINNESOTA	55811	9605	R002	4034	122		NO	YES	15	
CURRENT RESIDENT OR JOHNSON	5962 Seville Rd		DULUTH	MN - MINNESOTA	55811	9610	R002	4293	122		NO	YES	62	
CURRENT RESIDENT OR EIMER	5974 Seville Rd		DULUTH	MN - MINNESOTA	55811	9610	R002	4294	122		NO	YES	74	
CURRENT RESIDENT OR GEVING	6014 Seville Rd		DULUTH	MN - MINNESOTA	55811	9608	R002	4296	122		NO	YES	14	
CURRENT RESIDENT OR HOUSER	6016 Seville Rd		DULUTH	MN - MINNESOTA	55811	9608	R002	4297	122		NO	YES	16	
CURRENT RESIDENT OR SCHMIDT	6058 Seville Rd		DULUTH	MN - MINNESOTA	55811	9608	R002	4300	122		NO	YES	58	
EISENHAUER OR CURRENT RESIDENT	6092 Seville Rd		DULUTH	MN - MINNESOTA	55811	9608	R002	4302	122		NO	YES	92	
CURRENT RESIDENT OR HILLMAN	4545 Solway Rd		DULUTH	MN - MINNESOTA	55811	9611	R002	4343	122		NO	YES	45	
CURRENT RESIDENT OR CARDINAL	6007 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9539	R005	4385	109		NO	YES	07	
CURRENT RESIDENT OR LALIBERTE	6041 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9539	R005	4386	109		NO	YES	41	
CURRENT RESIDENT OR ANDERSON	4476 Woodgate Rd		DULUTH	MN - MINNESOTA	55810	9755	R007	4463	110		NO	YES	76	
CANOSIA TOWNSHIP	4896 Midway Rd		DULUTH	MN - MINNESOTA	55811	9765	R001	4488	122		NO	YES	96	
CURRENT RESIDENT OR LENIUS	6049 Hwy 194		DULUTH	MN - MINNESOTA	55811	9606	R002	4598	122		NO	YES	49	
CURRENT RESIDENT OR JOHNSON	6054 Hwy 194		DULUTH	MN - MINNESOTA	55811	9606	R002	4599	122		NO	YES	54	
CURRENT RESIDENT OR KOLOJESKI	6077 Hwy 194		DULUTH	MN - MINNESOTA	55811	9606	R002	4600	122		NO	YES	77	
CURRENT RESIDENT OR MORRIS	6078 Hwy 194		DULUTH	MN - MINNESOTA	55811	9606	R002	4601	122		NO	YES	78	
CURRENT RESIDENT OR TAMMEN	6085 Hwy 194		DULUTH	MN - MINNESOTA	55811	9606	R002	4602	122		NO	YES	85	
DAVE RANDS	6091 Hwy 194		DULUTH	MN - MINNESOTA	55811	9606	R002	4603	122		YES	YES	91	09/03/2022
RICHARD FLESVIG	4052 Jeffrey Rd		DULUTH	MN - MINNESOTA	55810	9519	R005	4615	109		YES	YES	52	11/11/2021
CURRENT RESIDENT OR RODDA	5429 Martin Rd		DULUTH	MN - MINNESOTA	55811	9706	R001	4662	122		NO	YES	29	
CURRENT RESIDENT OR	3505 SOLWAY RD		HERMANTOWN	MN - MINNESOTA	55810	9503	R005	4845	109	NO	NO	NO	05	
CURRENT RESIDENT OR HILDEN	4202 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9252	R002	4887	181	NO	NO	YES	02	
RAYMOND TIGUE	3962 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9254	R002	4895	181	NO	YES	YES	62	07/26/2022
KATHY JOHNSON	3660 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9268	R002	4898	181	NO	YES	YES	60	09/19/2023
MARY ANN TAST	161 N CLOQUET RD E		ESKO	MN - MINNESOTA	55733	9405	R001	4917	180	NO	YES	NO	61	08/11/2023
MARTELL OR CURRENT RESIDENT	4683 HANSON RD		DULUTH	MN - MINNESOTA	55811	9609	R002	4980	122	NO	NO	YES	83	
CURRENT RESIDENT OR WIGG	4038 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9255	R002	5065	181	NO	NO	YES	38	
CURRENT RESIDENT OR MEWES	4607 CANOSIA RD		SAGINAW	MN - MINNESOTA	55779	9505	R003	5067	182	NO	NO	YES	07	
ROBERT A SILVERNESS	5437 SHADY LANE		DULUTH	MN - MINNESOTA	55811	9734	R001	5086	122	NO	YES	YES	37	06/08/2023
LORI MICKELSON	6231 HWY 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	5163	182	NO	NO	YES	31	
SUSAN JOHNSON	6942 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9278	R002	5194	181	NO	YES	YES	42	09/25/2021
CURRENT RESIDENT OR HITE	5969 WARGIN RD		DULUTH	MN - MINNESOTA	55810	9732	R007	5199	110	NO	NO	YES	69	
CURRENT RESIDENT OR YOKI	5982 SEVILLE RD		DULUTH	MN - MINNESOTA	55811	9610	R002	5228	122	NO	NO	YES	82	
CURRENT RESIDENT OR COBB	5954 rose rd		DULUTH	MN - MINNESOTA	55810	9734	R007	5252	110	NO	NO	YES	54	
CURRENT RESIDENT MORAN	4466 ASPENWAY RD		DULUTH	MN - MINNESOTA	55810	9733	R007	5351	110	NO	NO	YES	66	
MIKE KRATT	5972 MORRIS THOMAS RD		DULUTH	MN - MINNESOTA	55810	9506	R005	5473	109	NO	YES	NO	72	09/01/2022
KAIYA & BENJAMIN FELLAND	3985 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9254	R002	5475	181	NO	NO	YES	85	
CURRENT RESIDENT OR KIRKMAN	3743 MATTSON RD		CLOQUET	MN - MINNESOTA	55720	9270	R002	5477	181	NO	NO	YES	43	
CURRENT RESIDENT OR KASPSZAK	6337 MAPLE GROVE RD		CLOQUET	MN - MINNESOTA	55720	9250	R002	5478	181	NO	NO	YES	37	
CURRENT RESIDENT OR SPEHAR	3679 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9268	R002	5479	181	NO	NO	YES	79	
CURRENT RESIDENT OR POGORELEC	3682 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9268	R002	5480	181	NO	NO	YES	82	
CURRENT RESIDENT OR ERICKSON	4465 ASPEN WAY		DULUTH	MN - MINNESOTA	55810	9733	R007	5586	110	NO	NO	YES	65	
CURRENT RESIDENT OR PRIVETTE	5928 W ARROWHEAD RD		DULUTH	MN - MINNESOTA	55810	9736	R007	5629	110	NO	NO	YES	28	
TODD WILMOT	6916 MAPLE GROVE RD		CLOQUET	MN - MINNESOTA	55720	9237	R002	5810	181	NO	YES	YES	16	08/26/2021
CURRENT RESIDENT OR ANDERSON	4450 ASPEN WAY		DULUTH	MN - MINNESOTA	55810	9733	R007	5892	110	NO	NO	YES	50	
KAREN & PETER HILDRE	3929 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9254	R002	5935	181	NO	NO	YES	29	

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
MAKENZIE ADAMS	3759 MATTSON RD		CLOQUET	MN - MINNESOTA	55720	9270	R002	5939	181	NO	NO	YES	59	
CURRENT RESIDENT OR BENKO	3970 CROSBY		CLOQUET	MN - MINNESOTA	55720	9282	R002	5944	181	NO	NO	YES	70	
CURRENT RESIDENT OR CHARON	7066 HEINE RD		CLOQUET	MN - MINNESOTA	55720	9280	R002	5945	181	NO	NO	YES	66	
JASON & NICOLE LENZ	6665 ARROWHEAD RD W		CLOQUET	MN - MINNESOTA	55720	9692	R002	5946	181	NO	YES	YES	65	09/15/2023
CURRENT RESIDENT OR TOBOLASKI	3950 CROSBY RD		CLOQUET	MN - MINNESOTA	55720	9282	R002	5948	181	NO	NO	YES	50	
CURRENT RESIDENT OR HILDRE	3943 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9254	R002	5949	181	NO	NO	YES	43	
CURRENT RESIDENT OR JOHNSON	3917 JACKSON RD		CLOQUET	MN - MINNESOTA	55720	9276	R002	5951	181	NO	NO	YES	17	
CURRENT RESIDENT OR HEINO	6989 ST LOUIS RIVER RD W		CLOQUET	MN - MINNESOTA	55720	9204	R002	5955	181	NO	NO	YES	89	
CURRENT RESIDENT OR MARCINIAK	3846 CROSBY RD		CLOQUET	MN - MINNESOTA	55720	9295	R002	5959	181	NO	NO	YES	46	
CURRENT RESIDENT OR	3968 CROSBY RD		CLOQUET	MN - MINNESOTA	55720	9282	R002	5964	181	NO	NO	YES	68	
BRENT PAULSON	3972 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9262	R002	5965	181	NO	NO	YES	72	
ANTHONY TRIBBY	4718 DOW RD		SAGINAW	MN - MINNESOTA	55779	9769	R003	5979	182	NO	NO	YES	18	
CURRENT RESIDENT OR CHAPIN	3550 CROSBY RD		CLOQUET	MN - MINNESOTA	55720	9293	R002	5988	181	NO	NO	YES	50	
RICHARD CARLSON	6558 W ARROWHEAD RD		CLOQUET	MN - MINNESOTA	55720	9246	R002	5989	181	NO	NO	YES	58	
CURRENT RESIDENT OR FORSTROM	6611 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9272	R002	5990	181	NO	NO	YES	11	
CURRENT RESIDENT OR BENTLEY	3858 CROSBY RD		CLOQUET	MN - MINNESOTA	55720	9295	R002	5991	181	NO	NO	YES	58	
CURRENT RESIDENT OR	6869 MAPLE GROVE RD		CLOQUET	MN - MINNESOTA	55720	9216	R002	5994	181	NO	NO	YES	69	
CURRENT RESIDENT OR SULLIVAN	7094 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9281	R002	5995	181	NO	NO	YES	94	
CURRENT RESIDENT OR KRSIEAN	4312 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9253	R002	5996	181	NO	NO	YES	12	
COMMISSIONER PETE STAUBER	100 N 5TH AVE W #202		DULUTH	MN - MINNESOTA	55802	1211	C026	6062	115	NO	NO	NO	52	
COLEEN ST MARIE	6274 HWY 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	6064	182	NO	NO	YES	74	
GARY & JEANNE KOIVISTO	4646 HANSON RD		DULUTH	MN - MINNESOTA	55811	9609	R002	6090	122	NO	YES	NO	46	07/25/2022
CURRENT RESIDENT OR NELSON	6154 JERRY RD		DULUTH	MN - MINNESOTA	55810	9579	R005	6101	109	NO	NO	YES	54	
CURRENT RESIDENT OR MAYRY	6105 SEVILLE RD		SAGINAW	MN - MINNESOTA	55779	9510	R003	6105	182	NO	NO	YES	05	
MILLER OR CURRENT RESIDENT	4624 HANSON RD		DULUTH	MN - MINNESOTA	55811	9609	R002	6112	122	NO	NO	YES	24	
CURRENT RESIDENT OR EKLUND	4137 SOLWAY RD		DULUTH	MN - MINNESOTA	55810	9739	R007	6116	110	NO	NO	YES	37	
LAWRENCE G SHELTON	7026 SAGINAW RD		SAGINAW	MN - MINNESOTA	55779	9410	R003	6190	182		NO	NO	26	
CURRENT RESIDENT OR SHELTON	P O BOX 94		SAGINAW	MN - MINNESOTA	55779	94	B001	6239	182	NO	NO	YES	94	
ROLAND OR CURRENT RESIDENT	5954 HWY 194		DULUTH	MN - MINNESOTA	55811	9604	R002	6358	122	NO	NO	YES	54	
STEVE SHOUTS	4004 LEISTE RD		CLOQUET	MN - MINNESOTA	55720	9240	R002	6372	181	NO	YES	YES	04	12/13/2021
CURRENT RESIDENT	3930 JEFFREY RD		PROCTOR	MN - MINNESOTA	55810	9533	R005	6377	109	NO	NO	YES	30	
CURRENT RESIDENT OR CARROLL	4473 ASPEN WAY		DULUTH	MN - MINNESOTA	55810	9733	R007	6381	110	NO	NO	NO	73	
CURRENT RESIDENT OR WILLIAMS	3855 JACKSON RD		CLOQUET	MN - MINNESOTA	55720	9277	R002	6389	181	NO	NO	YES	55	
CURRENT RESIDENT OR LINDHOLM	3867 JACKSON RD		CLOQUET	MN - MINNESOTA	55720	9277	R002	6390	181	NO	NO	YES	67	
CURRENT RESIDENT OR PULKRABEK	6907 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9278	R002	6391	181	NO	NO	YES	07	
CURRENT RESIDENT OR CARL	6618 ARROWHEAD RD W		CLOQUET	MN - MINNESOTA	55720	9692	R002	6395	181	NO	NO	YES	18	
CARMAN HULTGREN	6865 ST LOUIS RIVER RD		ESKO	MN - MINNESOTA	55733	9306	R001	6396	180	NO	YES	YES	65	10/21/2021
CURRENT RESIDENT OR SERTICH	6018 SEVILLE RD		DULUTH	MN - MINNESOTA	55811	9608	R002	6403	122	NO	NO	YES	18	
CURRENT RESIDENT OR PITTACK	5979 BIRCHWAY RD		DULUTH	MN - MINNESOTA	55810	9769	R007	6407	110	NO	NO	YES	79	
ASHLEY BIRD	4567 CARIBOU LAKE RD		DULUTH	MN - MINNESOTA	55811	9607	R002	6412	122	NO	NO	YES	67	
HEIDI HANSON	6046 ARROWHEAD RD W		PROCTOR	MN - MINNESOTA	55810	9754	R007	6415	110	NO	NO	YES	46	
CURRENT RESIDENT OR	4029 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9255	R002	6416	181	NO	NO	NO	29	
HEATHER NYLAND	6955 MAPLE GROVE RD		CLOQUET	MN - MINNESOTA	55720	9237	R002	6420	181	NO	YES	YES	55	12/13/2021
PRES LATHER WOLTER JR	13325 COUNTY RD 33		NORWOOD	MN - MINNESOTA	55368	9699	R003	6421	211	NO	NO	NO	25	
MINN. ASSOC. OF TOWNSHIPS	P O BOX 267		ST MICHAEL	MN - MINNESOTA	55376	267	B003	6422	211	NO	NO	NO	67	
CURRENT RESIDENT OR STOLAN	P O BOX 332		CLOQUET	MN - MINNESOTA	55720	332	B002	6423	181	NO	NO	NO	32	
CURRENT RESIDENT OR HALL	3963 LEISTE RD		CLOQUET	MN - MINNESOTA	55720	8207	R002	6424	181	NO	NO	YES	63	
CURRENT RESIDENT OR LAURENT	4294 VAN GASSLER RD		CLOQUET	MN - MINNESOTA	55720	8212	R002	6426	181	NO	NO	YES	94	
LOGAN FOLLETT	3623 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	8215	R002	6427	181	NO	NO	YES	23	
CHARLIE MARTIN	4160 PETERSON RD		CLOQUET	MN - MINNESOTA	55720	9236	R002	6428	181	NO	NO	YES	60	
CURRENT RESIDENT OR DOCKENDORF	6568 ARROWHEAD RD W		CLOQUET	MN - MINNESOTA	55720	9246	R002	6429	181	NO	NO	NO	68	
CURRENT RESIDENT JOHNSON	4366 VAN GASSLER RD		CLOQUET	MN - MINNESOTA	55720	9248	R002	6430	181	NO	NO	NO	66	
CURRENT RESIDENT OR CHERRA	6272 Rose Rd		DULUTH	MN - MINNESOTA	55810	9723	R007	6433	110	NO	NO	YES	72	
CURRENT RESIDENT OR SALO	5931ARROWHEAD RD W		DULUTH	MN - MINNESOTA	55810	9736	R007	6438	110	NO	NO	YES	31	
CURRENT RESIDENT OR DAHLIN	4249 Solway Rd		DULUTH	MN - MINNESOTA	55810	9737	R007	6439	110	NO	NO	YES	49	
CURRENT RESIDENT OR SCHILLING	4489 Solway Rd		DULUTH	MN - MINNESOTA	55810	9735	R007	6440	110	NO	NO	YES	89	
CURRENT RESIDENT OR	7021 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9410	R003	6442	182	NO	NO	YES	21	
CURRENT RESIDENT OR MORNEAU	7072 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9469	R003	6444	182	NO	NO	YES	72	
CURRENT RESIDENT OR MCCUSKEY	7050 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9469	R003	6447	182	NO	NO	YES	50	
CINDY GRAVES	6194 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9579	R005	6448	109	NO	NO	NO	94	
CURRENT RESIDENT OR SWEDBERG	6124 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9579	R005	6449	109	NO	NO	NO	24	
KAREN PATNAUDE	3751 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9512	R005	6450	109	NO	YES	YES	51	08/30/2023

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
D KALDAHL	3755 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9512	R005	6451	109	NO	YES	YES	55	09/06/2021
CURRENT RESIDENT OR SULIIN	6345 HERMANTOWN RD		HERMANTOWN	MN - MINNESOTA	55810	9567	R005	6452	109	NO	NO	YES	45	
CURRENT RESIDENT OR ISABELL	6099 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9539	R005	6455	109	NO	NO	YES	99	
EVAN ZIELLS	6174 MORRIS THOMAS RD		DULUTH	MN - MINNESOTA	55810	9584	R005	6459	109	NO	NO	YES	74	
CURRENT RESIDENT OR SZYMCZA	6203 MORRIS THOMAS RD		PROCTOR	MN - MINNESOTA	55810	9513	R005	6460	109	NO	NO	YES	03	
CURRENT RESIDENT OR WEIR	6212 MORRIS THOMAS RD		PROCTOR	MN - MINNESOTA	55810	9513	R005	6461	109	NO	NO	YES	12	
CURRENT RESIDENT OR HALLER	6285 MORRIS THOMAS RD		PROCTOR	MN - MINNESOTA	55810	9513	R005	6462	109	NO	NO	YES	85	
CURRENT RESIDENT OR CLIFT	6204 MORRIS THOMAS RD		DULUTH	MN - MINNESOTA	55810	9513	R005	6463	109	NO	NO	YES	04	
CURRENT RESIDENT OR ODONNELL	6210 MORRIS THOMAS RD		DULUTH	MN - MINNESOTA	55810	9513	R005	6464	109	NO	NO	YES	10	
CURRENT RESIDENT OR	6425 HWY 194		SAGINAW	MN - MINNESOTA	55779	9795	R003	6466	182	NO	NO	NO	25	
CURRENT RESIDENT OR BRAINARD	6168 HWY 194		SAGINAW	MN - MINNESOTA	55779	9793	R003	6467	182	NO	NO	YES	68	
CURRENT RESIDENT OR SKARBAKKA	6959 SEVILLE RD		SAGINAW	MN - MINNESOTA	55779	9771	R003	6468	182	NO	NO	YES	59	
MARILYN SCHNOBRICH	5965 Hwy 2		DULUTH	MN - MINNESOTA	55810	9528	R005	6470	109	NO	YES	YES	65	09/13/2022
CURRENT RESIDENT OR WARNER	7043 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9690	R001	6476	182	NO	NO	YES	43	
CURRENT RESIDENT OR	7045 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9469	R003	6478	182	NO	NO	YES	45	
CURRENT RESIDENT OR STEVENSON	7089 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9469	R003	6479	182	NO	NO	YES	89	
CURRENT RESIDENT OR OLSEN	3866 Pine Ridge Dr		DULUTH	MN - MINNESOTA	55810	9517	R005	6480	109	NO	NO	YES	66	
CURRENT RESIDENT OR HARGER	3750 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9514	R005	6481	109	NO	NO	YES	50	
CURRENT RESIDENT OR HENDRICKSON	3885 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9516	R005	6482	109	NO	NO	YES	85	
CURRENT RESIDENT OR THOMAS	6387 Old Hwy 2		DULUTH	MN - MINNESOTA	55810	9520	R005	6483	109	NO	NO	YES	87	
CURRENT RESIDENT OR JOHNSON	6089 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9525	R005	6485	109	NO	NO	YES	89	
CURRENT RESIDENT OR RUNQUIST	6171 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9524	R005	6486	109	NO	NO	YES	71	
CURRENT RESIDENT OR SMOLNIKAR	4469 ASPEN WAY RD		DULUTH	MN - MINNESOTA	55810	9733	R007	6488	110	NO	NO	YES	69	
ERIN ADAMS	4453 ASPEN WAY RD		DULUTH	MN - MINNESOTA	55810	9733	R007	6489	110	NO	NO	NO	53	
CURRENT RESIDENT OR MAKELA	5976 BIRCHWAY RD		DULUTH	MN - MINNESOTA	55810	9769	R007	6491	110	NO	NO	YES	76	
MASON KALNBACH	5991 Birchway Rd		DULUTH	MN - MINNESOTA	55810	9769	R007	6492	110	NO	NO	YES	91	
CURRENT RESIDENT OR SEDOR	6977 Maple Grove Rd		CLOQUET	MN - MINNESOTA	55720	9237	R002	6496	181	NO	NO	YES	77	
CURRENT RESIDENT OR CARLSON	6662 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9241	R002	6500	181	NO	NO	YES	62	
CURRENT RESIDENT OR LESTER	7088 Maple Grove Rd		CLOQUET	MN - MINNESOTA	55720	9235	R002	6501	181	NO	NO	YES	88	
CURRENT RESIDENT OR WALKOWIAK	6440 Maple Grove Rd		CLOQUET	MN - MINNESOTA	55720	9209	R002	6503	181	NO	NO	YES	40	
CURRENT RESIDENT OR FINNEGAN	4027 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9255	R002	6509	181	NO	NO	YES	27	
CURRENT RESIDENT OR SMEDSHAMMER	4139 PETERSON RD		CLOQUET	MN - MINNESOTA	55720	9236	R002	6511	181	NO	NO	YES	39	
CURRENT RESIDENT OR GREYDON	6067 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9539	R005	6516	109	NO	NO	YES	67	
CURRENT RESIDENT OR BISHOP	6377 St. Louis River Rd W		CLOQUET	MN - MINNESOTA	55720	9267	R002	6518	181	NO	NO	YES	77	
CURRENT RESIDENT OR FOX	4042 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9527	R005	6522	109	NO	NO	YES	42	
CURRENT RESIDENT OR ROJAS	6028 SEVILLE RD		DULUTH	MN - MINNESOTA	55811	9608	R002	6524	122	NO	NO	YES	28	
CURRENT RESIDENT OR POLZIN	6314 SEVILLE RD		SAGINAW	MN - MINNESOTA	55779	9507	R003	6530	182	NO	NO	YES	14	
ARNE & JUDY GADDA	6941 SEVILLE RD		SAGINAW	MN - MINNESOTA	55779	9771	R003	6532	182	NO	NO	YES	41	
CURRENT RESIDENT OR MCDONALD	4373 Solway Rd		DULUTH	MN - MINNESOTA	55810	9765	R007	6534	110	NO	NO	YES	73	
CURRENT RESIDENT OR WOLZ	4423 Solway Rd		DULUTH	MN - MINNESOTA	55810	9735	R007	6535	110	NO	NO	YES	23	
CURRENT RESIDENT OR PETERSON	4180 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	9249	R002	6538	181	NO	NO	YES	80	
CURRENT RESIDENT OR WESTLUND	4233 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	8212	R002	6539	181	NO	NO	YES	33	
CURRENT RESIDENT OR BEECHLER	4226 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	8212	R002	6540	181	NO	NO	YES	26	
SCOTT & LORI JOHNSON	3931 LEISTE RD		CLOQUET	MN - MINNESOTA	55720	8207	R002	6550	181	NO	YES	YES	31	09/23/2023
CURRENT RESIDENT OR LASKY	3611 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	8215	R002	6659	181	NO	NO	YES	11	
CURRENT RESIDENT OR HOMMERDING	6024 ARROWHEAD RD		DULUTH	MN - MINNESOTA	55810	9754	R007	6662	110	NO	NO	YES	24	
JEFF MOEN	6972 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9278	R002	6801	181	NO	NO	YES	72	
CHLOE OAKLAND	7046 HEINE RD		CLOQUET	MN - MINNESOTA	55720	9279	R002	6804	181	NO	YES	YES	46	02/28/2021
DIANE RAUSCHENFELS	9900 HUDSON BLVD #207		DULUTH	MN - MINNESOTA	55808	2126	C077	6853	121	NO	YES	YES	57	10/29/2022
CURRENT RESIDENT	6936 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9771	R003	6877	182	NO	NO	YES	36	
CURRENT RESIDENT	3933 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9254	R002	6944	181	NO	NO	NO	33	
CURRENT RESIDENT OR JOHNSON	4142 CARIBOU LAKE RD		DULUTH	MN - MINNESOTA	55810	9730	R007	6945	110	NO	NO	NO	42	
WUORI TOWNSHIP	7449 WERNER RD		VIRGINIA	MN - MINNESOTA	55792	8025	H001	6946	151	NO	NO	NO	49	
CURRENT RESIDENT OR TAYLOR	6351 HERMANTOWN RD		DULUTH	MN - MINNESOTA	55810	9567	R005	7009	109	NO	NO	YES	51	
ANGELA URBAN	6407 St. Louis River Rd E		CLOQUET	MN - MINNESOTA	55720	9423	R002	7058	181	NO	NO	YES	07	
CURRENT RESIDENT OR HAYDON	3953 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9254	R002	7185	181	NO	NO	NO	53	
CURRENT RESIDENT OR KARKKAINEN	6460 TAYLOR RD		CLOQUET	MN - MINNESOTA	55720	9213	R002	7202	181	NO	NO	YES	60	
CURRENT RESIDENT OR SCHRAMM	6545 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9269	R002	7214	181	NO	NO	NO	45	
CURRENT RESIDENT OR STORCK	3611 LINDROSE RD		CLOQUET	MN - MINNESOTA	55720	8208	R002	7215	181	NO	NO	NO	11	
CATHY RUMBLEY	5987 BIRCHWAY RD		DULUTH	MN - MINNESOTA	55810	9769	R007	7269	110	NO	YES	YES	87	12/08/2021
GREG GREEN	5980 Birchway Rd		DULUTH	MN - MINNESOTA	55810	9769	R007	7334	110	NO	NO	YES	80	

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
CURRENT RESIDENT OR SEME	4308 Tondryk Rd		SAGINAW	MN - MINNESOTA	55779	9695	R001	7380	182	NO	NO	NO	08	
NATHAN JOHNSON	3710 MATTSON RD		CLOQUET	MN - MINNESOTA	55720	9270	R002	7384	181	NO	NO	YES	10	
CURRENT RESIDENT OR TALBOT	6325 ST LOUIS RIVER RD W		CLOQUET	MN - MINNESOTA	55720	9267	R002	7385	181	NO	NO	NO	25	
CURRENT RESIDENT OR GORDER	6341 ST LOUIS RIVER RD		CLOQUET	MN - MINNESOTA	55720	9267	R002	7446	181	NO	NO	YES	41	
JOHN PROUTY	6413 SEVILLE RD		SAGINAW	MN - MINNESOTA	55779	9506	R003	7472	182	NO	YES	NO	13	05/17/2021
CURRENT RESIDENT OR TRUSTEM	5988 Birchway Rd		DULUTH	MN - MINNESOTA	55810	9769	R007	7533	110	NO	NO	YES	88	
CURRENT RESIDENT OR MACE	5992 Birchway Rd		DULUTH	MN - MINNESOTA	55810	9769	R007	7534	110	NO	NO	YES	92	
CURRENT RESIDENT OR ROKKE	4115 ENGLISH RD		CLOQUET	MN - MINNESOTA	55720	4100	R002	7536	181	NO	NO	NO	15	
CURRENT RESIDENT OR VOGEL	6252 MAPLE GROVE RD		DULUTH	MN - MINNESOTA	55810	9592	R005	7537	109	NO	NO	NO	52	
CURRENT RESIDENT OR HARJU	5915 WARGIN RD		DULUTH	MN - MINNESOTA	55810	9732	R007	7539	110	NO	NO	NO	15	
TABITHA VOLTZKE	6417 TAYLOR RD		CLOQUET	MN - MINNESOTA	55720	9213	R002	7575	181	NO	NO	YES	17	
CURRENT RESIDENT OR SCHILLING	4471 SOLWAY RD		DULUTH	MN - MINNESOTA	55810	9735	R007	7577	110	NO	NO	NO	71	
CURRENT RESIDENT OR SONNEMAN	3946 JACKSON RD		CLOQUET	MN - MINNESOTA	55720	9276	R002	7624	181	NO	NO	NO	46	
CURRENT RESIDENT OR BANGS	6229 HWY 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	7729	182	NO	NO	YES	29	
JONATHAN & HOLLY WOLFE	6039 W ARROWHEAD RD		DULUTH	MN - MINNESOTA	55810	9754	R007	7741	110	NO	NO	YES	39	
CURRENT RESIDENT OR PERKINS	4405 CARIBOU LK RD		DULUTH	MN - MINNESOTA	55810	9764	R007	7746	110	NO	NO	YES	05	
CURRENT RESIDENT OR SPINDLER	3643 LINDROSE RD		CLOQUET	MN - MINNESOTA	55720	8208	R002	7764	181	NO	NO	YES	43	
CURRENT RESIDENT	6984 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9278	R002	7765	181	NO	NO	YES	84	
CURRENT RESIDENT OR THRASHER	6805 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9275	R002	7768	181	NO	NO	YES	05	
CURRENT RESIDENT OR PETERSON	6373 MAPLE GROVE RD		CLOQUET	MN - MINNESOTA	55720	9250	R002	7779	181	NO	NO	YES	73	
KYLE PETERSON	4131 VAN GASSLER RD		CLOQUET	MN - MINNESOTA	55720	9249	R002	7781	181	NO	NO	YES	31	
CURRENT RESIDENT OR PALUSKY	6644 W ARROWHEAD RD		CLOQUET	MN - MINNESOTA	55720	9692	R002	7783	181	NO	NO	YES	44	
CURRENT RESIDENT OR LUND	3590 STONE LK RD		CLOQUET	MN - MINNESOTA	55720	9287	R002	7785	181	NO	NO	YES	90	
CURRENT RESIDENT OR PETERSON	6416 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9265	R002	7786	181	NO	NO	YES	16	
CURRENT RESIDENT OR ROBARGE	3757 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9264	R002	7796	181	NO	NO	YES	57	
CURRENT RESIDENT OR BIRD	6140 HWY 194		SAGINAW	MN - MINNESOTA	55779	9793	R003	7851	182	NO	NO	YES	40	
CURRENT RESIDENT OR AKEY	6525 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9269	R002	7991	181	NO	NO	YES	25	
CURRENT RESIDENT OR BARBER	4690 DOW RD		SAGINAW	MN - MINNESOTA	55779	9769	R003	7994	182	NO	NO	YES	90	
KAREN BRICKLEY	3939 JEFFREY RD		PROCTOR	MN - MINNESOTA	55810	9533	R005	8050	109	NO	NO	YES	39	
JULIE SELENSKI	3735 MUNGER SHAW RD		PROCTOR	MN - MINNESOTA	55810	9514	R005	8166	109	NO	NO	YES	35	
NANCY JOHNSON-KUSEL	3791 MUNGER SHAW RD		DULUTH	MN - MINNESOTA	55810	9514	R005	8169	109	NO	NO	YES	91	
CURRENT RESIDENT OR NARTNIK	3594 SANDBERG RD		DULUTH	MN - MINNESOTA	55810	1635	R005	8173	109	NO	NO	YES	94	
CURRENT RESIDENT OR	3997 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9262	R002	8187	181	NO	NO	NO	97	
CURRENT RESIDENT OR ABRAHAMSON	3605 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9268	R002	8195	181	NO	NO	YES	05	
CURRENT RESIDENT OR FULTS	6915 SEVILLE RD		SAGINAW	MN - MINNESOTA	55779	9771	R003	8352	182	NO	NO	NO	15	
JESSICA HENKEL-JOHNSON	4085 JEFFREY RD		DULUTH	MN - MINNESOTA	55810	9519	R005	8405	109	NO	NO	YES	85	
GAIL PAULUS	4099 JEFFREY RD		DULUTH	MN - MINNESOTA	55810	9519	R005	8423	109	NO	YES	NO	99	11/07/2022
CURRENT RESIDENT OR LEISTE	6464 MAPLE GROVE RD		CLOQUET	MN - MINNESOTA	55720	9209	R002	8435	181	NO	NO	NO	64	
WILLIAM VOGEL	6270 MAPLE GROVE RD		DULUTH	MN - MINNESOTA	55810	9592	R005	8436	109	NO	NO	NO	70	
JOAN E. MILLER	2604 N 21ST ST	APT 4	SUPERIOR	WI - WISCONSIN	54880	7376	c004	8456	204	NO	NO	NO	04	
STONEMAN	4149 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9244	R002	8519	181	NO	NO	NO	49	
CURRENT RESIDENT	7021 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9281	R002	8698	181	NO	NO	NO	21	
MIRANDA DESANTO	5947 ROSE RD		DULUTH	MN - MINNESOTA	55810	9734	R007	8699	110	NO	NO	NO	47	
JIM ANDERSON	6375 HIGHWAY 2		CLOQUET	MN - MINNESOTA	55720	9257	R002	8752	181	NO	NO	NO	75	
ANDREW KILPO	5983 BIRCHWAY RD		PROCTOR	MN - MINNESOTA	55810	9769	R014	8807	100	NO	NO	NO	83	
KENNETH & MARGARET JOHNSON	5092 W ARROWHEAD RD		HERMANTOWN	MN - MINNESOTA	55811			8816	122	NO	NO	NO		
DAWN ECKSTROM	6198 HERMANTOWN RD		DULUTH	MN - MINNESOTA	55810	9569	R005	8817	109	NO	YES	NO	98	08/18/2023
CURRENT RESIDENT OR WENDY BARTLETT	3988 JEFFERY RD		DULUTH	MN - MINNESOTA	55810	9533	R005	8825	109	NO	NO	NO	88	
CURRENT RESIDENT OR HEINECKE	6141 ROSE RD		DULUTH	MN - MINNESOTA	55810			8875	100	NO	NO	NO		
JOE EVERETT	2215 ANDERSON RD		DULUTH	MN - MINNESOTA	55811			8904	122	NO	NO	NO		04/13/2022
RUTH & BRIAN DOURN	5995 WARGIN RD		DULUTH	MN - MINNESOTA	55810			8968	100	NO	NO	NO		
JAMES MADIGAN	3790 ALEXANDER RD		HERMANTOWN	MN - MINNESOTA	55811			8977	122	NO	NO	NO		
JOSHUA HUGHES	7009 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720			8988	181	NO	NO	NO		
KELLY KURAS	3634 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720			8989	181	NO	YES	NO		08/12/2022
CURRENT RESIDENT	6937 HWY 2		SAGINAW	MN - MINNESOTA	55779			9029	182	NO	NO	NO		
DOUG VANDERWEYST	4428 WOODGATE RD		DULUTH	MN - MINNESOTA	55810			9033	100	NO	YES			
LINDA STETHENSON	4615 SOLWAY RD		DULUTH	MN - MINNESOTA	55811			9049	122	NO	NO	NO		
TOM & KELLEY STARKA	5908 HWY 2		DULUTH	MN - MINNESOTA	55810			9115	100	NO	NO	NO		
CURRENT RESIDENT	6437 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720			9129	181	NO	NO	NO		
BETTY FREEMAN	3789 ALEXANDER RD		HERMANTOWN	MN - MINNESOTA	55810			9137	100	NO	NO	NO		
CURRENT RESIDENT	3585 LINDROSE RD		CLOQUET	MN - MINNESOTA	55720			9138	181	NO	NO	YES		
PENTTI AND DEBBIE ANTILA	6415 OLD HWY 2		PROCTOR	MN - MINNESOTA	55810			9139	100	NO	NO	NO		

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
CURRENT RESIDENT	3673 MATTSON RD		CLOQUET	MN - MINNESOTA	55720			9140	181	NO	NO	NO		
HEATHER URBANIAK	1101 ANDERSON RD		DULUTH	MN - MINNESOTA	55811	5415	R002	9141	122	NO	NO	YES	88	

HVDC Modernization Project

OPEN HOUSE

minnesota power
AN ALLETE COMPANY

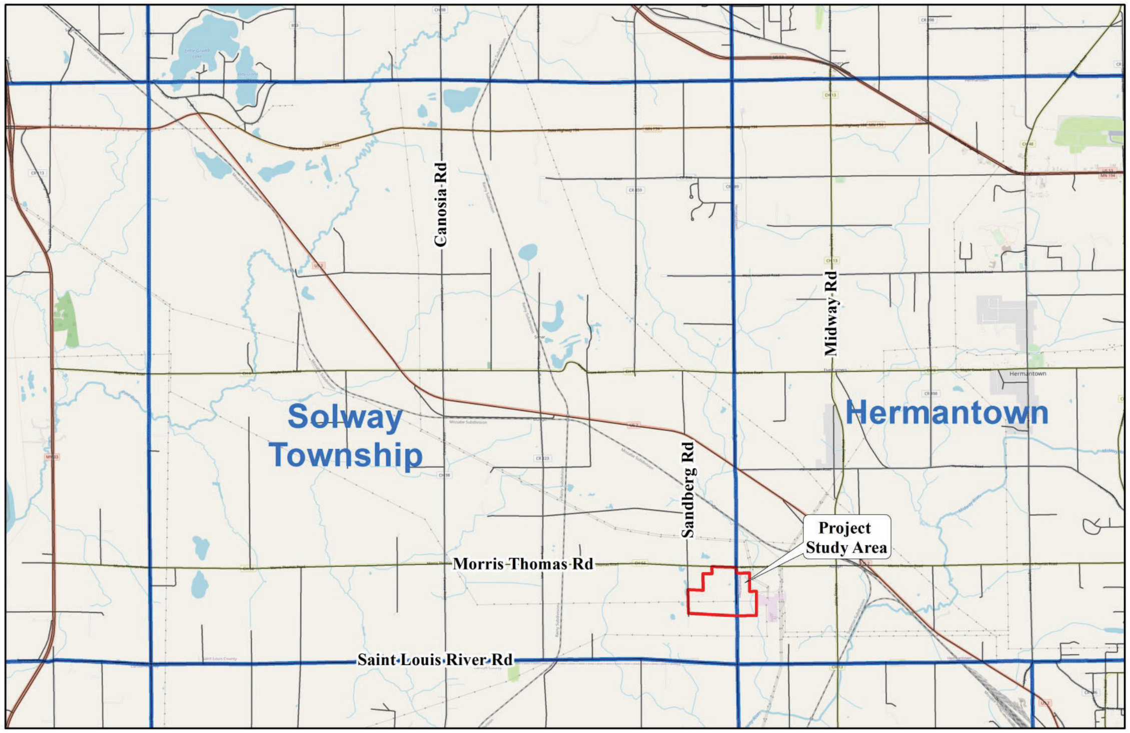
Join Minnesota Power at an Open House to learn more about the HVDC Modernization Project.

You can ask questions and provide comments about the proposed project.

OPEN HOUSE DETAILS

When:
April 19, 2023
6:00 - 7:30 PM

Where:
SOLWAY TOWN HALL
4029 Munger Shaw Road
Cloquet, MN 55720



Minnesota Power
30 West Superior St.
Duluth, MN 55802

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Mailing Address Line 1
Mailing Address Line 2
Mailing Address Line 3
Mailing Address Line 4
Mailing Address Line 5

minnesota power

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Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
PROCTOR CITY HALL	100 PIONK DR.		PROCTOR	MN - MINNESOTA	55810	1705	C005	6	103		YES	YES	99	05/01/2022
KERRY JUNTUNEN	131 9th Ave		PROCTOR	MN - MINNESOTA	55810	2741	C005	902	103		YES	YES	31	
JOHN ENGELKING	425 Boundary Ave S		PROCTOR	MN - MINNESOTA	55810	2424	C025	1831	105		NO	YES	25	
JAMES SCHWARZBAUER	827 Almac Dr		PROCTOR	MN - MINNESOTA	55810	2744	R022	2182	112		YES	YES	27	07/15/2023
BILL & PEG SWEENEY	826 Almac Dr		PROCTOR	MN - MINNESOTA	55810	2743	R022	2183	112		YES	YES	26	07/14/2023
KARL RUTHENBECK	815 Almac Dr		PROCTOR	MN - MINNESOTA	55810	2744	R022	2190	112		NO	YES	15	
RORY & SHERRI JOHNSON	801 Almac Dr		PROCTOR	MN - MINNESOTA	55810	2744	R022	2199	112		YES	YES	01	08/27/2022
CURRENT RESIDENT OR POPOVICH	6406 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9247	R002	2453	181		NO	YES	06	
CURRENT RESIDENT OR NELSON	6416 Arrowhead Rd E		CLOQUET	MN - MINNESOTA	55720	9247	R002	2454	181		NO	YES	16	
CURRENT RESIDENT OR NELSON	6436 Arrowhead Rd E		CLOQUET	MN - MINNESOTA	55720	9247	R002	2455	181		NO	YES	36	
CURRENT RESIDENT OR AXTELL	6461 Arrowhead Rd E		CLOQUET	MN - MINNESOTA	55720	9247	R002	2457	181		NO	YES	61	
GAIL BOATMAN	6542 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9246	R002	2458	181		YES	YES	42	08/08/2022
CURRENT RESIDENT OR CARLSON	6535 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9246	R002	2460	181		NO	YES	35	
CURRENT RESIDENT OR HEDMAN	6575 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9246	R002	2461	181		NO	YES	75	
CURRENT RESIDENT OR KIRSCH	6580 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9246	R002	2462	181		NO	YES	80	
CURRENT RESIDENT OR MCVEAN	6588 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9246	R002	2463	181		NO	YES	88	
SHARON & LARRY VANDENHEUVEL	6589 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9246	R002	2464	181		NO	YES	89	
BRIANNE JOHNSON	6607 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9692	R002	2468	181		YES	YES	07	10/15/2023
CURRENT RESIDENT OR KRAUSE	6635 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9692	R002	2469	181		NO	YES	35	
CURRENT RESIDENT OR SHENETT	6649 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9692	R002	2470	181		NO	YES	49	
CURRENT RESIDENT OR BENNETT	6656 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9692	R002	2471	181		NO	YES	56	
CURRENT RESIDENT OR POHJOLA	6662 Arrowhead Rd W		CLOQUET	MN - MINNESOTA	55720	9692	R002	2472	181		NO	YES	62	
CURRENT RESIDENT OR WEILER	3528 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9297	R002	2474	181		NO	YES	28	
CURRENT RESIDENT OR LESLIE	3535 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9297	R002	2475	181		NO	YES	35	
CURRENT RESIDENT OR LINDQUIST	3588 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9297	R002	2476	181		NO	YES	88	
CURRENT RESIDENT OR HOLTE	3602 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9268	R002	2477	181		NO	YES	02	
CURRENT RESIDENT OR SIEVERS	3644 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9268	R002	2479	181		NO	YES	44	
DRAKE JONAS	3659 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9268	R002	2481	181		NO	YES	59	
CURRENT RESIDENT OR PETERS	3662 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9268	R002	2482	181		NO	YES	62	
TREY GAULT	3670 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9268	R002	2483	181		NO	YES	70	
CURRENT RESIDENT OR MARKUS	3677 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9268	R002	2484	181		NO	YES	77	
CURRENT RESIDENT OR MOLDENHAUER	3735 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9264	R002	2485	181		NO	YES	35	
CURRENT RESIDENT OR MOSER	3793 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9264	R002	2489	181		NO	YES	93	
CURRENT RESIDENT OR KACZMARK	3868 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9298	R002	2492	181		NO	YES	68	
CURRENT RESIDENT OR JOHNSON	3871 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9298	R002	2493	181		NO	YES	71	
CURRENT RESIDENT OR MARKKULA	3962 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9262	R002	2494	181		NO	YES	62	
CURRENT RESIDENT	3977 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9262	R002	2497	181		NO	YES	77	
CURRENT RESIDENT OR KOLLASCH	4057 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9258	R002	2499	181		NO	YES	57	
LEON FORSTROM	4073 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9258	R002	2500	181		NO	YES	73	
CURRENT RESIDENT OR KRAUSE	4131 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9244	R002	2501	181		NO	YES	31	
CURRENT RESIDENT OR KRAUSE	4111 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9244	R002	2502	181		NO	YES	11	
CURRENT RESIDENT OR EARLS	4288 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	8200	R002	2505	181		NO	YES	88	
CURRENT RESIDENT OR FOUCAULT	4311 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9245	R002	2506	181		NO	YES	11	
KRIS FOUCAULT	4333 Canosia Rd		CLOQUET	MN - MINNESOTA	55720	9245	R002	2507	181		YES	YES	33	09/15/2022
CURRENT RESIDENT OR BJORKLUND	3644 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9285	R002	2512	181		NO	YES	44	
CURRENT RESIDENT OR BERG	3652 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9285	R002	2513	181		NO	YES	52	
CURRENT RESIDENT OR	3664 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9285	R002	2514	181		NO	YES	64	
CURRENT RESIDENT OR OLSON	3674 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9285	R002	2516	181		NO	YES	74	
CURRENT RESIDENT OR BUCZYNSKI	3752 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9294	R002	2517	181		NO	YES	52	
CURRENT RESIDENT OR WENNER	3794 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9294	R002	2519	181		NO	YES	94	
CURRENT RESIDENT OR COCCIE	3802 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9295	R002	2520	181		NO	YES	02	
CURRENT RESIDENT OR BIRCH	3868 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9295	R002	2521	181		NO	YES	68	
CURRENT RESIDENT OR KETTLEHUT	3904 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9282	R002	2522	181		NO	YES	04	
CURRENT RESIDENT OR MENINGER	3928 Crosby Rd		CLOQUET	MN - MINNESOTA	55720	9282	R002	2524	181		NO	YES	28	
MARY JANE & DAVID ANDERSON	4171 Gaus Rd		CLOQUET	MN - MINNESOTA	55720	9239	R002	2526	181		NO	YES	71	
CURRENT RESIDENT OR HILSON	7044 Heine Rd		CLOQUET	MN - MINNESOTA	55720	9279	R002	2528	181		NO	YES	44	
KELLY MITCHELL	7043 Heine Rd		CLOQUET	MN - MINNESOTA	55720	9279	R002	2529	181		NO	YES	43	
BRIAN GAUS	4239 Gaus Rd		CLOQUET	MN - MINNESOTA	55720	9238	R002	2530	181		YES	YES	39	03/03/2023
CURRENT RESIDENT OR NEWMAN	7081 Heine Rd W		CLOQUET	MN - MINNESOTA	55720	9280	R002	2532	181		NO	YES	81	
JAMES WOZNIAK	6505 Hermantown Rd		CLOQUET	MN - MINNESOTA	55720	9263	R002	2534	181		YES	YES	05	03/20/2022
CURRENT RESIDENT	6510 Hermantown Rd		CLOQUET	MN - MINNESOTA	55720	9263	R002	2535	181		NO	YES	10	
CURRENT RESIDENT OR SMITH	6573 Hermantown Rd W		CLOQUET	MN - MINNESOTA	55720	9263	R002	2537	181		NO	YES	73	
CURRENT RESIDENT OR HANNINEN	6559 Highway 2		CLOQUET	MN - MINNESOTA	55720	9259	R002	2539	181		NO	YES	59	

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
CLARE STROMLUND	6351 Hwy 2 E		CLOQUET	MN - MINNESOTA	55720	9257	R002	2540	181		YES	YES	51	09/30/2022
JOHN CHILDERS	6383 Hwy 2 E		CLOQUET	MN - MINNESOTA	55720	9257	R002	2542	181		YES	YES	83	12/31/2021
CURRENT RESIDENT OR MICHAEL	6401 Hwy 2 E		CLOQUET	MN - MINNESOTA	55720	9242	R002	2543	181		NO	YES	01	
CURRENT RESIDENT OR CARLSON	6511 Hwy 2 W		CLOQUET	MN - MINNESOTA	55720	9259	R002	2544	181		NO	YES	11	
CURRENT RESIDENT OR FALLANG	3543 Hwy 33 N		CLOQUET	MN - MINNESOTA	55720	9208	R004	2546	181		NO	YES	43	
CURRENT RESIDENT OR LANGLEY	3567 Jackson Rd		CLOQUET	MN - MINNESOTA	55720	9229	R002	2547	181		NO	YES	67	
CURRENT RESIDENT OR EILEFSON	3922 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	8207	R002	2551	181		NO	YES	22	
LILY SHUBITZKE	3958 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	8207	R002	2552	181		NO	YES	58	
CURRENT RESIDENT OR BRADBURY	3965 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	8207	R002	2553	181		NO	YES	65	
FRANK SIIRO	3982 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	8207	R002	2554	181		YES	YES	82	07/28/2024
CURRENT RESIDENT OR LORENTZSON	3999 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	8207	R002	2555	181		NO	YES	99	
	4007 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	9240	R002	2556	181		NO	YES	07	
CURRENT RESIDENT OR DAHLSTROM	4012 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	9240	R002	2557	181		NO	YES	12	
RANDY JULIN	4040 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	9240	R002	2558	181		YES	YES	40	03/31/2023
CURRENT RESIDENT	4074 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	9240	R002	2559	181		NO	YES	74	
CURRENT RESIDENT OR RANNILA	4088 Leiste Rd		CLOQUET	MN - MINNESOTA	55720	9240	R002	2560	181		NO	YES	88	
CURRENT RESIDENT OR HULTGREN	3561 Lindrose Rd		CLOQUET	MN - MINNESOTA	55720	9274	R002	2562	181		NO	YES	61	
CURRENT RESIDENT OR SALINE	3630 Lindrose Rd		CLOQUET	MN - MINNESOTA	55720	8208	R002	2565	181		NO	YES	30	
CURRENT RESIDENT OR LEHENBAUER	6310 Maple Grove Rd E		CLOQUET	MN - MINNESOTA	55720	9250	R002	2566	181		NO	YES	10	
CURRENT RESIDENT OR ANDERSON	6315 Maple Grove Rd E		CLOQUET	MN - MINNESOTA	55720	9250	R002	2567	181		NO	YES	15	
CURRENT RESIDENT OR AMUNDSON	6328 Maple Grove Rd E		CLOQUET	MN - MINNESOTA	55720	9250	R002	2568	181		NO	YES	28	
CURRENT RESIDENT OR MOE	6338 Maple Grove Rd		CLOQUET	MN - MINNESOTA	55720	9250	R002	2569	181		NO	YES	38	
CURRENT RESIDENT OR LARSON	6379 Maple Grove Rd E		CLOQUET	MN - MINNESOTA	55720	9250	R002	2571	181		NO	YES	79	
CURRENT RESIDENT OR LEISTE	6414 Maple Grove Rd E		CLOQUET	MN - MINNESOTA	55720	9209	R002	2572	181		NO	YES	14	
CURRENT RESIDENT OR PETERSON	6419 Maple Grove Rd E		CLOQUET	MN - MINNESOTA	55720	9209	R002	2573	181		NO	YES	19	
CURRENT RESIDENT OR BAUBLITZ	6514 Maple Grove Rd		CLOQUET	MN - MINNESOTA	55720	9243	R002	2575	181		NO	YES	14	
CURRENT RESIDENT OR JOHNSON	6530 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9243	R002	2576	181		NO	YES	30	
CURRENT RESIDENT OR JACOBSON	6537 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9243	R002	2577	181		NO	YES	37	
LAURA MCCUSKEY	6639 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9241	R002	2578	181		YES	YES	39	07/11/2022
VAL FOX	6640 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9241	R002	2579	181		YES	YES	40	06/30/2023
CURRENT RESIDENT OR HOLLAND	6658 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9241	R002	2580	181		NO	YES	58	
CURRENT RESIDENT	6667 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9241	R002	2581	181		NO	NO	67	
JAMES ZIELLS	6823 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9216	R002	2582	181		YES	YES	23	01/02/2023
CURRENT RESIDENT OR STERLING	6958 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9237	R002	2585	181		NO	YES	58	
BARB KUNELIS	6966 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9237	R002	2586	181		YES	YES	66	12/02/2021
CURRENT RESIDENT OR NELSON	6982 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9237	R002	2587	181		NO	YES	82	
CURRENT RESIDENT OR WASS	6998 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9237	R002	2588	181		NO	YES	98	
CURRENT RESIDENT OR HANSEN	7018 Maple Grove Rd		CLOQUET	MN - MINNESOTA	55720	9235	R002	2591	181		NO	YES	18	
CURRENT RESIDENT OR SEDOR	7034 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9235	R002	2592	181		NO	YES	34	
CURRENT RESIDENT OR SCHUTT	7042 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9235	R002	2593	181		NO	YES	42	
MELVIN W FREMLING	3597 Mattson Rd		CLOQUET	MN - MINNESOTA	55720	8209	R002	2594	181		NO	YES	97	
CURRENT RESIDENT OR BJONSKAAS	3654 Mattson Rd		CLOQUET	MN - MINNESOTA	55720	9271	R002	2596	181		NO	YES	54	
CURRENT RESIDENT OR SKOG	3760 Mattson Rd		CLOQUET	MN - MINNESOTA	55720	9270	R002	2598	181		NO	YES	60	
CURRENT RESIDENT OR GREENE	6314 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	8210	R002	2601	181		NO	YES	14	
CURRENT RESIDENT OR ESSIG	6365 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	8210	R002	2602	181		NO	YES	65	
CURRENT RESIDENT OR BAILEY	6368 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	8210	R002	2603	181		NO	YES	68	
BYRON G HELLAND	6431 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	9265	R002	2604	181		YES	YES	31	12/11/2021
THERESA & GORDY JENSEN	6410 Morris Thomas Rd		CLOQUET	MN - MINNESOTA	55720	9265	R002	2605	181		NO	YES	10	
CURRENT RESIDENT SWIERCESKI	6434 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	9265	R002	2606	181		NO	NO	34	
CURRENT RESIDENT OR JOHNSON	6442 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	9265	R002	2608	181		NO	YES	42	
CURRENT RESIDENT OR AKEY	6455 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	9265	R002	2609	181		NO	YES	55	
CURRENT RESIDENT OR WALDRIFF	6456 Morris Thomas Rd E		CLOQUET	MN - MINNESOTA	55720	9265	R002	2610	181		NO	YES	56	
CURRENT RESIDENT OR MUNTHE	6551 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9269	R002	2611	181		NO	YES	51	
CURRENT RESIDENT OR HESTER	6556 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9269	R002	2612	181		NO	YES	56	
CURRENT RESIDENT OR KOHNE	6559 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9269	R002	2613	181		NO	YES	59	
TERRY & JOANNE ANDREWS	6603 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9272	R002	2614	181		NO	YES	03	
MARLIN FORSTROM	6625 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9272	R002	2615	181		NO	YES	25	
CURRENT RESIDENT OR JACKSON	6707 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9273	R002	2617	181		NO	YES	07	
CURRENT RESIDENT OR JACKSON	6711 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9273	R002	2618	181		NO	YES	11	
CURRENT RESIDENT OR SALINE	6718 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9273	R002	2620	181		NO	YES	18	
CURRENT RESIDENT OR JACKSON	6719 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9273	R002	2621	181		NO	YES	19	
CURRENT RESIDENT OR BLOOMER	6749 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9273	R002	2622	181		NO	YES	49	
CURRENT RESIDENT OR SALINE	6760 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9273	R002	2623	181		NO	YES	60	

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
CURRENT RESIDENT OR MONETTE	6908 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2632	181		NO	YES	08	
CURRENT RESIDENT OR ROY	6910 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2633	181		NO	YES	10	
CURRENT RESIDENT OR HEIKKILA	6926 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2634	181		NO	YES	26	
CURRENT RESIDENT OR SYKES	6931 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2635	181		NO	YES	31	
CURRENT RESIDENT OR HEIKKILA	6936 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2636	181		NO	YES	36	
ELIZABETH BERGLUND	6965 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2637	181		NO	YES	65	
CURRENT RESIDENT OR SUNDIN	6983 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2638	181		NO	YES	83	
CURRENT RESIDENT OR HUGHES	6995 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9278	R002	2639	181		NO	YES	95	
CURRENT RESIDENT OR HUGHES	7035 Morris Thomas Rd		CLOQUET	MN - MINNESOTA	55720	9281	R002	2643	181		NO	YES	35	
CURRENT RESIDENT OR VIEBAHN	7045 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9281	R002	2644	181		NO	YES	45	
CURRENT RESIDENT OR LUOMA	7076 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9281	R002	2648	181		NO	YES	76	
CURRENT RESIDENT OR VERMEERSCH	7090 Morris Thomas Rd W		CLOQUET	MN - MINNESOTA	55720	9281	R002	2649	181		NO	YES	90	
CURRENT RESIDENT OR WIITA	3581 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9266	R002	2651	181		NO	YES	81	
CURRENT RESIDENT OR ZIELLS	3584 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9266	R002	2652	181		NO	YES	84	
CURRENT RESIDENT OR LAFLAMME	3930 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9254	R002	2655	181		NO	YES	30	
CURRENT RESIDENT	3986 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9254	R002	2656	181		NO	YES	86	
TYLER JOHNSON	3996 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9254	R002	2658	181		NO	YES	96	
MUNGER TAVERN	4003 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9255	R002	2659	181		NO	YES	03	
CURRENT RESIDENT OR LYES	4026 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9255	R002	2660	181		NO	YES	26	
CURRENT RESIDENT OR HOPE LUTHERAN CHURCH	4093 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9255	R002	2661	181		NO	YES	93	
CURRENT RESIDENT OR ROBARGE	4103 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9251	R002	2662	181		NO	YES	03	
CURRENT RESIDENT OR HENNESSEY	4138 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9251	R002	2663	181		NO	YES	38	
CURRENT RESIDENT OR FLEISCHER	4213 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9252	R002	2664	181		NO	YES	13	
CURRENT RESIDENT OR CHERNE	4282 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9252	R002	2665	181		NO	YES	82	
CURRENT RESIDENT OR BERGLIN	4293 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9252	R002	2666	181		NO	YES	93	
CURRENT RESIDENT OR TVERBERG	4294 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9252	R002	2667	181		NO	YES	94	
CURRENT RESIDENT OR WILLIS	4302 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9253	R002	2669	181		NO	YES	02	
CURRENT RESIDENT OR COZZI	4309 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9253	R002	2670	181		NO	YES	09	
CURRENT RESIDENT OR RUONA	6546 Old Hwy 2		CLOQUET	MN - MINNESOTA	55720	9261	R002	2672	181		NO	YES	46	
JODY KARG	6592 Old Hwy 2 W		CLOQUET	MN - MINNESOTA	55720	9261	R002	2674	181		YES	YES	92	10/24/2021
CURRENT RESIDENT OR BALLARD	7071 St. Louis River Rd W		CLOQUET	MN - MINNESOTA	55720	9218	R002	2679	181		NO	YES	71	
CURRENT RESIDENT OR WALDBILLIG	7091 St. Louis River Rd W		CLOQUET	MN - MINNESOTA	55720	9218	R002	2680	181		NO	YES	91	
CURRENT RESIDENT OR ALTONEN	6513 St. Louis River Rd		ESKO	MN - MINNESOTA	55733	9301	R001	2684	180		NO	YES	13	
CURRENT RESIDENT OR WHITTINGTON	7019 St. Louis River Rd W		CLOQUET	MN - MINNESOTA	55720	9218	R002	2685	181		NO	YES	19	
CURRENT RESIDENT OR LUND	3578 Stonelake Rd		CLOQUET	MN - MINNESOTA	55720	9287	R002	2686	181		NO	YES	78	
CURRENT RESIDENT OR LUNDGREN	4110 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	9249	R002	2687	181		NO	YES	10	
JACE ROCKSTAD	4160 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	9249	R002	2688	181		NO	YES	60	
CURRENT RESIDENT OR LARSON	4173 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	9249	R002	2689	181		NO	YES	73	
CURRENT RESIDENT OR GREENE	4196 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	9249	R002	2691	181		NO	YES	96	
CURRENT RESIDENT OR WARD	4201 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	8212	R002	2692	181		NO	YES	01	
LAWRENCE G SHELTON	7061 Klimek Rd		SAGINAW	MN - MINNESOTA	55779	9763	R003	2712	182		YES	NO	61	06/01/2022
CURRENT RESIDENT OR OLSON	4315 Tondryk Rd		SAGINAW	MN - MINNESOTA	55779	9695	R001	2759	182		NO	YES	15	
CURRENT RESIDENT OR NYNAS	4318 Tondryk Rd		SAGINAW	MN - MINNESOTA	55779	9695	R001	2760	182		NO	YES	18	
WADE OLSON	4396 Tondryk Rd		SAGINAW	MN - MINNESOTA	55779	9695	R001	2761	182		NO	YES	96	
JENNIFER THOMPSON	6732 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9776	R003	2768	182		NO	YES	32	
CURRENT RESIDENT OR SAWYER	6931 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9771	R003	2771	182		NO	YES	31	
CURRENT RESIDENT OR YOUNG	6992 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9771	R003	2772	182		NO	YES	92	
CURRENT RESIDENT OR BECKWITH	6999 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9709	R003	2773	182		NO	YES	99	
CURRENT RESIDENT OR SATHER	7005 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9765	R003	2774	182		NO	YES	05	
CURRENT RESIDENT OR GREENWOOD	7007 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9765	R003	2775	182		NO	YES	07	
CURRENT RESIDENT OR WHERLEY	7017 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9765	R003	2776	182		NO	YES	17	
JOSEPH MILLER	4722 Old Seville Rd		SAGINAW	MN - MINNESOTA	55779	9772	R003	2779	182		NO	YES	22	
CURRENT RESIDENT OR SWANSTROM	4724 Old Seville Rd		SAGINAW	MN - MINNESOTA	55779	9774	R003	2781	182		NO	YES	24	
CURRENT RESIDENT OR MAHNKE	7036 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9690	R001	2783	182		NO	YES	36	
CURRENT RESIDENT OR LAASE	4610 Jackson Rd N		SAGINAW	MN - MINNESOTA	55779	9700	R002	2784	182		NO	YES	10	
RONALD R NYLUND	6789 W Arrowhead Rd		SAGINAW	MN - MINNESOTA	55779	9696	R001	2795	182		YES	YES	89	07/27/2022
CURRENT RESIDENT OR GILBERTSON	6690 W Arrowhead Rd		SAGINAW	MN - MINNESOTA	55779	9696	R001	2796	182		NO	YES	90	
CURRENT RESIDENT OR HATINEN	4691 Ayers Rd		SAGINAW	MN - MINNESOTA	55779	9766	R003	2799	182		NO	YES	91	
CURRENT RESIDENT OR JOHNSON	4693 Ayers Rd		SAGINAW	MN - MINNESOTA	55779	9766	R003	2800	182		NO	YES	93	
KEVIN MAKI	4713 Ayers Rd		SAGINAW	MN - MINNESOTA	55779	9768	R003	2814	182		NO	YES	13	
CURRENT RESIDENT OR MAKI	4534 Bergquist Rd		SAGINAW	MN - MINNESOTA	55779	9794	R003	2833	182		NO	YES	34	
CURRENT RESIDENT OR SCHUBITZKE	6332 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9703	R003	2880	182		NO	YES	32	
CURRENT RESIDENT OR SELL	6262 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	2881	182		NO	YES	62	

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
LINDA STEPHENSON	6254 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	2882	182		NO	YES	54	
CURRENT RESIDENT OR CASKEY	6204 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	2883	182		NO	YES	04	
CURRENT RESIDENT	6177 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9793	R003	2884	182		NO	YES	77	
CURRENT RESIDENT OR SOBCZAK	6191 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9793	R003	2886	182		NO	YES	91	
CURRENT RESIDENT OR JACOBSON	6195 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9793	R003	2888	182		NO	YES	95	
CURRENT RESIDENT OR SEVERSON	6211 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	2889	182		NO	YES	11	
DAVID ROSSITER	6267 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	2893	182		YES	YES	67	03/09/2023
LEAH SPICER	6329 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9703	R003	2894	182		NO	YES	29	
CURRENT RESIDENT OR ROSSITER	6365 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9703	R003	2895	182		NO	YES	65	
GLORIA HANSON	6401 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9795	R003	2897	182		NO	YES	01	
CURRENT RESIDENT OR NELSON	6423 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9795	R003	2899	182		NO	YES	23	
CURRENT RESIDENT OR COPISKEY	6930 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9692	R001	2900	182		NO	YES	30	
DAMIAN HUFFER	6720 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9694	R001	2901	182		NO	YES	20	
CURRENT RESIDENT OR VITTORIO	6712 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9694	R001	2902	182		NO	YES	12	
CURRENT RESIDENT	6651 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9694	R001	2903	182		NO	YES	51	
CURRENT RESIDENT OR PALMI	6703 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9694	R001	2905	182		NO	YES	03	
ADAM AHO	6725 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9694	R001	2906	182		YES	YES	25	03/08/2023
CURRENT RESIDENT OR STROM	6803 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9692	R001	2908	182		NO	YES	03	
CURRENT RESIDENT OR KNUTSON	6863 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9692	R001	2910	182		NO	YES	63	
CURRENT RESIDENT OR SIEBER	6871 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9692	R001	2911	182		NO	YES	71	
CURRENT RESIDENT OR ERCEG	6993 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9692	R001	2912	182		NO	YES	93	
CURRENT RESIDENT OR HENKE	6735 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9503	R003	2917	182		NO	YES	35	
CURRENT RESIDENT OR RISDON	6733 Hwy 194		SAGINAW	MN - MINNESOTA	55779	9504	R003	2918	182		NO	YES	33	
CURRENT RESIDENT OR	6344 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9507	R003	2925	182		NO	YES	44	
CURRENT RESIDENT OR BETZLER	6312 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9507	R003	2927	182		NO	YES	12	
CURRENT RESIDENT OR VANVALKENBURG	6234 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9510	R003	2939	182		NO	YES	34	
KEITH & SHARON OLSON	6565 Bergstrom Rd		SAGINAW	MN - MINNESOTA	55779	9573	R002	3149	182		NO	YES	65	
CURRENT RESIDENT OR HARNELL	6794 Industrial Rd		SAGINAW	MN - MINNESOTA	55779	9437	R002	3232	182		NO	YES	94	
DUAYNE A ANDERSON	6834 Industrial Rd		SAGINAW	MN - MINNESOTA	55779	9444	R001	3249	182		YES	YES	34	08/31/2022
CURRENT RESIDENT OR WARNER	7062 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9469	R003	3282	182		NO	YES	62	
CURRENT RESIDENT OR FABBRO	7057 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9469	R003	3284	182		NO	YES	57	
CURRENT RESIDENT OR PALYOK	7048 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9469	R003	3286	182		NO	YES	48	
CURRENT RESIDENT OR KLEJESKI	3519 Lindrose Rd		ESKO	MN - MINNESOTA	55733	9302	R001	3295	180		NO	YES	19	
CURRENT RESIDENT OR ZIELLS	6529 St. Louis River Rd		ESKO	MN - MINNESOTA	55733	9301	R001	3306	180		NO	YES	29	
CURRENT RESIDENT OR NIEMI	6557 St. Louis River Rd		ESKO	MN - MINNESOTA	55733	9301	R001	3308	180		NO	YES	57	
CURRENT RESIDENT OR ROBERTS	6583 St. Louis River Rd		ESKO	MN - MINNESOTA	55733	9301	R001	3309	180		NO	YES	83	
STEPHANIE FORSLUND	6673 St. Louis River Rd		ESKO	MN - MINNESOTA	55733	9304	R001	3311	180		YES	YES	73	08/19/2021
CURRENT RESIDENT OR CRANDALL	6785 St. Louis River Rd		ESKO	MN - MINNESOTA	55733	9305	R001	3312	180		NO	YES	85	
CURRENT RESIDENT OR MACDONALD	6459 Old Hwy 2		DULUTH	MN - MINNESOTA	55810	9571	R005	3352	109		NO	YES	59	
WLSSD	2626 COURTLAND ST		DULUTH	MN - MINNESOTA	55806	1813	C042	3433	119		YES	NO	26	03/31/2022
MARY MURPHY	5180 ARROWHEAD RD		HERMANTOWN	MN - MINNESOTA	55811	1327	C042	3479	122		YES	YES	80	12/23/2021
CURRENT RESIDENT OR LEPAGE	5628 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9711	R022	3584	112		NO	YES	28	
PAUL FISH	3935 Solway Rd		DULUTH	MN - MINNESOTA	55810	9725	R007	3587	110		YES	YES	35	11/01/2022
ROBERT SHULTZ	6336 Rose Rd		DULUTH	MN - MINNESOTA	55810	9723	R007	3588	110		YES	YES	36	11/21/2022
CURRENT RESIDENT OR BREIMON JR	6248 Rose Rd		DULUTH	MN - MINNESOTA	55810	9723	R007	3589	110		NO	YES	48	
CURRENT RESIDENT OR DALTON	6230 Rose Rd		DULUTH	MN - MINNESOTA	55810	4515	R007	3591	110		NO	YES	30	
CURRENT RESIDENT OR HANSON	6207 Rose Rd		DULUTH	MN - MINNESOTA	55810	4515	R007	3593	110		NO	YES	07	
TYESHAWN BRODIN	6138 Rose Rd		DULUTH	MN - MINNESOTA	55810	4514	R007	3595	110		NO	YES	38	
CURRENT RESIDENT OR PAPPAS	6114 Rose Rd		DULUTH	MN - MINNESOTA	55810	4514	R007	3596	110		NO	YES	14	
CURRENT RESIDENT OR RANDS	6113 Rose Rd		DULUTH	MN - MINNESOTA	55810	4514	R007	3597	110		NO	YES	13	
CURRENT RESIDENT OR AXTELL	4445 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9764	R007	3599	110		NO	YES	45	
HANK SEPPALA	4156 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9730	R007	3600	110		YES	YES	56	09/10/2021
CURRENT RESIDENT OR CLARK	4187 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9730	R007	3601	110		NO	YES	87	
CURRENT RESIDENT OR HANSON	4190 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9730	R007	3602	110		NO	YES	90	
CURRENT RESIDENT OR DUNAISKI	4212 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9762	R007	3603	110		NO	YES	12	
CURRENT RESIDENT OR DOMAGALA	4230 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9762	R007	3604	110		NO	YES	30	
CURRENT RESIDENT OR PANFIL	4240 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9762	R007	3605	110		NO	YES	40	
CURRENT RESIDENT OR DUNBAR	4243 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9762	R007	3606	110		NO	YES	43	
CURRENT RESIDENT OR SCHILLING	4266 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9762	R007	3607	110		NO	YES	66	
LEROY AND KATHLEEN HANSON	4294 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9762	R007	3608	110		YES	YES	94	08/18/2023
CURRENT RESIDENT OR NOVAK	4308 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9763	R007	3609	110		NO	YES	08	
CURRENT RESIDENT OR WARWICK	4330 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9763	R007	3610	110		NO	YES	30	
CURRENT RESIDENT OR SCHILLING	4381 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9763	R007	3611	110		NO	YES	81	

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
CURRENT RESIDENT OR GRICE	4315 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9763	R007	3612	110		NO	YES	15	
CURRENT RESIDENT OR CIESIELSKI	6078 Rose Rd		DULUTH	MN - MINNESOTA	55810	9731	R007	3613	110		NO	YES	78	
CURRENT RESIDENT OR GEVING	6073 Rose Rd		DULUTH	MN - MINNESOTA	55810	9731	R007	3614	110		NO	YES	73	
KAITLYN HALVERSON	6018 Rose Rd		DULUTH	MN - MINNESOTA	55810	9731	R007	3617	110		NO	YES	18	
CURRENT RESIDENT OR IVERSON	5985 Rose Rd		DULUTH	MN - MINNESOTA	55810	9731	R007	3618	110		NO	YES	85	
CURRENT RESIDENT OR PETERSON	4460 Woodgate Rd		DULUTH	MN - MINNESOTA	55810	9755	R007	3620	110		NO	YES	60	
CURRENT RESIDENT OR HILL	4458 Aspen Way		DULUTH	MN - MINNESOTA	55810	9733	R007	3621	110		NO	NO	58	
CURRENT RESIDENT OR SCHILLA	5965 Rose Rd		DULUTH	MN - MINNESOTA	55810	9734	R007	3622	110		NO	YES	65	
CURRENT RESIDENT OR BRADLEY	5959 Rose Rd		DULUTH	MN - MINNESOTA	55810	9734	R007	3623	110		NO	YES	59	
CURRENT RESIDENT OR VENNEVOLD	5953 Rose Rd		DULUTH	MN - MINNESOTA	55810	9734	R007	3626	110		NO	YES	53	
CURRENT RESIDENT OR BENSON	5942 Rose Rd		DULUTH	MN - MINNESOTA	55810	9734	R007	3628	110		NO	YES	42	
CURRENT RESIDENT OR KRAUSE	5939 Rose Rd		DULUTH	MN - MINNESOTA	55810	9734	R007	3629	110		NO	YES	39	
CURRENT RESIDENT OR HUGHES	5917 Rose Rd		DULUTH	MN - MINNESOTA	55810	9734	R007	3630	110		NO	YES	17	
CURRENT RESIDENT OR SUNDQUIST	4439 Solway Rd		DULUTH	MN - MINNESOTA	55810	9735	R007	3631	110		NO	YES	39	
CURRENT RESIDENT OR FAHRION	4425 Solway Rd		DULUTH	MN - MINNESOTA	55810	9735	R007	3632	110		NO	YES	25	
CURRENT RESIDENT OR SCANLON	4415 Solway Rd		DULUTH	MN - MINNESOTA	55810	9735	R007	3633	110		NO	YES	15	
CURRENT RESIDENT OR STONE	5903 Arrowhead Rd W		DULUTH	MN - MINNESOTA	55810	9736	R007	3635	110		NO	YES	03	
CURRENT RESIDENT OR JACKSON	5917 Arrowhead Rd W		DULUTH	MN - MINNESOTA	55810	9736	R007	3636	110		NO	YES	17	
CURRENT RESIDENT OR SKIBINSKI	5941 Arrowhead Rd W		DULUTH	MN - MINNESOTA	55810	9736	R007	3637	110		NO	YES	41	
KYLE PETERSON	5942 Arrowhead Rd W		DULUTH	MN - MINNESOTA	55810	9736	R007	3638	110		NO	YES	42	
STEVEN S WARREN	5954 Arrowhead Rd W		PROCTOR	MN - MINNESOTA	55810	9736	R007	3639	110		YES	YES	54	07/01/2022
CURRENT RESIDENT OR FLEURY	5964 Arrowhead Rd W		DULUTH	MN - MINNESOTA	55810	9736	R007	3640	110		NO	YES	64	
CURRENT RESIDENT OR BURKMAN	5976 Arrowhead Rd W		DULUTH	MN - MINNESOTA	55810	9736	R007	3641	110		NO	YES	76	
ANTHONY BANKS	4253 Solway Rd		DULUTH	MN - MINNESOTA	55810	9737	R007	3642	110		NO	NO	53	
CURRENT RESIDENT OR HARJU	4233 Solway Rd		DULUTH	MN - MINNESOTA	55810	9737	R007	3643	110		NO	YES	33	
LAURA NORDBERG	5927 Wargin Rd		DULUTH	MN - MINNESOTA	55810	9732	R007	3644	110		YES	YES	27	
RONALD G GAJEWSKI	5939 Wargin Rd		DULUTH	MN - MINNESOTA	55810	9732	R007	3645	110		YES	YES	39	03/21/2023
CURRENT RESIDENT OR HAJEK	5951 Wargin Rd		DULUTH	MN - MINNESOTA	55810	9732	R007	3646	110		NO	YES	51	
CURRENT RESIDENT OR WILSON	6002 Wargin Rd		DULUTH	MN - MINNESOTA	55810	9732	R007	3647	110		NO	YES	02	
CURRENT RESIDENT OR IDE	4149 Solway Rd		DULUTH	MN - MINNESOTA	55810	9739	R007	3648	110		NO	YES	49	
MARY HAGBERG	4117 Solway Rd		DULUTH	MN - MINNESOTA	55810	9739	R007	3649	110		YES	YES	17	09/23/2022
CURRENT RESIDENT OR BOYER	3539 Solway Rd		DULUTH	MN - MINNESOTA	55810	9503	R005	3682	109		NO	YES	39	
CURRENT RESIDENT OR CHILES	5963 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9506	R005	3687	109		NO	YES	63	
EVAN O'CONNOR	3603 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9507	R005	3688	109		NO	YES	03	
JOHN ROGALLA	3699 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9507	R005	3689	109		NO	YES	99	
CURRENT RESIDENT OR HASHEY	3849 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9510	R005	3691	109		NO	YES	49	
CURRENT RESIDENT OR PARROTT	3869 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9510	R005	3692	109		NO	YES	69	
CURRENT RESIDENT OR SCHMIDT	5987 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9578	R005	3693	109		NO	YES	87	
CURRENT RESIDENT OR MORGAN	6024 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9511	R005	3694	109		NO	YES	24	
CURRENT RESIDENT OR PARKER	6029 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9511	R005	3695	109		NO	YES	29	
CURRENT RESIDENT OR PARROTT	6087 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9511	R005	3696	109		NO	YES	87	
CURRENT RESIDENT OR SCHILLING	6043 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9511	R005	3697	109		NO	YES	43	
CURRENT RESIDENT OR MERCIER	6214 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9580	R005	3698	109		NO	YES	14	
CURRENT RESIDENT OR PILEGAARD	6064 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9511	R005	3699	109		NO	NO	64	
CURRENT RESIDENT OR WEYANDT	3780 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9512	R005	3702	109		NO	YES	80	
CURRENT RESIDENT OR PRIOLO	3763 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9512	R005	3704	109		NO	YES	63	
SCOTT HAEDRICH	3738 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9512	R005	3706	109		YES	YES	3838	08/07/2021
JESSICA PATNAUDE	3751 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9512	R005	3707	109		NO	NO	3131	
CURRENT RESIDENT OR MAKI	6005 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9583	R005	3708	109		NO	YES	0505	
CURRENT RESIDENT OR GULBRANSON	6049 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9583	R005	3709	109		NO	YES	49	
JOHN & KAREN ROGALLA	6063 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9583	R005	3710	109		NO	YES	6363	
CURRENT RESIDENT OR BARNARD	6090 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9583	R005	3712	109		NO	YES	9090	
DEANNA PRIOLA	6102 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9584	R005	3714	109		YES	YES	0202	03/28/2023
CURRENT RESIDENT OR WHITMAN	6121 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9584	R005	3715	109		NO	YES	2121	
CURRENT RESIDENT OR VANARMAN	6123 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9584	R005	3716	109		NO	YES	2323	
CURRENT RESIDENT OR ELLISON	6131 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9584	R005	3717	109		NO	YES	31	
GAYLE & JOEL ZIELLS	6164 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9584	R005	3721	109		YES	NO	64	10/01/2021
CURRENT RESIDENT OR FAINT	6171 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9584	R005	3722	109		NO	YES	71	
CURRENT RESIDENT OR NELSON	6195 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9584	R005	3723	109		NO	YES	95	
CURRENT RESIDENT OR BAKKEN	6207 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9513	R005	3726	109		NO	YES	07	
CURRENT RESIDENT OR KING	6214 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9513	R005	3729	109		NO	YES	14	
CURRENT RESIDENT OR WOOD	6215 Morris Thomas Rd		DULUTH	MN - MINNESOTA	55810	9513	R005	3730	109		NO	YES	15	
CURRENT RESIDENT OR O'CONNOR	3740 Bailey Rd		DULUTH	MN - MINNESOTA	55810	9500	R005	3732	109		NO	YES	40	

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
CURRENT RESIDENT OR CARLSON	3721 Bailey Rd		DULUTH	MN - MINNESOTA	55810	9500	R005	3734	109		NO	YES	21	
CURRENT RESIDENT OR GUTHRIE	3730 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9514	R005	3740	109		NO	YES	30	
CURRENT RESIDENT OR CARLSON	3761 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9514	R005	3741	109		NO	YES	61	
CURRENT RESIDENT OR CARROLL	6264 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9581	R005	3746	109		NO	YES	64	
CURRENT RESIDENT OR SUOMELA	6328 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9515	R005	3747	109		NO	YES	28	
CURRENT RESIDENT OR CARROLL	6356 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9515	R005	3748	109		NO	YES	56	
CURRENT RESIDENT OR HARTLEY	6415 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9582	R005	3749	109		NO	YES	15	
CURRENT RESIDENT OR MCGREGOR	3821 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9516	R005	3750	109		NO	YES	21	
JAMES L MILLER	3880 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9516	R005	3751	109		YES	YES	80	12/24/2022
CURRENT RESIDENT OR BERG	3892 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9516	R005	3752	109		NO	YES	92	
CURRENT RESIDENT OR MOE	3887 Pine Ridge Dr		DULUTH	MN - MINNESOTA	55810	9517	R005	3753	109		NO	YES	87	
SCOTT MOE	3878 Pine Ridge Dr		DULUTH	MN - MINNESOTA	55810	9517	R005	3754	109		YES	YES	78	08/24/2023
CURRENT RESIDENT OR MANDERUD	6241 Hermantown Rd		DULUTH	MN - MINNESOTA	55810	9569	R005	3755	109		NO	YES	41	
CURRENT RESIDENT OR WARGIN	6186 Hermantown Rd		DULUTH	MN - MINNESOTA	55810	9569	R005	3756	109		NO	YES	86	
CURRENT RESIDENT OR	3913 JEFFREY RD		DULUTH	MN - MINNESOTA	55810	9533	R005	3757	109		NO	YES	13	
CURRENT RESIDENT OR ADRIAN HANSON	3951 Jeffrey Rd		DULUTH	MN - MINNESOTA	55810	9533	R005	3758	109		NO	YES	51	
CURRENT RESIDENT OR SAVO	6357 Old Hwy 2		DULUTH	MN - MINNESOTA	55810	9520	R005	3762	109		NO	YES	57	
CURRENT RESIDENT OR STENBERG	4042 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9521	R005	3764	109		NO	YES	42	
CURRENT RESIDENT OR BUSCH JR	4069 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9521	R005	3765	109		NO	YES	69	
CURRENT RESIDENT OR THOMPSON	4083 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9521	R005	3766	109		NO	YES	83	
CURRENT RESIDENT OR VOGEL	6287 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9592	R005	3768	109		NO	YES	87	
CURRENT RESIDENT OR FOURNIER	6219 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9592	R005	3769	109		NO	YES	19	
CURRENT RESIDENT OR WELSH	4134 Jeffrey Rd		DULUTH	MN - MINNESOTA	55810	9523	R005	3773	109		NO	YES	34	
CURRENT RESIDENT OR SORENSON	4129 Jeffrey Rd		DULUTH	MN - MINNESOTA	55810	9523	R005	3774	109		NO	YES	29	
CURRENT RESIDENT OR LARSON	4105 Jeffrey Rd		DULUTH	MN - MINNESOTA	55810	9523	R005	3775	109		NO	YES	05	
CURRENT RESIDENT OR JOHNSON	6128 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9524	R005	3778	109		NO	YES	28	
CURRENT RESIDENT OR WINDUS	6090 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9525	R005	3779	109		NO	YES	90	
CURRENT RESIDENT OR KOLENDA	6071 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9525	R005	3780	109		NO	YES	71	
CURRENT RESIDENT OR OSWALD	6059 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9525	R005	3781	109		NO	YES	59	
CURRENT RESIDENT OR CHERNEY	6047 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9525	R005	3782	109		NO	YES	47	
CURRENT RESIDENT OR CLARK	6035 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9525	R005	3783	109		NO	YES	35	
CURRENT RESIDENT OR HEWETT	5995 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9526	R005	3786	109		NO	YES	95	
CURRENT RESIDENT OR SWANSON	5961 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9526	R005	3788	109		NO	YES	61	
CURRENT RESIDENT OR CARDINAL	5912 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9526	R005	3790	109		NO	YES	12	
TERRANCE R JOHNSON	4037 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9527	R005	3792	109		NO	YES	37	10/23/2021
BRAD & TONYA KOLENDA	4012 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9527	R005	3793	109		YES	YES	12	07/08/2023
CHAD LOWREY	4000 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9527	R005	3794	109		YES	YES	00	04/14/2023
LEXI OLIVER	3977 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	1687	R005	3795	109		NO	YES	77	
CURRENT RESIDENT OR LEVEILLE	6007 Hwy 2		DULUTH	MN - MINNESOTA	55810	9588	R005	3796	109		NO	YES	07	
TAMMY LOFDAHL	6099 Hwy 2		DULUTH	MN - MINNESOTA	55810	9508	R005	3798	109		YES	YES	99	10/17/2020
MARCIE & JEFF KEPPERS	6115 Hwy 2		PROCTOR	MN - MINNESOTA	55810	9587	R005	3799	109		YES	YES	15	01/03/2023
CURRENT RESIDENT OR LEMIRE	6127 Hwy 2		DULUTH	MN - MINNESOTA	55810	9591	R005	3800	109		NO	YES	27	
SAGE HENDERSON	6084 Hwy 2		DULUTH	MN - MINNESOTA	55810	9531	R005	3802	109		NO	YES	84	
CURRENT RESIDENT OR LUNKE	6066 Hwy 2		DULUTH	MN - MINNESOTA	55810	9531	R005	3803	109		NO	YES	66	
CURRENT RESIDENT OR LAFLAMME	6016 Hwy 2		DULUTH	MN - MINNESOTA	55810	9531	R005	3804	109		NO	YES	16	
MICAH ROSEEN	5987 Hwy 2		DULUTH	MN - MINNESOTA	55810	9528	R005	3805	109		NO	YES	87	
CURRENT RESIDENT OR PETERSON	5911 Hwy 2		DULUTH	MN - MINNESOTA	55810	9528	R005	3806	109		NO	YES	11	
FRANKIE DEDOMINCES	1405 ROBERT AVE		CLOQUET	MN - MINNESOTA	55720			3808	181		YES	YES		02/02/2023
MARK WARD	5947 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9568	R005	3818	109		YES	YES	47	12/22/2022
CURRENT RESIDENT OR RAIHO	5959 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9568	R005	3819	109		NO	YES	59	
PETER & ALLIE HAFFTEN	5971 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9568	R005	3820	109		YES	YES	71	06/11/2020
CURRENT RESIDENT OR CARLSON	5993 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9568	R005	3822	109		NO	YES	93	
CURRENT RESIDENT OR JOHANSON	6087 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9539	R005	3823	109		NO	YES	87	
CURRENT RESIDENT OR BROWN	6117 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9540	R005	3824	109		NO	YES	17	
CURRENT RESIDENT OR DINCAU	6177 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9540	R005	3825	109		NO	YES	77	
CURRENT RESIDENT OR CHILDS	3523 Mettsa Rd		DULUTH	MN - MINNESOTA	55810	9554	R005	3826	109		NO	YES	23	
CURRENT RESIDENT OR WOODS	3556 Mettsa Rd		DULUTH	MN - MINNESOTA	55810	9541	R005	3827	109		NO	YES	56	
CURRENT RESIDENT OR WOODS	3557 Mettsa Rd		DULUTH	MN - MINNESOTA	55810	9554	R005	3828	109		NO	YES	57	
CURRENT RESIDENT OR CHILDS	6207 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9553	R005	3829	109		NO	YES	07	
TOWN OF MIDWAY C/0 LOIS LENNARTSON	3302 Midway Rd		DULUTH	MN - MINNESOTA	55810	9546	R005	3847	109		NO	YES	02	
PAUL SNEIDE	5331 Ugstad Jct Rd		DULUTH	MN - MINNESOTA	55810	9768	R022	3933	112		YES	YES	31	09/10/2022
CURRENT RESIDENT OR DAVEAU	6260 SEVILLE RD		SAGINAW	MN - MINNESOTA	55779	9510	R003	3948	182		NO	YES	60	
GENE CLARK	4222 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9762	R007	3959	110		NO	YES	22	

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CURRENT RESIDENT OR FERRAZZI	4447 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9764	R007	3961	110		NO	YES	47	
CURRENT RESIDENT OR SWANSON	4458 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55810	9764	R007	3962	110		NO	YES	58	
CURRENT RESIDENT OR RANDS	4535 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55811	9607	R002	3963	122		NO	YES	35	
CURRENT RESIDENT OR SHELTON	4536 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55811	9607	R002	3964	122		NO	YES	36	
CURRENT RESIDENT OR SIEVERS	4549 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55811	9607	R002	3965	122		NO	YES	49	
CURRENT RESIDENT OR KNAFFLA	4624 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55811	9607	R002	3967	122		NO	YES	24	
CURRENT RESIDENT OR KYLLONEN	4646 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55811	9607	R002	3968	122		NO	YES	46	
CURRENT RESIDENT OR BEAUDIN	4666 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55811	9607	R002	3970	122		NO	YES	66	
CURRENT RESIDENT OR BUSH	4678 Caribou Lake Rd		DULUTH	MN - MINNESOTA	55811	9607	R002	3971	122		NO	YES	78	
CURRENT RESIDENT OR SATHERS	4643 Hanson Rd		DULUTH	MN - MINNESOTA	55811	9609	R002	4033	122		NO	YES	43	
CURRENT RESIDENT OR JACKSON	4515 HANSON Rd		DULUTH	MN - MINNESOTA	55811	9605	R002	4034	122		NO	YES	15	
CURRENT RESIDENT OR JOHNSON	5962 Seville Rd		DULUTH	MN - MINNESOTA	55811	9610	R002	4293	122		NO	YES	62	
CURRENT RESIDENT OR EIMER	5974 Seville Rd		DULUTH	MN - MINNESOTA	55811	9610	R002	4294	122		NO	YES	74	
CURRENT RESIDENT OR GEVING	6014 Seville Rd		DULUTH	MN - MINNESOTA	55811	9608	R002	4296	122		NO	YES	14	
CURRENT RESIDENT OR HOUSER	6016 Seville Rd		DULUTH	MN - MINNESOTA	55811	9608	R002	4297	122		NO	YES	16	
CURRENT RESIDENT OR SCHMIDT	6058 Seville Rd		DULUTH	MN - MINNESOTA	55811	9608	R002	4300	122		NO	YES	58	
EISENHAUER OR CURRENT RESIDENT	6092 Seville Rd		DULUTH	MN - MINNESOTA	55811	9608	R002	4302	122		NO	YES	92	
CURRENT RESIDENT OR HILLMAN	4545 Solway Rd		DULUTH	MN - MINNESOTA	55811	9611	R002	4343	122		NO	YES	45	
CURRENT RESIDENT OR CARDINAL	6007 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9539	R005	4385	109		NO	YES	07	
CURRENT RESIDENT OR LALIBERTE	6041 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9539	R005	4386	109		NO	YES	41	
CURRENT RESIDENT OR ANDERSON	4476 Woodgate Rd		DULUTH	MN - MINNESOTA	55810	9755	R007	4463	110		NO	YES	76	
CANOSIA TOWNSHIP	4896 Midway Rd		DULUTH	MN - MINNESOTA	55811	9765	R001	4488	122		NO	YES	96	
CURRENT RESIDENT OR LENIUS	6049 Hwy 194		DULUTH	MN - MINNESOTA	55811	9606	R002	4598	122		NO	YES	49	
CURRENT RESIDENT OR JOHNSON	6054 Hwy 194		DULUTH	MN - MINNESOTA	55811	9606	R002	4599	122		NO	YES	54	
CURRENT RESIDENT OR KOLOJESKI	6077 Hwy 194		DULUTH	MN - MINNESOTA	55811	9606	R002	4600	122		NO	YES	77	
CURRENT RESIDENT OR MORRIS	6078 Hwy 194		DULUTH	MN - MINNESOTA	55811	9606	R002	4601	122		NO	YES	78	
CURRENT RESIDENT OR TAMMEN	6085 Hwy 194		DULUTH	MN - MINNESOTA	55811	9606	R002	4602	122		NO	YES	85	
DAVE RANDS	6091 Hwy 194		DULUTH	MN - MINNESOTA	55811	9606	R002	4603	122		YES	YES	91	09/03/2022
RICHARD FLESVIG	4052 Jeffrey Rd		DULUTH	MN - MINNESOTA	55810	9519	R005	4615	109		YES	YES	52	11/11/2021
CURRENT RESIDENT OR RODDA	5429 Martin Rd		DULUTH	MN - MINNESOTA	55811	9706	R001	4662	122		NO	YES	29	
CURRENT RESIDENT OR	3505 SOLWAY RD		HERMANTOWN	MN - MINNESOTA	55810	9503	R005	4845	109	NO	NO	NO	05	
CURRENT RESIDENT OR HILDEN	4202 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9252	R002	4887	181	NO	NO	YES	02	
RAYMOND TIGUE	3962 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9254	R002	4895	181	NO	YES	YES	62	07/26/2022
KATHY JOHNSON	3660 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9268	R002	4898	181	NO	YES	YES	60	09/19/2023
MARY ANN TAST	161 N CLOQUET RD E		ESKO	MN - MINNESOTA	55733	9405	R001	4917	180	NO	YES	NO	61	08/11/2023
MARTELL OR CURRENT RESIDENT	4683 HANSON RD		DULUTH	MN - MINNESOTA	55811	9609	R002	4980	122	NO	NO	YES	83	
CURRENT RESIDENT OR WIGG	4038 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9255	R002	5065	181	NO	NO	YES	38	
CURRENT RESIDENT OR MEWES	4607 CANOSIA RD		SAGINAW	MN - MINNESOTA	55779	9505	R003	5067	182	NO	NO	YES	07	
ROBERT A SILVERNESS	5437 SHADY LANE		DULUTH	MN - MINNESOTA	55811	9734	R001	5086	122	NO	YES	YES	37	06/08/2023
LORI MICKELSON	6231 HWY 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	5163	182	NO	NO	YES	31	
SUSAN JOHNSON	6942 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9278	R002	5194	181	NO	YES	YES	42	09/25/2021
CURRENT RESIDENT OR HITE	5969 WARGIN RD		DULUTH	MN - MINNESOTA	55810	9732	R007	5199	110	NO	NO	YES	69	
CURRENT RESIDENT OR YOKI	5982 SEVILLE RD		DULUTH	MN - MINNESOTA	55811	9610	R002	5228	122	NO	NO	YES	82	
CURRENT RESIDENT OR COBB	5954 rose rd		DULUTH	MN - MINNESOTA	55810	9734	R007	5252	110	NO	NO	YES	54	
CURRENT RESIDENT MORAN	4466 ASPENWAY RD		DULUTH	MN - MINNESOTA	55810	9733	R007	5351	110	NO	NO	YES	66	
MIKE KRATT	5972 MORRIS THOMAS RD		DULUTH	MN - MINNESOTA	55810	9506	R005	5473	109	NO	YES	NO	72	09/01/2022
KAIYA & BENJAMIN FELLAND	3985 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9254	R002	5475	181	NO	NO	YES	85	
CURRENT RESIDENT OR KIRKMAN	3743 MATTSON RD		CLOQUET	MN - MINNESOTA	55720	9270	R002	5477	181	NO	NO	YES	43	
CURRENT RESIDENT OR KASPSZAK	6337 MAPLE GROVE RD		CLOQUET	MN - MINNESOTA	55720	9250	R002	5478	181	NO	NO	YES	37	
CURRENT RESIDENT OR SPEHAR	3679 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9268	R002	5479	181	NO	NO	YES	79	
CURRENT RESIDENT OR POGORELEC	3682 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9268	R002	5480	181	NO	NO	YES	82	
CURRENT RESIDENT OR ERICKSON	4465 ASPEN WAY		DULUTH	MN - MINNESOTA	55810	9733	R007	5586	110	NO	NO	YES	65	
CURRENT RESIDENT OR PRIVETTE	5928 W ARROWHEAD RD		DULUTH	MN - MINNESOTA	55810	9736	R007	5629	110	NO	NO	YES	28	
TODD WILMOT	6916 MAPLE GROVE RD		CLOQUET	MN - MINNESOTA	55720	9237	R002	5810	181	NO	YES	YES	16	08/26/2021
CURRENT RESIDENT OR ANDERSON	4450 ASPEN WAY		DULUTH	MN - MINNESOTA	55810	9733	R007	5892	110	NO	NO	YES	50	
KAREN & PETER HILDRE	3929 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9254	R002	5935	181	NO	NO	YES	29	
MAKENZIE ADAMS	3759 MATTSON RD		CLOQUET	MN - MINNESOTA	55720	9270	R002	5939	181	NO	NO	YES	59	
CURRENT RESIDENT OR BENKO	3970 CROSBY		CLOQUET	MN - MINNESOTA	55720	9282	R002	5944	181	NO	NO	YES	70	
CURRENT RESIDENT OR CHARON	7066 HEINE RD		CLOQUET	MN - MINNESOTA	55720	9280	R002	5945	181	NO	NO	YES	66	
JASON & NICOLE LENZ	6665 ARROWHEAD RD W		CLOQUET	MN - MINNESOTA	55720	9692	R002	5946	181	NO	YES	YES	65	09/15/2023
CURRENT RESIDENT OR TOBOLASKI	3950 CROSBY RD		CLOQUET	MN - MINNESOTA	55720	9282	R002	5948	181	NO	NO	YES	50	
CURRENT RESIDENT OR HILDRE	3943 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9254	R002	5949	181	NO	NO	YES	43	
CURRENT RESIDENT OR JOHNSON	3917 JACKSON RD		CLOQUET	MN - MINNESOTA	55720	9276	R002	5951	181	NO	NO	YES	17	

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
CURRENT RESIDENT OR HEINO	6989 ST LOUIS RIVER RD W		CLOQUET	MN - MINNESOTA	55720	9204	R002	5955	181	NO	NO	YES	89	
CURRENT RESIDENT OR MARCINIAK	3846 CROSBY RD		CLOQUET	MN - MINNESOTA	55720	9295	R002	5959	181	NO	NO	YES	46	
CURRENT RESIDENT OR	3968 CROSBY RD		CLOQUET	MN - MINNESOTA	55720	9282	R002	5964	181	NO	NO	YES	68	
BRENT PAULSON	3972 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9262	R002	5965	181	NO	NO	YES	72	
ANTHONY TRIBBY	4718 DOW RD		SAGINAW	MN - MINNESOTA	55779	9769	R003	5979	182	NO	NO	YES	18	
CURRENT RESIDENT OR CHAPIN	3550 CROSBY RD		CLOQUET	MN - MINNESOTA	55720	9293	R002	5988	181	NO	NO	YES	50	
RICHARD CARLSON	6558 W ARROWHEAD RD		CLOQUET	MN - MINNESOTA	55720	9246	R002	5989	181	NO	NO	YES	58	
CURRENT RESIDENT OR FORSTROM	6611 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9272	R002	5990	181	NO	NO	YES	11	
CURRENT RESIDENT OR BENTLEY	3858 CROSBY RD		CLOQUET	MN - MINNESOTA	55720	9295	R002	5991	181	NO	NO	YES	58	
CURRENT RESIDENT OR	6869 MAPLE GROVE RD		CLOQUET	MN - MINNESOTA	55720	9216	R002	5994	181	NO	NO	YES	69	
CURRENT RESIDENT OR SULLIVAN	7094 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9281	R002	5995	181	NO	NO	YES	94	
CURRENT RESIDENT OR KRSIEAN	4312 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9253	R002	5996	181	NO	NO	YES	12	
COMMISSIONER PETE STAUBER	100 N 5TH AVE W #202		DULUTH	MN - MINNESOTA	55802	1211	C026	6062	115	NO	NO	NO	52	
COLEEN ST MARIE	6274 HWY 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	6064	182	NO	NO	YES	74	
GARY & JEANNE KOIVISTO	4646 HANSON RD		DULUTH	MN - MINNESOTA	55811	9609	R002	6090	122	NO	YES	NO	46	07/25/2022
CURRENT RESIDENT OR NELSON	6154 JERRY RD		DULUTH	MN - MINNESOTA	55810	9579	R005	6101	109	NO	NO	YES	54	
CURRENT RESIDENT OR MAYRY	6105 SEVILLE RD		SAGINAW	MN - MINNESOTA	55779	9510	R003	6105	182	NO	NO	YES	05	
MILLER OR CURRENT RESIDENT	4624 HANSON RD		DULUTH	MN - MINNESOTA	55811	9609	R002	6112	122	NO	NO	YES	24	
CURRENT RESIDENT OR EKLUND	4137 SOLWAY RD		DULUTH	MN - MINNESOTA	55810	9739	R007	6116	110	NO	NO	YES	37	
LAWRENCE G SHELTON	7026 SAGINAW RD		SAGINAW	MN - MINNESOTA	55779	9410	R003	6190	182		NO	NO	26	
CURRENT RESIDENT OR SHELTON	P O BOX 94		SAGINAW	MN - MINNESOTA	55779	94	B001	6239	182	NO	NO	YES	94	
ROLAND OR CURRENT RESIDENT	5954 HWY 194		DULUTH	MN - MINNESOTA	55811	9604	R002	6358	122	NO	NO	YES	54	
STEVE SHOUTS	4004 LEISTE RD		CLOQUET	MN - MINNESOTA	55720	9240	R002	6372	181	NO	YES	YES	04	12/13/2021
CURRENT RESIDENT	3930 JEFFREY RD		PROCTOR	MN - MINNESOTA	55810	9533	R005	6377	109	NO	NO	YES	30	
CURRENT RESIDENT OR CARROLL	4473 ASPEN WAY		DULUTH	MN - MINNESOTA	55810	9733	R007	6381	110	NO	NO	NO	73	
CURRENT RESIDENT OR WILLIAMS	3855 JACKSON RD		CLOQUET	MN - MINNESOTA	55720	9277	R002	6389	181	NO	NO	YES	55	
CURRENT RESIDENT OR LINDHOLM	3867 JACKSON RD		CLOQUET	MN - MINNESOTA	55720	9277	R002	6390	181	NO	NO	YES	67	
CURRENT RESIDENT OR PULKRABEK	6907 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9278	R002	6391	181	NO	NO	YES	07	
CURRENT RESIDENT OR CARL	6618 ARROWHEAD RD W		CLOQUET	MN - MINNESOTA	55720	9692	R002	6395	181	NO	NO	YES	18	
CARMAN HULTGREN	6865 ST LOUIS RIVER RD		ESKO	MN - MINNESOTA	55733	9306	R001	6396	180	NO	YES	YES	65	10/21/2021
CURRENT RESIDENT OR SERTICH	6018 SEVILLE RD		DULUTH	MN - MINNESOTA	55811	9608	R002	6403	122	NO	NO	YES	18	
CURRENT RESIDENT OR PITTACK	5979 BIRCHWAY RD		DULUTH	MN - MINNESOTA	55810	9769	R007	6407	110	NO	NO	YES	79	
ASHLEY BIRD	4567 CARIBOU LAKE RD		DULUTH	MN - MINNESOTA	55811	9607	R002	6412	122	NO	NO	YES	67	
HEIDI HANSON	6046 ARROWHEAD RD W		PROCTOR	MN - MINNESOTA	55810	9754	R007	6415	110	NO	NO	YES	46	
CURRENT RESIDENT OR	4029 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9255	R002	6416	181	NO	NO	NO	29	
HEATHER NYLAND	6955 MAPLE GROVE RD		CLOQUET	MN - MINNESOTA	55720	9237	R002	6420	181	NO	YES	YES	55	12/13/2021
PRES LATHER WOLTER JR	13325 COUNTY RD 33		NORWOOD	MN - MINNESOTA	55368	9699	R003	6421	211	NO	NO	NO	25	
MINN. ASSOC. OF TOWNSHIPS	P O BOX 267		ST MICHAEL	MN - MINNESOTA	55376	267	B003	6422	211	NO	NO	NO	67	
CURRENT RESIDENT OR STOLAN	P O BOX 332		CLOQUET	MN - MINNESOTA	55720	332	B002	6423	181	NO	NO	NO	32	
CURRENT RESIDENT OR HALL	3963 LEISTE RD		CLOQUET	MN - MINNESOTA	55720	8207	R002	6424	181	NO	NO	YES	63	
CURRENT RESIDENT OR LAURENT	4294 VAN GASSLER RD		CLOQUET	MN - MINNESOTA	55720	8212	R002	6426	181	NO	NO	YES	94	
LOGAN FOLLETT	3623 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	8215	R002	6427	181	NO	NO	YES	23	
CHARLIE MARTIN	4160 PETERSON RD		CLOQUET	MN - MINNESOTA	55720	9236	R002	6428	181	NO	NO	YES	60	
CURRENT RESIDENT OR DOCKENDORF	6568 ARROWHEAD RD W		CLOQUET	MN - MINNESOTA	55720	9246	R002	6429	181	NO	NO	NO	68	
CURRENT RESIDENT JOHNSON	4366 VAN GASSLER RD		CLOQUET	MN - MINNESOTA	55720	9248	R002	6430	181	NO	NO	NO	66	
CURRENT RESIDENT OR CHERRA	6272 Rose Rd		DULUTH	MN - MINNESOTA	55810	9723	R007	6433	110	NO	NO	YES	72	
CURRENT RESIDENT OR SALO	5931ARROWHEAD RD W		DULUTH	MN - MINNESOTA	55810	9736	R007	6438	110	NO	NO	YES	31	
CURRENT RESIDENT OR DAHLIN	4249 Solway Rd		DULUTH	MN - MINNESOTA	55810	9737	R007	6439	110	NO	NO	YES	49	
CURRENT RESIDENT OR SCHILLING	4489 Solway Rd		DULUTH	MN - MINNESOTA	55810	9735	R007	6440	110	NO	NO	YES	89	
CURRENT RESIDENT OR	7021 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9410	R003	6442	182	NO	NO	YES	21	
CURRENT RESIDENT OR MORNEAU	7072 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9469	R003	6444	182	NO	NO	YES	72	
CURRENT RESIDENT OR MCCUSKEY	7050 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9469	R003	6447	182	NO	NO	YES	50	
CINDY GRAVES	6194 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9579	R005	6448	109	NO	NO	NO	94	
CURRENT RESIDENT OR SWEDBERG	6124 Jerry Rd		DULUTH	MN - MINNESOTA	55810	9579	R005	6449	109	NO	NO	NO	24	
KAREN PATNAUDE	3751 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9512	R005	6450	109	NO	YES	YES	51	08/30/2023
D KALDAHL	3755 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9512	R005	6451	109	NO	YES	YES	55	09/06/2021
CURRENT RESIDENT OR SULIIN	6345 HERMANTOWN RD		HERMANTOWN	MN - MINNESOTA	55810	9567	R005	6452	109	NO	NO	YES	45	
CURRENT RESIDENT OR ISABELL	6099 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9539	R005	6455	109	NO	NO	YES	99	
EVAN ZIELLS	6174 MORRIS THOMAS RD		DULUTH	MN - MINNESOTA	55810	9584	R005	6459	109	NO	NO	YES	74	
CURRENT RESIDENT OR SZYMCZA	6203 MORRIS THOMAS RD		PROCTOR	MN - MINNESOTA	55810	9513	R005	6460	109	NO	NO	YES	03	
CURRENT RESIDENT OR WEIR	6212 MORRIS THOMAS RD		PROCTOR	MN - MINNESOTA	55810	9513	R005	6461	109	NO	NO	YES	12	
CURRENT RESIDENT OR HALLER	6285 MORRIS THOMAS RD		PROCTOR	MN - MINNESOTA	55810	9513	R005	6462	109	NO	NO	YES	85	
CURRENT RESIDENT OR CLIFT	6204 MORRIS THOMAS RD		DULUTH	MN - MINNESOTA	55810	9513	R005	6463	109	NO	NO	YES	04	

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
CURRENT RESIDENT OR ODONNELL	6210 MORRIS THOMAS RD		DULUTH	MN - MINNESOTA	55810	9513	R005	6464	109	NO	NO	YES	10	
CURRENT RESIDENT OR	6425 HWY 194		SAGINAW	MN - MINNESOTA	55779	9795	R003	6466	182	NO	NO	NO	25	
CURRENT RESIDENT OR BRAINARD	6168 HWY 194		SAGINAW	MN - MINNESOTA	55779	9793	R003	6467	182	NO	NO	YES	68	
CURRENT RESIDENT OR SKARBAKKA	6959 SEVILLE RD		SAGINAW	MN - MINNESOTA	55779	9771	R003	6468	182	NO	NO	YES	59	
MARILYN SCHNOBRICH	5965 Hwy 2		DULUTH	MN - MINNESOTA	55810	9528	R005	6470	109	NO	YES	YES	65	09/13/2022
CURRENT RESIDENT OR WARNER	7043 Hwy 2		SAGINAW	MN - MINNESOTA	55779	9690	R001	6476	182	NO	NO	YES	43	
CURRENT RESIDENT OR	7045 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9469	R003	6478	182	NO	NO	YES	45	
CURRENT RESIDENT OR STEVENSON	7089 Saginaw Rd		SAGINAW	MN - MINNESOTA	55779	9469	R003	6479	182	NO	NO	YES	89	
CURRENT RESIDENT OR OLSEN	3866 Pine Ridge Dr		DULUTH	MN - MINNESOTA	55810	9517	R005	6480	109	NO	NO	YES	66	
CURRENT RESIDENT OR HARGER	3750 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9514	R005	6481	109	NO	NO	YES	50	
CURRENT RESIDENT OR HENDRICKSON	3885 Munger Shaw Rd		DULUTH	MN - MINNESOTA	55810	9516	R005	6482	109	NO	NO	YES	85	
CURRENT RESIDENT OR THOMAS	6387 Old Hwy 2		DULUTH	MN - MINNESOTA	55810	9520	R005	6483	109	NO	NO	YES	87	
CURRENT RESIDENT OR JOHNSON	6089 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9525	R005	6485	109	NO	NO	YES	89	
CURRENT RESIDENT OR RUNQUIST	6171 Maple Grove Rd		DULUTH	MN - MINNESOTA	55810	9524	R005	6486	109	NO	NO	YES	71	
CURRENT RESIDENT OR SMOLNIKAR	4469 ASPEN WAY RD		DULUTH	MN - MINNESOTA	55810	9733	R007	6488	110	NO	NO	YES	69	
ERIN ADAMS	4453 ASPEN WAY RD		DULUTH	MN - MINNESOTA	55810	9733	R007	6489	110	NO	NO	NO	53	
CURRENT RESIDENT OR MAKELA	5976 BIRCHWAY RD		DULUTH	MN - MINNESOTA	55810	9769	R007	6491	110	NO	NO	YES	76	
MASON KALNBACH	5991 Birchway Rd		DULUTH	MN - MINNESOTA	55810	9769	R007	6492	110	NO	NO	YES	91	
CURRENT RESIDENT OR SEDOR	6977 Maple Grove Rd		CLOQUET	MN - MINNESOTA	55720	9237	R002	6496	181	NO	NO	YES	77	
CURRENT RESIDENT OR CARLSON	6662 Maple Grove Rd W		CLOQUET	MN - MINNESOTA	55720	9241	R002	6500	181	NO	NO	YES	62	
CURRENT RESIDENT OR LESTER	7088 Maple Grove Rd		CLOQUET	MN - MINNESOTA	55720	9235	R002	6501	181	NO	NO	YES	88	
CURRENT RESIDENT OR WALKOWIAK	6440 Maple Grove Rd		CLOQUET	MN - MINNESOTA	55720	9209	R002	6503	181	NO	NO	YES	40	
CURRENT RESIDENT OR FINNEGAN	4027 Munger Shaw Rd		CLOQUET	MN - MINNESOTA	55720	9255	R002	6509	181	NO	NO	YES	27	
CURRENT RESIDENT OR SMEDSHAMMER	4139 PETERSON RD		CLOQUET	MN - MINNESOTA	55720	9236	R002	6511	181	NO	NO	YES	39	
CURRENT RESIDENT OR GREYDON	6067 St. Louis River Rd		DULUTH	MN - MINNESOTA	55810	9539	R005	6516	109	NO	NO	YES	67	
CURRENT RESIDENT OR BISHOP	6377 St. Louis River Rd W		CLOQUET	MN - MINNESOTA	55720	9267	R002	6518	181	NO	NO	YES	77	
CURRENT RESIDENT OR FOX	4042 Sandberg Rd		DULUTH	MN - MINNESOTA	55810	9527	R005	6522	109	NO	NO	YES	42	
CURRENT RESIDENT OR ROJAS	6028 SEVILLE RD		DULUTH	MN - MINNESOTA	55811	9608	R002	6524	122	NO	NO	YES	28	
CURRENT RESIDENT OR POLZIN	6314 SEVILLE RD		SAGINAW	MN - MINNESOTA	55779	9507	R003	6530	182	NO	NO	YES	14	
ARNE & JUDY GADDA	6941 SEVILLE RD		SAGINAW	MN - MINNESOTA	55779	9771	R003	6532	182	NO	NO	YES	41	
CURRENT RESIDENT OR MCDONALD	4373 Solway Rd		DULUTH	MN - MINNESOTA	55810	9765	R007	6534	110	NO	NO	YES	73	
CURRENT RESIDENT OR WOLZ	4423 Solway Rd		DULUTH	MN - MINNESOTA	55810	9735	R007	6535	110	NO	NO	YES	23	
CURRENT RESIDENT OR PETERSON	4180 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	9249	R002	6538	181	NO	NO	YES	80	
CURRENT RESIDENT OR WESTLUND	4233 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	8212	R002	6539	181	NO	NO	YES	33	
CURRENT RESIDENT OR BEECHLER	4226 Van Gassler Rd		CLOQUET	MN - MINNESOTA	55720	8212	R002	6540	181	NO	NO	YES	26	
SCOTT & LORI JOHNSON	3931 LEISTE RD		CLOQUET	MN - MINNESOTA	55720	8207	R002	6550	181	NO	YES	YES	31	09/23/2023
CURRENT RESIDENT OR LASKY	3611 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	8215	R002	6659	181	NO	NO	YES	11	
CURRENT RESIDENT OR HOMMERDING	6024 ARROWHEAD RD		DULUTH	MN - MINNESOTA	55810	9754	R007	6662	110	NO	NO	YES	24	
JEFF MOEN	6972 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9278	R002	6801	181	NO	NO	YES	72	
CHLOE OAKLAND	7046 HEINE RD		CLOQUET	MN - MINNESOTA	55720	9279	R002	6804	181	NO	YES	YES	46	02/28/2021
DIANE RAUSCHENFELS	9900 HUDSON BLVD #207		DULUTH	MN - MINNESOTA	55808	2126	C077	6853	121	NO	YES	YES	57	10/29/2022
CURRENT RESIDENT	6936 Seville Rd		SAGINAW	MN - MINNESOTA	55779	9771	R003	6877	182	NO	NO	YES	36	
CURRENT RESIDENT	3933 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9254	R002	6944	181	NO	NO	NO	33	
CURRENT RESIDENT OR JOHNSON	4142 CARIBOU LAKE RD		DULUTH	MN - MINNESOTA	55810	9730	R007	6945	110	NO	NO	NO	42	
WUORI TOWNSHIP	7449 WERNER RD		VIRGINIA	MN - MINNESOTA	55792	8025	H001	6946	151	NO	NO	NO	49	
CURRENT RESIDENT OR TAYLOR	6351 HERMANTOWN RD		DULUTH	MN - MINNESOTA	55810	9567	R005	7009	109	NO	NO	YES	51	
ANGELA URBAN	6407 St. Louis River Rd E		CLOQUET	MN - MINNESOTA	55720	9423	R002	7058	181	NO	NO	YES	07	
CURRENT RESIDENT OR HAYDON	3953 MUNGER SHAW RD		CLOQUET	MN - MINNESOTA	55720	9254	R002	7185	181	NO	NO	NO	53	
CURRENT RESIDENT OR KARKKAINEN	6460 TAYLOR RD		CLOQUET	MN - MINNESOTA	55720	9213	R002	7202	181	NO	NO	YES	60	
CURRENT RESIDENT OR SCHRAMM	6545 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9269	R002	7214	181	NO	NO	NO	45	
CURRENT RESIDENT OR STORCK	3611 LINDROSE RD		CLOQUET	MN - MINNESOTA	55720	8208	R002	7215	181	NO	NO	NO	11	
CATHY RUMBLEY	5987 BIRCHWAY RD		DULUTH	MN - MINNESOTA	55810	9769	R007	7269	110	NO	YES	YES	87	12/08/2021
GREG GREEN	5980 Birchway Rd		DULUTH	MN - MINNESOTA	55810	9769	R007	7334	110	NO	NO	YES	80	
CURRENT RESIDENT OR SEME	4308 Tondryk Rd		SAGINAW	MN - MINNESOTA	55779	9695	R001	7380	182	NO	NO	NO	08	
NATHAN JOHNSON	3710 MATTSON RD		CLOQUET	MN - MINNESOTA	55720	9270	R002	7384	181	NO	NO	YES	10	
CURRENT RESIDENT OR TALBOT	6325 ST LOUIS RIVER RD W		CLOQUET	MN - MINNESOTA	55720	9267	R002	7385	181	NO	NO	NO	25	
CURRENT RESIDENT OR GORDER	6341 ST LOUIS RIVER RD		CLOQUET	MN - MINNESOTA	55720	9267	R002	7446	181	NO	NO	YES	41	
JOHN PROUTY	6413 SEVILLE RD		SAGINAW	MN - MINNESOTA	55779	9506	R003	7472	182	NO	YES	NO	13	05/17/2021
CURRENT RESIDENT OR TRUSTEM	5988 Birchway Rd		DULUTH	MN - MINNESOTA	55810	9769	R007	7533	110	NO	NO	YES	88	
CURRENT RESIDENT OR MACE	5992 Birchway Rd		DULUTH	MN - MINNESOTA	55810	9769	R007	7534	110	NO	NO	YES	92	
CURRENT RESIDENT OR ROKKE	4115 ENGLISH RD		CLOQUET	MN - MINNESOTA	55720	4100	R002	7536	181	NO	NO	NO	15	
CURRENT RESIDENT OR VOGEL	6252 MAPLE GROVE RD		DULUTH	MN - MINNESOTA	55810	9592	R005	7537	109	NO	NO	NO	52	

Name	Street	Street 2	City	State	Zip	Zip 2	Carrier	INDEX	ZONE	QUESTION 7	mailing journal	Mailing	Delivery Point	Renewal date
CURRENT RESIDENT OR HARJU	5915 WARGIN RD		DULUTH	MN - MINNESOTA	55810	9732	R007	7539	110	NO	NO	NO	15	
TABITHA VOLTZKE	6417 TAYLOR RD		CLOQUET	MN - MINNESOTA	55720	9213	R002	7575	181	NO	NO	YES	17	
CURRENT RESIDENT OR SCHILLING	4471 SOLWAY RD		DULUTH	MN - MINNESOTA	55810	9735	R007	7577	110	NO	NO	NO	71	
CURRENT RESIDENT OR SONNEMAN	3946 JACKSON RD		CLOQUET	MN - MINNESOTA	55720	9276	R002	7624	181	NO	NO	NO	46	
CURRENT RESIDENT OR BANGS	6229 HWY 194		SAGINAW	MN - MINNESOTA	55779	9702	R003	7729	182	NO	NO	YES	29	
JONATHAN & HOLLY WOLFE	6039 W ARROWHEAD RD		DULUTH	MN - MINNESOTA	55810	9754	R007	7741	110	NO	NO	YES	39	
CURRENT RESIDENT OR PERKINS	4405 CARIBOU LK RD		DULUTH	MN - MINNESOTA	55810	9764	R007	7746	110	NO	NO	YES	05	
CURRENT RESIDENT OR SPINDLER	3643 LINDROSE RD		CLOQUET	MN - MINNESOTA	55720	8208	R002	7764	181	NO	NO	YES	43	
CURRENT RESIDENT	6984 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9278	R002	7765	181	NO	NO	YES	84	
CURRENT RESIDENT OR THRASHER	6805 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9275	R002	7768	181	NO	NO	YES	05	
CURRENT RESIDENT OR PETERSON	6373 MAPLE GROVE RD		CLOQUET	MN - MINNESOTA	55720	9250	R002	7779	181	NO	NO	YES	73	
KYLE PETERSON	4131 VAN GASSLER RD		CLOQUET	MN - MINNESOTA	55720	9249	R002	7781	181	NO	NO	YES	31	
CURRENT RESIDENT OR PALUSKY	6644 W ARROWHEAD RD		CLOQUET	MN - MINNESOTA	55720	9692	R002	7783	181	NO	NO	YES	44	
CURRENT RESIDENT OR LUND	3590 STONE LK RD		CLOQUET	MN - MINNESOTA	55720	9287	R002	7785	181	NO	NO	YES	90	
CURRENT RESIDENT OR PETERSON	6416 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9265	R002	7786	181	NO	NO	YES	16	
CURRENT RESIDENT OR ROBARGE	3757 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9264	R002	7796	181	NO	NO	YES	57	
CURRENT RESIDENT OR BIRD	6140 HWY 194		SAGINAW	MN - MINNESOTA	55779	9793	R003	7851	182	NO	NO	YES	40	
CURRENT RESIDENT OR AKEY	6525 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9269	R002	7991	181	NO	NO	YES	25	
CURRENT RESIDENT OR BARBER	4690 DOW RD		SAGINAW	MN - MINNESOTA	55779	9769	R003	7994	182	NO	NO	YES	90	
KAREN BRICKLEY	3939 JEFFREY RD		PROCTOR	MN - MINNESOTA	55810	9533	R005	8050	109	NO	NO	YES	39	
JULIE SELENSKI	3735 MUNGER SHAW RD		PROCTOR	MN - MINNESOTA	55810	9514	R005	8166	109	NO	NO	YES	35	
NANCY JOHNSON-KUSEL	3791 MUNGER SHAW RD		DULUTH	MN - MINNESOTA	55810	9514	R005	8169	109	NO	NO	YES	91	
CURRENT RESIDENT OR NARTNIK	3594 SANDBERG RD		DULUTH	MN - MINNESOTA	55810	1635	R005	8173	109	NO	NO	YES	94	
CURRENT RESIDENT OR	3997 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9262	R002	8187	181	NO	NO	NO	97	
CURRENT RESIDENT OR ABRAHAMSON	3605 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9268	R002	8195	181	NO	NO	YES	05	
CURRENT RESIDENT OR FULTS	6915 SEVILLE RD		SAGINAW	MN - MINNESOTA	55779	9771	R003	8352	182	NO	NO	NO	15	
JESSICA HENKEL-JOHNSON	4085 JEFFREY RD		DULUTH	MN - MINNESOTA	55810	9519	R005	8405	109	NO	NO	YES	85	
GAIL PAULUS	4099 JEFFREY RD		DULUTH	MN - MINNESOTA	55810	9519	R005	8423	109	NO	YES	NO	99	11/07/2022
CURRENT RESIDENT OR LEISTE	6464 MAPLE GROVE RD		CLOQUET	MN - MINNESOTA	55720	9209	R002	8435	181	NO	NO	NO	64	
WILLIAM VOGEL	6270 MAPLE GROVE RD		DULUTH	MN - MINNESOTA	55810	9592	R005	8436	109	NO	NO	NO	70	
JOAN E. MILLER	2604 N 21ST ST	APT 4	SUPERIOR	WI - WISCONSIN	54880	7376	c004	8456	204	NO	NO	NO	04	
STONEMAN	4149 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720	9244	R002	8519	181	NO	NO	NO	49	
CURRENT RESIDENT	7021 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720	9281	R002	8698	181	NO	NO	NO	21	
MIRANDA DESANTO	5947 ROSE RD		DULUTH	MN - MINNESOTA	55810	9734	R007	8699	110	NO	NO	NO	47	
JIM ANDERSON	6375 HIGHWAY 2		CLOQUET	MN - MINNESOTA	55720	9257	R002	8752	181	NO	NO	NO	75	
ANDREW KILPO	5983 BIRCHWAY RD		PROCTOR	MN - MINNESOTA	55810	9769	R014	8807	100	NO	NO	NO	83	
KENNETH & MARGARET JOHNSON	5092 W ARROWHEAD RD		HERMANTOWN	MN - MINNESOTA	55811			8816	122	NO	NO	NO		
DAWN ECKSTROM	6198 HERMANTOWN RD		DULUTH	MN - MINNESOTA	55810	9569	R005	8817	109	NO	YES	NO	98	08/18/2023
CURRENT RESIDENT OR WENDY BARTLETT	3988 JEFFERY RD		DULUTH	MN - MINNESOTA	55810	9533	R005	8825	109	NO	NO	NO	88	
CURRENT RESIDENT OR HEINECKE	6141 ROSE RD		DULUTH	MN - MINNESOTA	55810			8875	100	NO	NO	NO		
JOE EVERETT	2215 ANDERSON RD		DULUTH	MN - MINNESOTA	55811			8904	122	NO	NO	NO		04/13/2022
RUTH & BRIAN DOURN	5995 WARGIN RD		DULUTH	MN - MINNESOTA	55810			8968	100	NO	NO	NO		
JAMES MADIGAN	3790 ALEXANDER RD		HERMANTOWN	MN - MINNESOTA	55811			8977	122	NO	NO	NO		
JOSHUA HUGHES	7009 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720			8988	181	NO	NO	NO		
KELLY KURAS	3634 CANOSIA RD		CLOQUET	MN - MINNESOTA	55720			8989	181	NO	YES	NO		08/12/2022
CURRENT RESIDENT	6937 HWY 2		SAGINAW	MN - MINNESOTA	55779			9029	182	NO	NO	NO		
DOUG VANDERWEYST	4428 WOODGATE RD		DULUTH	MN - MINNESOTA	55810			9033	100	NO	YES			
LINDA STETHENSON	4615 SOLWAY RD		DULUTH	MN - MINNESOTA	55811			9049	122	NO	NO	NO		
TOM & KELLEY STARKA	5908 HWY 2		DULUTH	MN - MINNESOTA	55810			9115	100	NO	NO	NO		
CURRENT RESIDENT	6437 MORRIS THOMAS RD		CLOQUET	MN - MINNESOTA	55720			9129	181	NO	NO	NO		
BETTY FREEMAN	3789 ALEXANDER RD		HERMANTOWN	MN - MINNESOTA	55810			9137	100	NO	NO	NO		
CURRENT RESIDENT	3585 LINDROSE RD		CLOQUET	MN - MINNESOTA	55720			9138	181	NO	NO	YES		
PENTTI AND DEBBIE ANTILA	6415 OLD HWY 2		PROCTOR	MN - MINNESOTA	55810			9139	100	NO	NO	NO		
CURRENT RESIDENT	3673 MATTSON RD		CLOQUET	MN - MINNESOTA	55720			9140	181	NO	NO	NO		
HEATHER URBANIAK	1101 ANDERSON RD		DULUTH	MN - MINNESOTA	55811	5415	R002	9141	122	NO	NO	YES	88	

AFFIDAVIT OF MAILING

In the Matter of the Application for a Certificate of Need and Route Permit for the HVDC Modernization Project in St. Louis County

PUC Docket No. CN-22-607/TL-22-611

STATE OF MINNESOTA)
) SS.
COUNTY OF HENNEPIN)

I, Daniel S. Flo, hereby certify that on the 3rd day of April 2023, I directed to be sent via U.S. Mail a true and correct copy of the Direct Mail Notice Letter attached hereto as Exhibit 1 to all Landowners and Mailing Addresses on the mailing list attached hereto as Exhibit 2.

MELISSA ADELE DELLWO
NOTARY PUBLIC
MINNESOTA
My Commission Expires 1-31-24

Daniel S. Flo

Subscribed and sworn to before me
this 6 day of April 2023.

Notary Public

EXHIBIT 1

April 3, 2023

NOTICE OF PROPOSED TRANSMISSION LINE PROJECT

Re: In the Matter of the Application for a Certificate of Need and Route Permit for the HVDC Modernization Project
MPUC Docket Nos. E015/CN-22-607; E015/TL-22-611

PLEASE TAKE NOTICE that Minnesota Power ("Company") is applying to the Minnesota Public Utilities Commission ("Commission") for a Certificate of Need and Route Permit to modernize and upgrade its existing High-Voltage Direct-Current ("HVDC") terminal near the Arrowhead Substation in Hermantown Minnesota ("HVDC Modernization Project," or "Project").

Project Description

Minnesota Power intends to submit a combined application for a Certificate of Need and a Route Permit to modernize and upgrade its existing High-Voltage Direct-Current ("HVDC") terminal near the Arrowhead Substation located in Hermantown Minnesota ("HVDC Modernization Project" or "Project"). The Project would require modernizing and upgrading both HVDC terminals for the 465-mile-long HVDC transmission line ("HVDC Line") and interconnecting the upgraded HVDC terminals to the existing alternating-current ("AC") transmission system. These HVDC terminals are currently located near the Arrowhead Substation in Hermantown, Minnesota and the Center Substation in Center, North Dakota. In order to modernize the HVDC terminals and implement the latest technology, new buildings and electrical infrastructure need to be constructed on a new site near the existing HVDC terminals. In Minnesota, to connect the new HVDC terminal to the existing AC system, the Project would require the construction of a new St Louis County 345-kilovolt ("kV")/230-kV substation located less than one mile west of the current Arrowhead Substation. The new HVDC terminal would be connected to the St Louis County Substation by less than one mile of 345-kV large high-voltage transmission line ("LHVTL")[1] and the new St Louis County Substation would be connected to the existing Arrowhead Substation by two parallel 230-kV LHVTLs less than one mile in length. Additionally, a short portion of the existing ±250-kV HVDC Line in Minnesota will need to be reconfigured to terminate at the new HVDC terminal.

The Project will be designed to provide voltage regulation, frequency response, blackstart capability, and bidirectional power transfer capability; all of which will enable

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[1] As defined by Minn. Stat. § 216B.2421, subd. 2(2); Minn. R. 7849.0010, subp. 14. The exemption found in Minn. Stat. 216B.243, subd. 8(a)(4) for "a high-voltage transmission line of one mile or less required to connect a new or upgraded substation to an existing, new, or upgraded high-voltage transmission line" does not apply because the proposed LHVTL in Minnesota is greater than one mile in length.

Minnesota Power and the region to continue to support our clean energy transition. The Project is currently scheduled to be in service in 2027.

A map of the area under consideration for the proposed Project is attached to this letter as **Figure 1**.

Project Need

The HVDC Modernization Project is needed to modernize aging HVDC assets, continue to position the transmission grid for clean energy transition, and improve the reliability of the transmission system in Minnesota and North Dakota. The existing HVDC terminal has operated for 45 years, 15 years over its 30-year design life. In recent years, Minnesota Power has experienced HVDC terminal outages due to failures in the control system, power electronics, transformers, and other components. Based on experience with other electric system components, the failure rate is expected to increase in both frequency and duration, which is of particular concern for the existing HVDC system because of limited parts availability. The orderly replacement of the HVDC terminal equipment is prudent to ensure continuous efficient delivery (and potential expansion) of Minnesota Power's renewable, carbon-free energy resources into the future.

Further information on the Project need is available on Minnesota Power's website: https://www.mnpower.com/Company/Transmission.

Regulatory Review Process

Before Minnesota Power can construct the Project, the Commission must determine whether the Project is needed (Certificate of Need) and if so, will determine the route along which the Project will be built (Route Permit).

The Certificate of Need process is governed by Minnesota law, including Minnesota Statutes section 216B.243, and Minnesota Rules Chapter 7849, specifically Rules 7849.0010 to 7849.0400 and 7849.1000 to 7849.2100. A copy of the Certificate of Need application, once submitted, can be obtained by visiting the Commission's website at https://mn.gov/puc/ in Docket No. E015/CN-22-607.

In addition to certifying the need for the Project, the Commission must also grant a Route Permit for the Project. The routing of the Project is governed by Minnesota law, including Minnesota Statutes Chapter 216E, and Minnesota Rules Chapters 4410 and 7850. A copy of the Route Permit application, once submitted, can be obtained by visiting the Commission's website (above) in Docket No. E015/TL-22-611.

The Commission will not make these determinations until it has completed a thorough review process that encourages public involvement and analyzes the impacts of the Project and various route alternatives. This process includes preparation of an Environmental Assessment ("EA") on the Project by the Minnesota Department of Commerce's Energy Environmental Review and Analysis ("EERA") staff.

Minnesota Power will submit an application for a Route Permit with one proposed route for the terminal and associated transmission lines. Other routes can be proposed to be evaluated during the scoping process. The Commission and the EERA staff will decide which routes get studied and considered for approval. Routes that have been shown at public meetings are preliminary and subject to change. In addition, other, new routes may also be studied and considered for approval.

The Commission will review all of the data from the public process and will decide if the Project is needed and which route should be approved. Selection of a final route by the Commission will be based on an evaluation of the routes guided by the factors identified in Minnesota Statutes section 216E.03, Minnesota Rules part 7850.4100, and stakeholder input received during the regulatory process.

The table below provides a high-level summary of the major steps in the regulatory process.

Summary of Regulatory Schedule Following Minnesota Law

Action	Approximate Date
Pre-Application study and public meetings and stakeholder outreach	Fall 2022 to Spring 2023
Certificate of Need and Route Permit Applications submitted to Commission	Spring 2023
Informational and Scoping Meetings (public meeting and comment)	Summer 2023
Draft Environmental Assessment Issued (public meeting and comment period)	Summer 2023
Public Hearings (public meeting and comment period)	Summer 2023
Commission Decision	Fall 2023

Right-of-Way for the Project

Before beginning construction, Minnesota Power will acquire property rights for the right-of-way, through either fee acquisition of property or an easement that will be negotiated with the landowner for each parcel. Minnesota Power anticipates acquiring easements with a typical right-of-way approximately 150 feet wide for the 345-kV transmission line, 130 feet wide for each 230-kV transmission line, and 150 feet wide for the ±250-kV HVDC Line. Where these transmission lines parallel existing lines, less new right-of-way may be required because the new transmission line may share a portion of the existing right-of-way.

EXHIBIT 1

Additional Information and Mailing Lists

To subscribe to the Project's Certificate of Need docket and to receive email notifications when information is filed in that docket, please visit https://mn.gov/puc/, click on "eDockets," then click on "Go to eDockets Project Database," and then click on "eFiling Home/Login" in the left menu. Then, click on the "Subscribe to Dockets" button, enter your email address, and select "Docket Number" from the Type of Subscriptions dropdown box, and select "[22]" from the first Docket number drop down box and enter "[607]" 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 (22-611).

If you would like to have your name added to the Project Route Permit proceeding mailing list (MPUC Docket No. E015/TL-22-611) you 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 (regular mail or email) and 2) your complete mailing or email address. You may also find information about the Project on the Department of Commerce's webpage at https://mn.gov/eera/web/page/home/ by clicking "Transmission Lines" and locating the Project in the list. Please be aware that the Project may not be listed at this location until the Route Permit application is submitted.

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. E015/CN-22-607), mail, fax, or email Robin Benson at Minnesota Public Utilities Commission, 121 7th Place E., Suite 350, St. Paul, MN 55101-2147, Fax: 651-297-7073 or robin.benson@state.mn.us.

If you have questions about the state regulatory process, you may contact the Minnesota state regulatory staff listed below:

Minnesota Public Utilities Commission
Mike Kaluzniak
121 7th Place East, Suite 350
St. Paul, Minnesota 55101
(651) 296-7124
1-800-657-3782
mike.kaluzniak@state.mn.us
https://mn.gov/puc/

Minnesota Department of Commerce EERA
Jenna Ness
85 7th Place East, Suite 280
St. Paul, Minnesota 55101
(651) 539-1844
1-800-657-3710
jenna.ness@state.mn.us
https://mn.gov/eera/

Please visit the Minnesota Power's website at: https://www.mnpower.com/Company/Transmission for more information.

EXHIBIT 1

Project phone and e-mail addresses are:

Project Phone Number – (218) 355-3515

Project E-mail Address – askus@mnpower.com

Transmission Planning Process in Minnesota

Minnesota Statutes section 216B.2425 requires that each electric transmission-owning utility in the state file a biennial transmission planning report with the Commission in the fall of odd-numbered years. These reports provide information on the transmission planning process used by utilities in the state of Minnesota and information about other transmission line projects. The 2021 Biennial Transmission Planning Report is available at: www.minnelectrans.com. The 2021 Biennial Transmission Planning Report was submitted on October 29, 2021.

Sincerely,

Dan McCourtney
Environmental & Land Manager
Minnesota Power

EXHIBIT 1

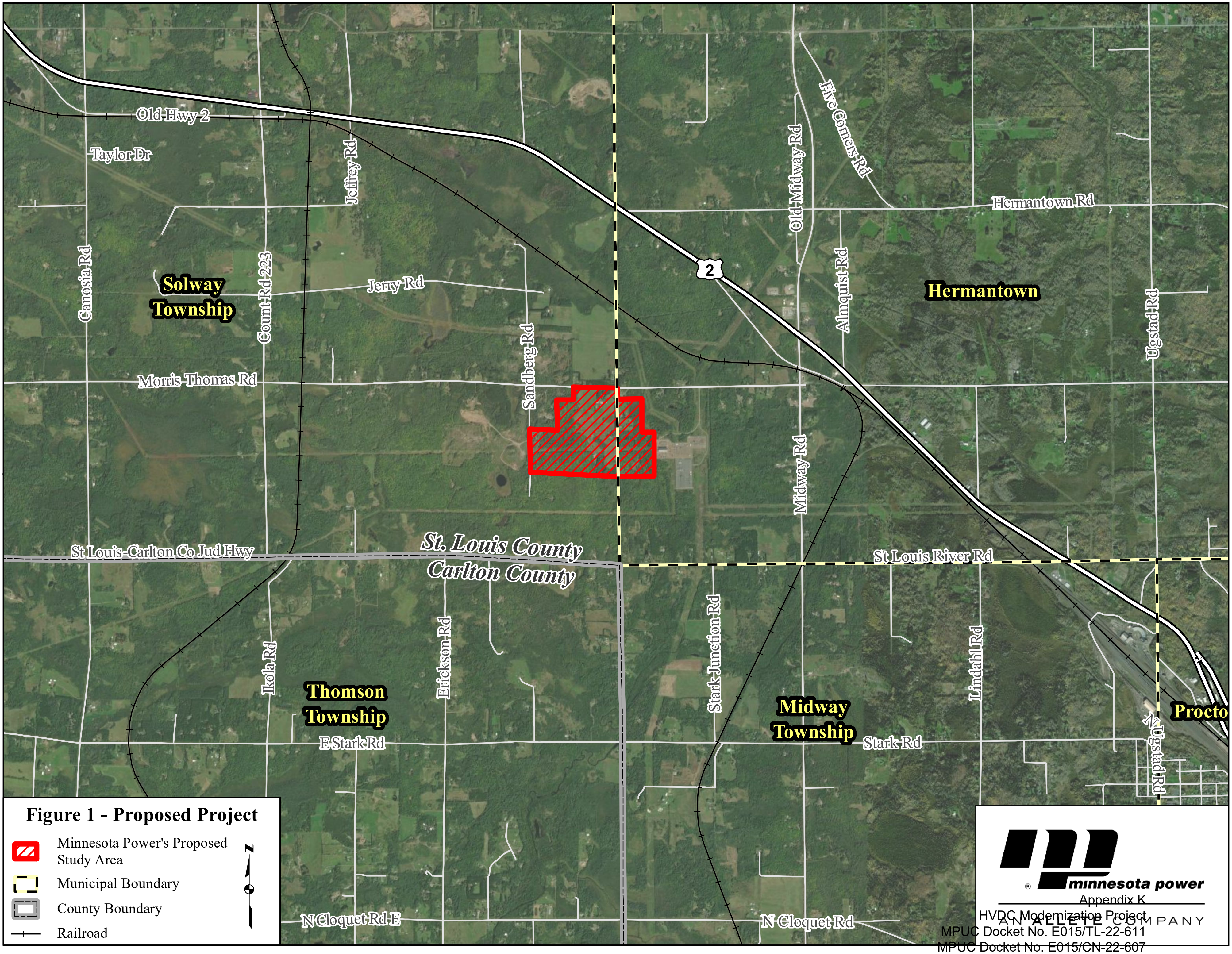


Figure 1 - Proposed Project

- ▨ Minnesota Power's Proposed Study Area
- ⬚ Municipal Boundary
- ⬚ County Boundary
- ┼ Railroad

EXHIBIT 2

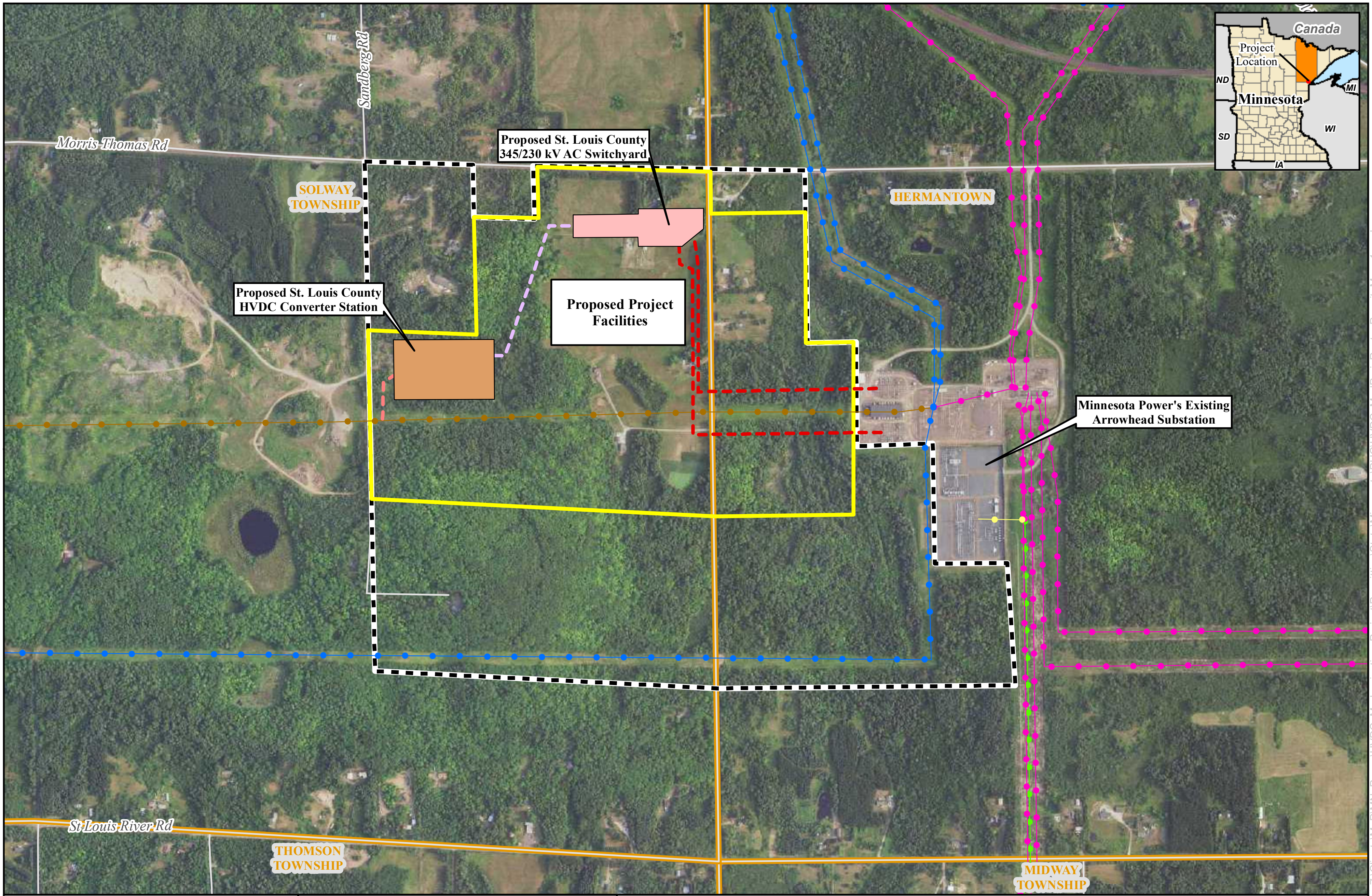
ORGANIZATION	NAME	TITLE	ADDRESS	CITY	STATE	ZIP CODE
	AMES ELIZABETH R		7874 165TH ST E	HASTINGS	MN	55033
	BECK TED		PO BOX 281	CLOQUET	MN	55720
	BENEDICT, ROSS E & NYLA J		292 ST LOUIS RIVER RD E	DULUTH	MN	55810
	BERG WILLIAM P ETUX		3602 SOLWAY RD	DULUTH	MN	55810
	BOYER MARK R		3539 SOLWAY RD	PROCTOR	MN	55810
	BRADFORD LYNN R		3525 SOLWAY RD	HERMANTOW	MN	55810
	DIETER CANDIS M		5993 SAINT LOUIS RIVER RD	PROCTOR	MN	55810
	EDEN THOMAS G		3709 SOLWAY RD	DULUTH	MN	55811
	EK CLARISSA L M		3505 SOLWAY RD	HERMANTOW	MN	55810
	ESTEP MATTHEW		5861 ST LOUIS RIVER RD	HERMANTOW	MN	55810
	FLYNN DENNIS M SR ETUX		5867 ST LOUIS RIVER RD	HERMANTOW	MN	55810
	FOUCAULT, M ANNETTE		726 4TH ST, PO BOX 1015	PROCTOR	MN	55810
	FREMLING TINA M		5890 MORRIS THOMAS RD	HERMANTOW	MN	55811
	GARRICK GAIL		3738 SOLWAY RD	HERMANTOW	MN	55810
	GARRICK GAIL J		3738 SOLWAY RD	HERMANTOW	MN	55810
	GIERSDORF DUSTIN B		6007 ST LOUIS RIVER RD	DULUTH	MN	55810
	GRADY SHANE E		3699 S SANDBERG RD	DULUTH	MN	55810
	GRAY ALEXANDER W		5392 FISH LAKE DAM RD	DULUTH	MN	55803
	GUSTAFSON KEITH		4629 AIRPARK BLVD	DULUTH	MN	55811
	GVESRUDE LEE R		6015 ST LOUIS RIVER RD	DULUTH	MN	55810
	HAEDRICH SCOTT		3738 SANDBERG RD	DULUTH	MN	55810
	HAFFTEN PETER C		5971 ST LOUIS RIVER RD	PROCTOR	MN	55810
	HANSEN BRYCE ROBERT		5833 MORRIS THOMAS RD	HERMANTOW	MN	55810
	HEDQUIST JOY		5581 LILAC HILL RD	DULUTH	MN	55810
	ISABELL JAMES E		6099 ST LOUIS RIVER RD	PROCTOR	MN	55810
	JOHNSON, JUDD A & SARA C		282 ST LOUIS RIVER RD E	DULUTH	MN	55810
	KANTOLA, RAYMOND E		254 ST LOUIS RIVER RD E	DULUTH	MN	55810
	KOHLMEIER ROBERT I & CATHERINE S		5757 ST LOUIS RIVER RD	DULUTH	MN	55810
	KOSKI MICHAEL G JR		PO BOX 7216	DULUTH	MN	55807-0216
	KRATT MICHAEL RAY		5972 MORRIS THOMAS RD	DULUTH	MN	55810
	KUHLMEY SCOTT		6031 SAINT LOUIS RIVER RD E	PROCTOR	MN	55810
	LALIBERTE RONALD G		6041 ST LOUIS RIVER RD	DULUTH	MN	55810
	MAKI THOMAS J SR		6005 MORRIS THOMAS RD	PROCTOR	MN	55810
	Mike Perrott		3867 Sandberg Rd	Duluth	MN	55810
	NARTNIK DAVID G		3594 SANDBERG RD	PROCTOR	MN	55810
	NORLUND RUTH M		3506 SOLWAY RD	HERMANTOW	MN	55810
	O'CONNOR PATRICK		3603 SANDBERG RD	PROCTOR	MN	55810
	OPDAHL-FRALICK DEBORAH L		2208 COUNTRY LANE	MINNETONKA	MN	55305-3113
	PELLAND ANDREW J		5831 ST LOUIS RIVER RD	HERMANTOW	MN	55811
	PEYTON BARBARA J		5891 MORRIS THOMAS RD	HERMANTOW	MN	55810
	RAIHO REVOCABLE TRUST		5959 ST LOUIS RIVER RD	DULUTH	MN	55810
	RALPH MICHAEL P		5781 ST LOUIS RIVER RD	HERMANTOW	MN	55810
	ROGALLA SARAH		6060 MORRIS THOMAS RD	DULUTH	MN	55810
	ROGALLA SARAH LYNN		6060 MORRIS THOMAS RD	DULUTH	MN	55810
	RUNYAN CHRISTOPHER A		5821 S ST LOUIS RIVER RD	HERMANTOW	MN	55811
	SANDSTEDT JULIANN K		3612 SOLWAY RD	HERMANTOW	MN	55810
	SANDSTEDT THOMAS ETAL		3612 SOLWAY RD	HERMANTOW	MN	55810
	SCHMINSKI JARED DANIEL		3483 STARK JUNCTION RD	DULUTH	MN	55810
	SHEEHAN SHAYNA		5949 MORRIS THOMAS RD	DULUTH	MN	55810
	SMITH MARC		850 4TH AVE	PROCTOR	MN	55810
	SOBCZAK BRANDON J		3535 SOLWAY RD	PROCTOR	MN	55810
	ST LOUIS COUNTY		100 N 5TH AVE W # 1	DULUTH	MN	55802
	TAYLOR JEREMY		5836 ST LOUIS RIVER RD	PROCTOR	MN	55810
	THOMPSON SCOTT		5771 ST LOUIS RIVER ROAD	HERMANTOW	MN	55810
	UMPIERRE CARRIE A		5747 ST LOUIS RIVER RD	HERMANTOW	MN	55810
	UMPIERRE MANNY		18 LOIS LANE	ESKO	MN	55733
	VAH SAMANTHA		5828 MORRIS THOMAS RD	HERMANTOW	MN	55810

EXHIBIT 2

ORGANIZATION	NAME	TITLE	ADDRESS	CITY	STATE	ZIP CODE
	VANDERSCHEUREN DALE		5989 ST LOUIS RIVER RD E	DULUTH	MN	55810
	WARD MARK B ETUX		5947 ST LOUIS RIVER RD	DULUTH	MN	55810
	WARREN MICHAEL DENNIS		6067 ST LOUIS RIVER RD	DULUTH	MN	55810
	WIETMAN BRANDON THOMAS		5850 MORRIS THOMAS RD	DULUTH	MN	55811
	WILLIAMS SAMUEL P		3537 SOLWAY RD	DULUTH	MN	55810
	YOST BARBARA J		5866 ST LOUIS RIVER RD	DULUTH	MN	55810

Appendix L

Project Maps



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0 500 1,000 Feet

1 inch = 1,000 feet

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Map 1 - Proposed Route
HVDC Modernization Project
St. Louis County, Minnesota

- Proposed St. Louis County – Arrowhead 230 kV AC Lines
- Proposed +/-250 kV HVDC Line Reroute
- Proposed St. Louis County HVDC – St. Louis County AC Switchyard 345 kV Line
- Proposed Route
- Project Study Area
- Municipal Boundary
- Existing 115 kV Transmission Line
- Existing 230 kV Transmission Line
- Existing 250 kV Transmission Line
- Existing 345 kV Transmission Line
- Existing 345kV/115 kV Transmission Line

Appendix L
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611
MPUC Docket No. E015/CN-22-607

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_1.mxd

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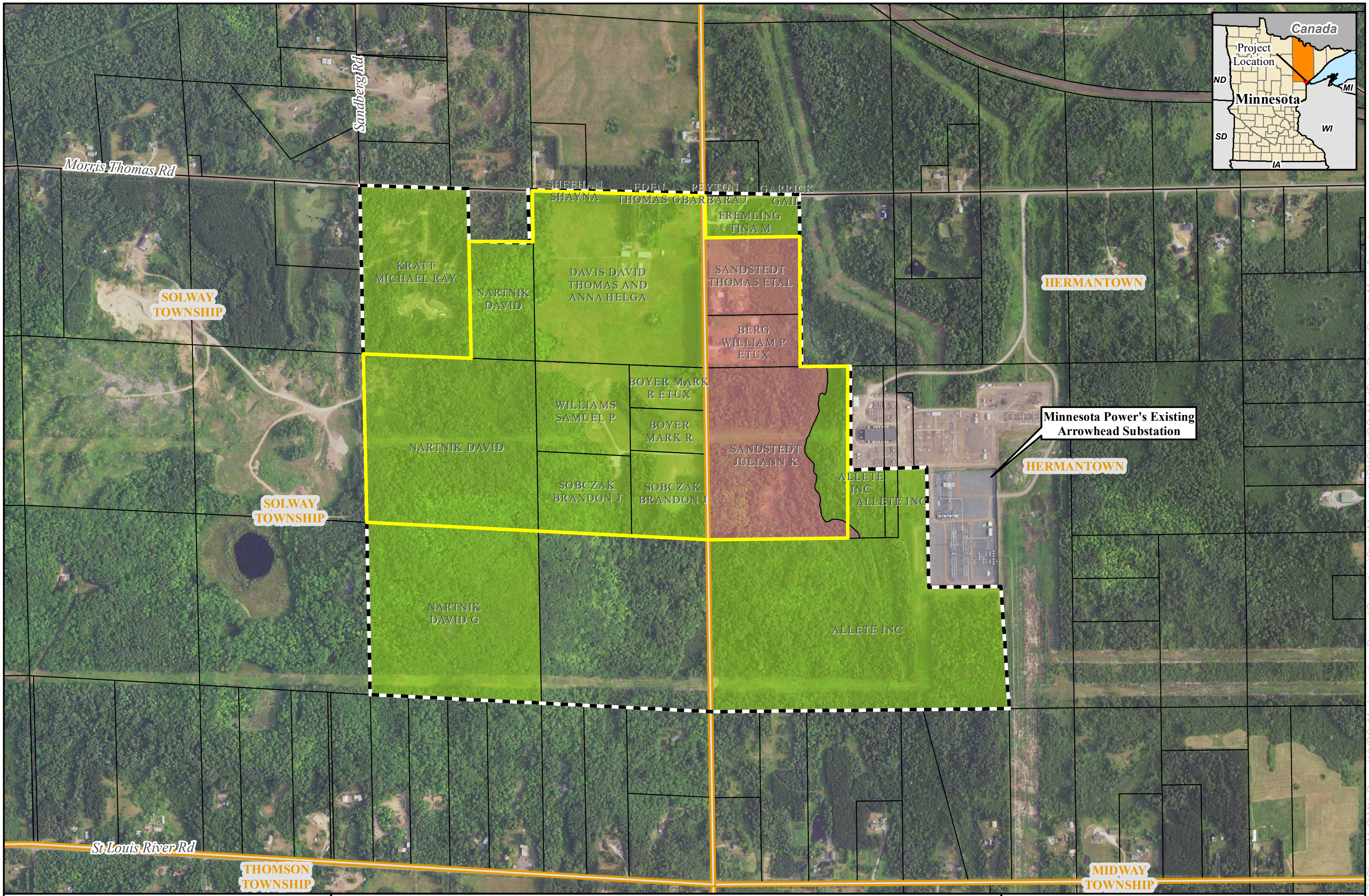

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Feet
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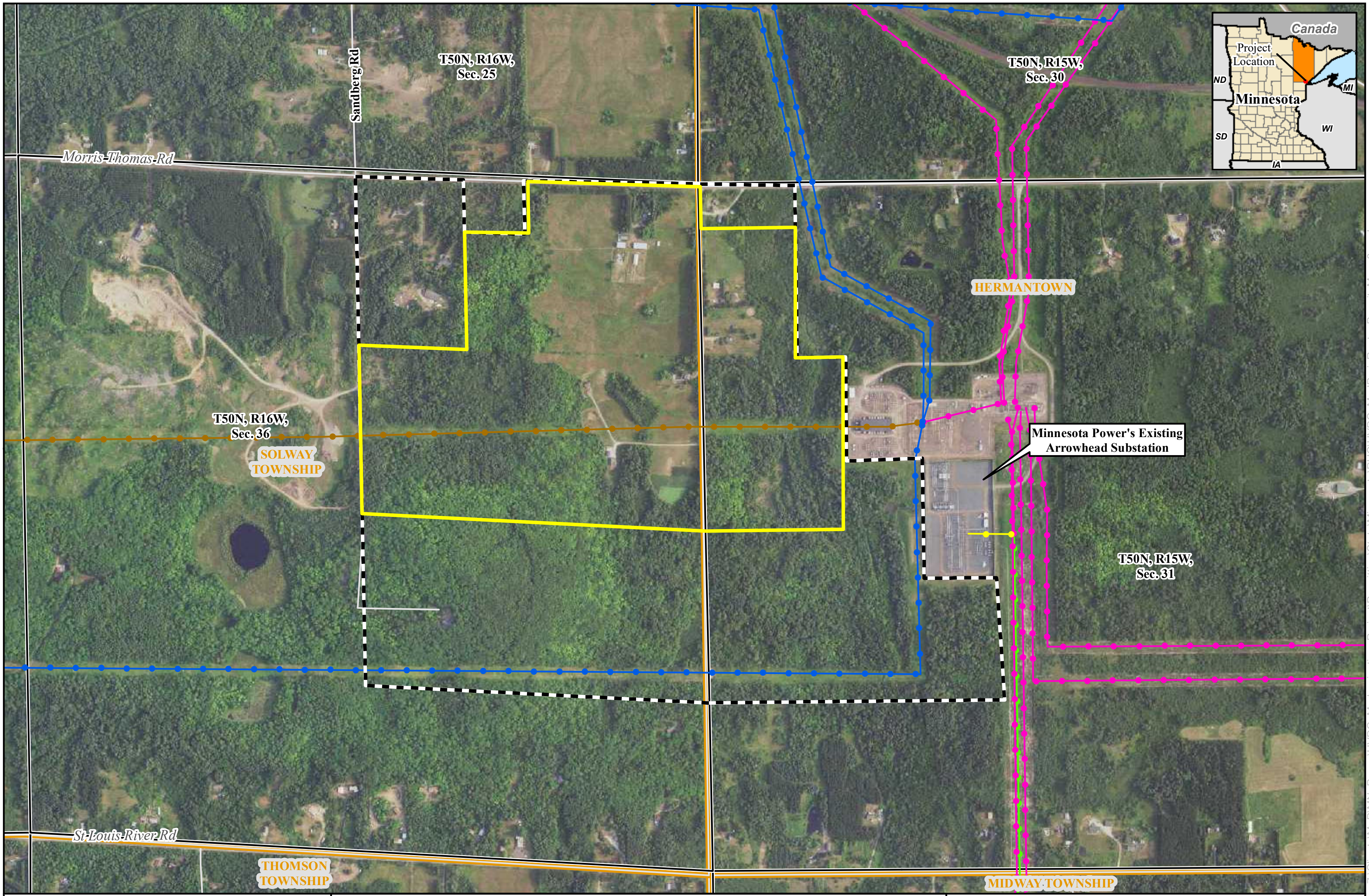
Map 2 - Parcel Status (Transmission Line Right-of-Way)
HVDC Modernization Project
St. Louis County, Minnesota

- 🟨 Proposed Route
- ▨ Project Study Area
- 🟩 Owned by Minnesota Power
- 🟥 Negotiating
- ☐ Parcel Boundary
- 🟧 Municipal Boundary

Date: (4/4/2023) Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_2.mxd



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Map 3 - Project Setting
HVDC Modernization Project
St. Louis County, Minnesota

Existing 115 kV Transmission Line	Proposed Route
Existing 230 kV Transmission Line	Project Study Area
Existing 250 kV Transmission Line	TRS Boundary
Existing 345 kV Transmission Line	Municipal Boundary
Existing 345kV/115 kV Transmission Line	

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_3.mxd

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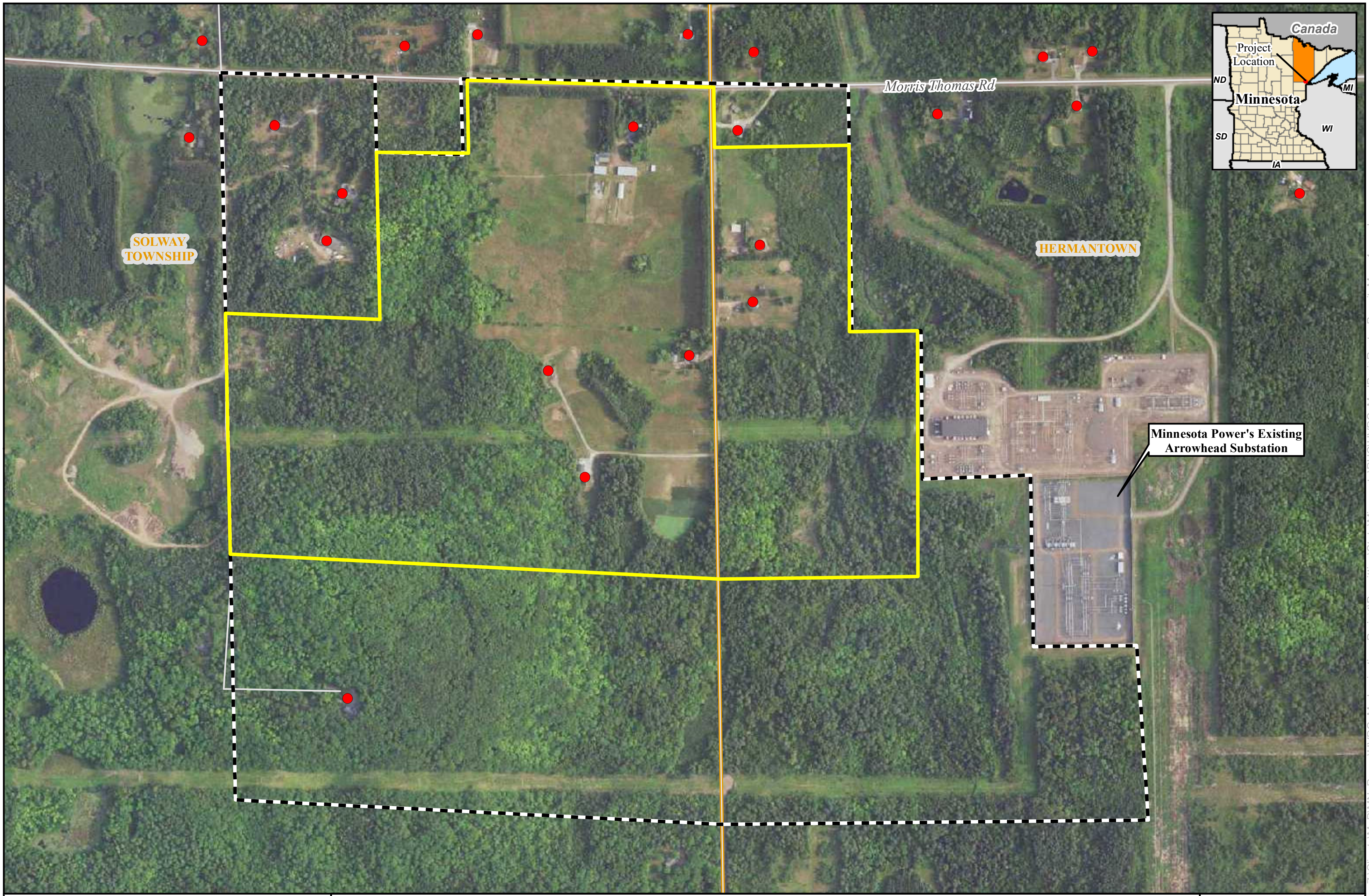

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Feet
1 inch = 700 feet

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Map 4a – Human Settlement - Proximity to Residences
HVDC Modernization Project
St. Louis County, Minnesota

● Residence
🟨 Proposed Route
▨ Project Study Area
▭ Municipal Boundary

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_4a.mxd

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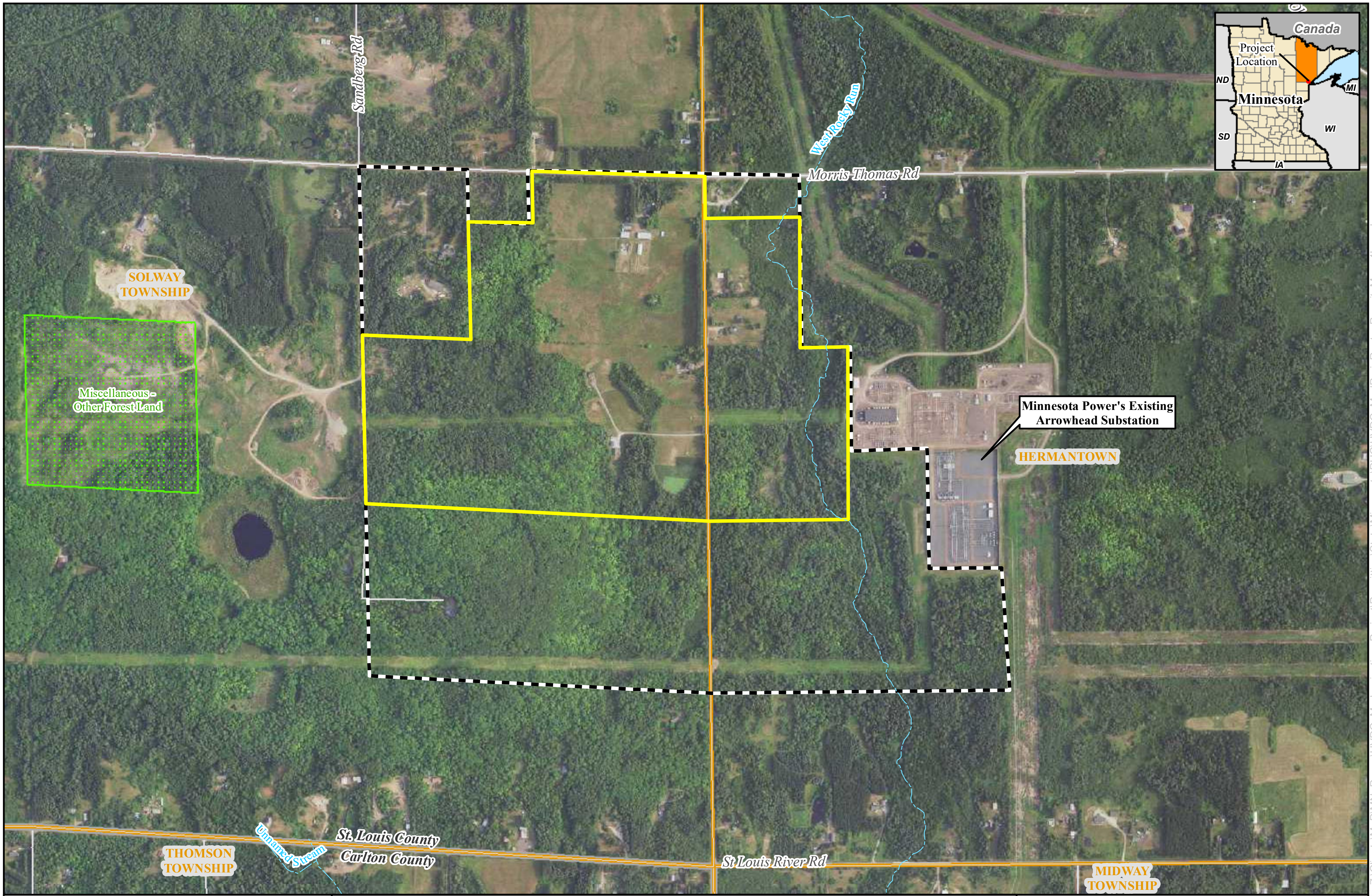

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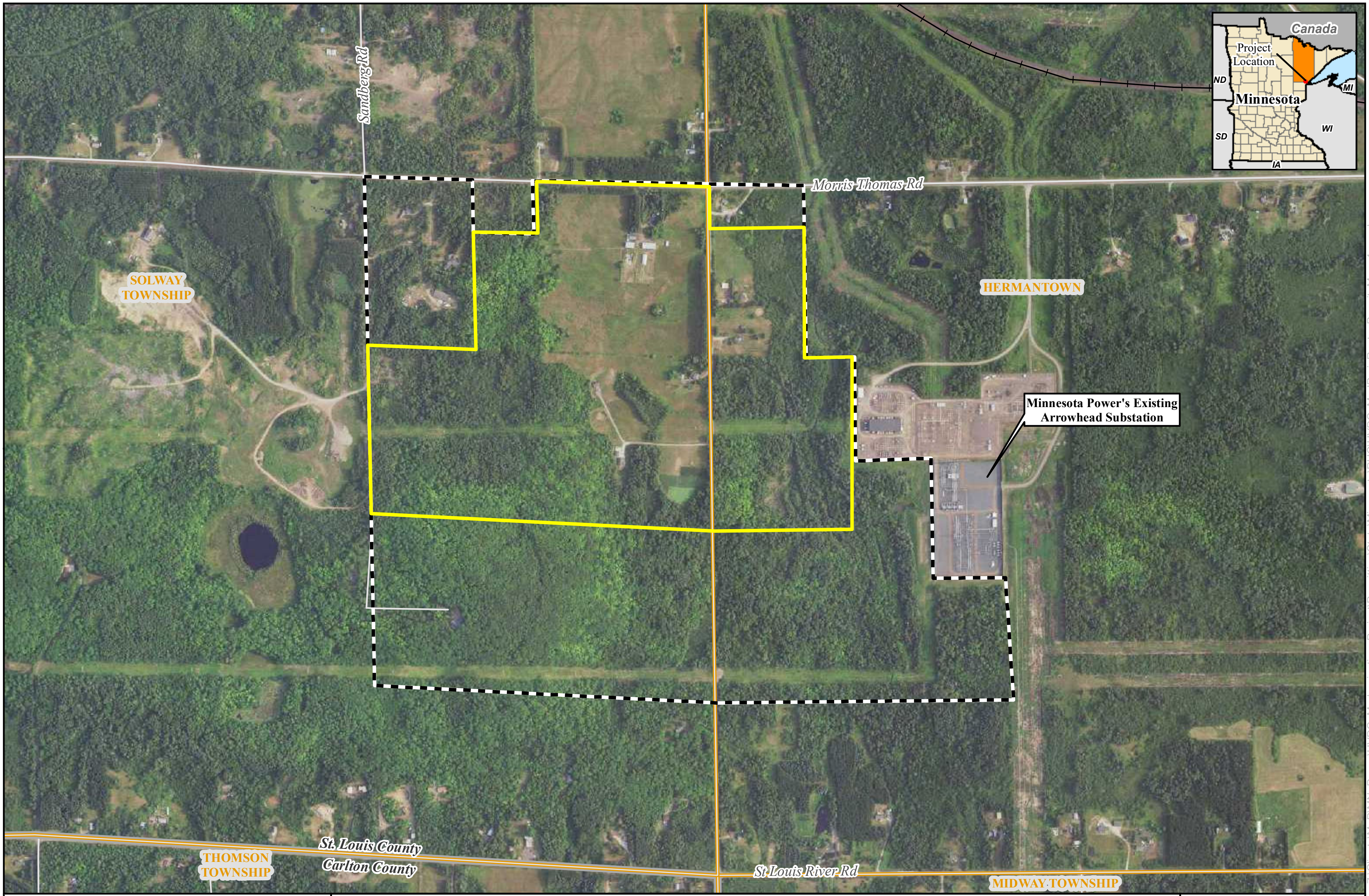
Map 4b – Human Settlement - Recreation
HVDC Modernization Project
St. Louis County, Minnesota

- Trout Stream (PWI/303d Water)
- 🟨 Proposed Route
- ▨ Project Study Area
- ▨ DNR Managed Unit
- ▢ County Boundary
- 🟧 Municipal Boundary

Appendix L
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611
MPUC Docket No. E015/CN-22-607
6 of 16

Date: (5/31/2023) Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_4b.mxd



0 500 1,000 Feet

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Map 4c – Human Settlement – Public Services and Transportation
HVDC Modernization Project
St. Louis County, Minnesota

┼	Railroad
🟨	Proposed Route
▭	Project Study Area
▨	County Boundary
▭	Municipal Boundary

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_4c.mxd

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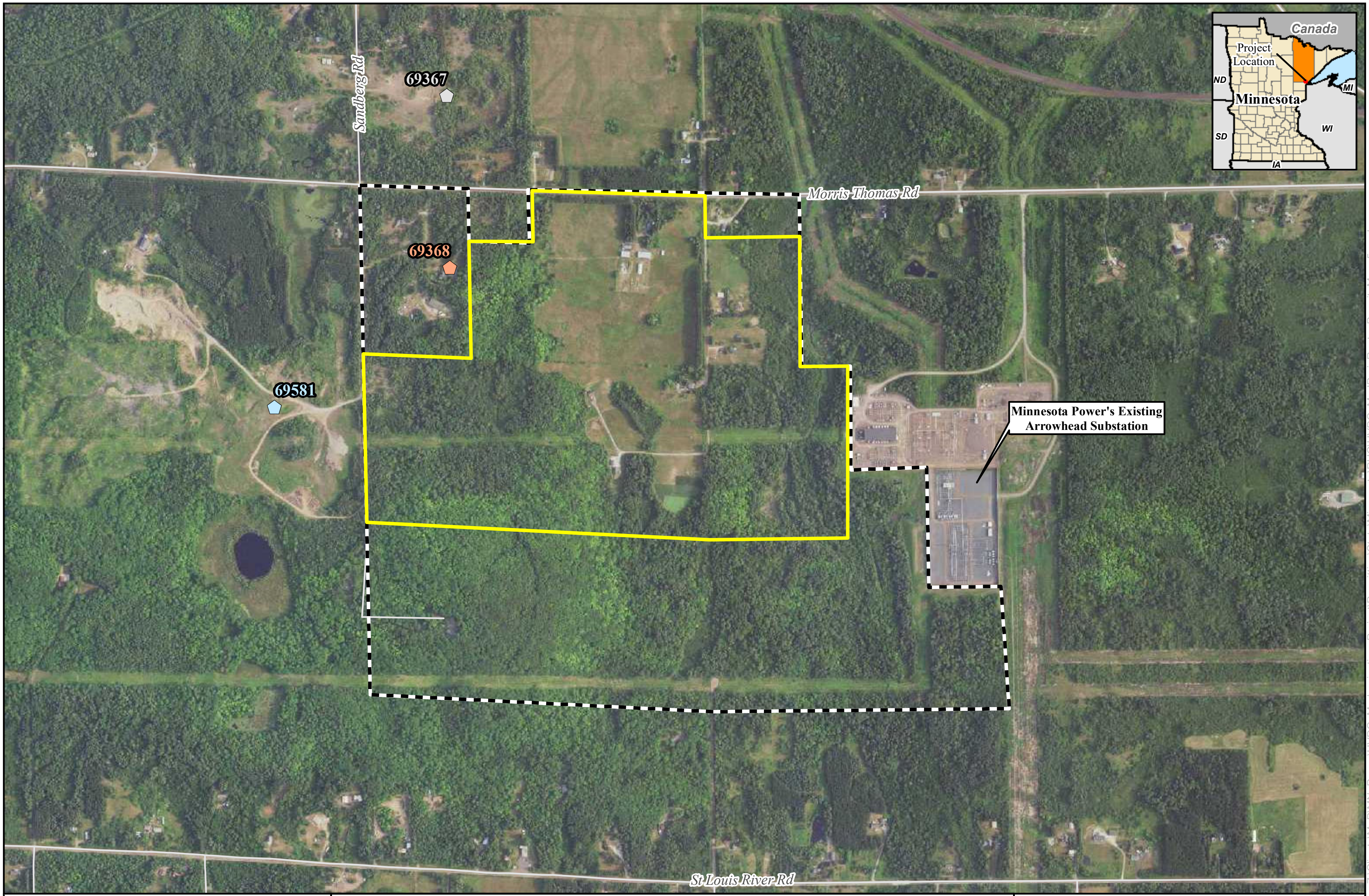

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Feet
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Map 5 - Land-Based Economies
HVDC Modernization Project
St. Louis County, Minnesota

▭	Proposed Route
⬚	Project Study Area

Gravel Pit (MnDOT)

⬟	Commercial Aggregate
⬟	Inactive Aggregate Source
⬟	Aggregate Pit (MnDOT owned)

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_5.mxd

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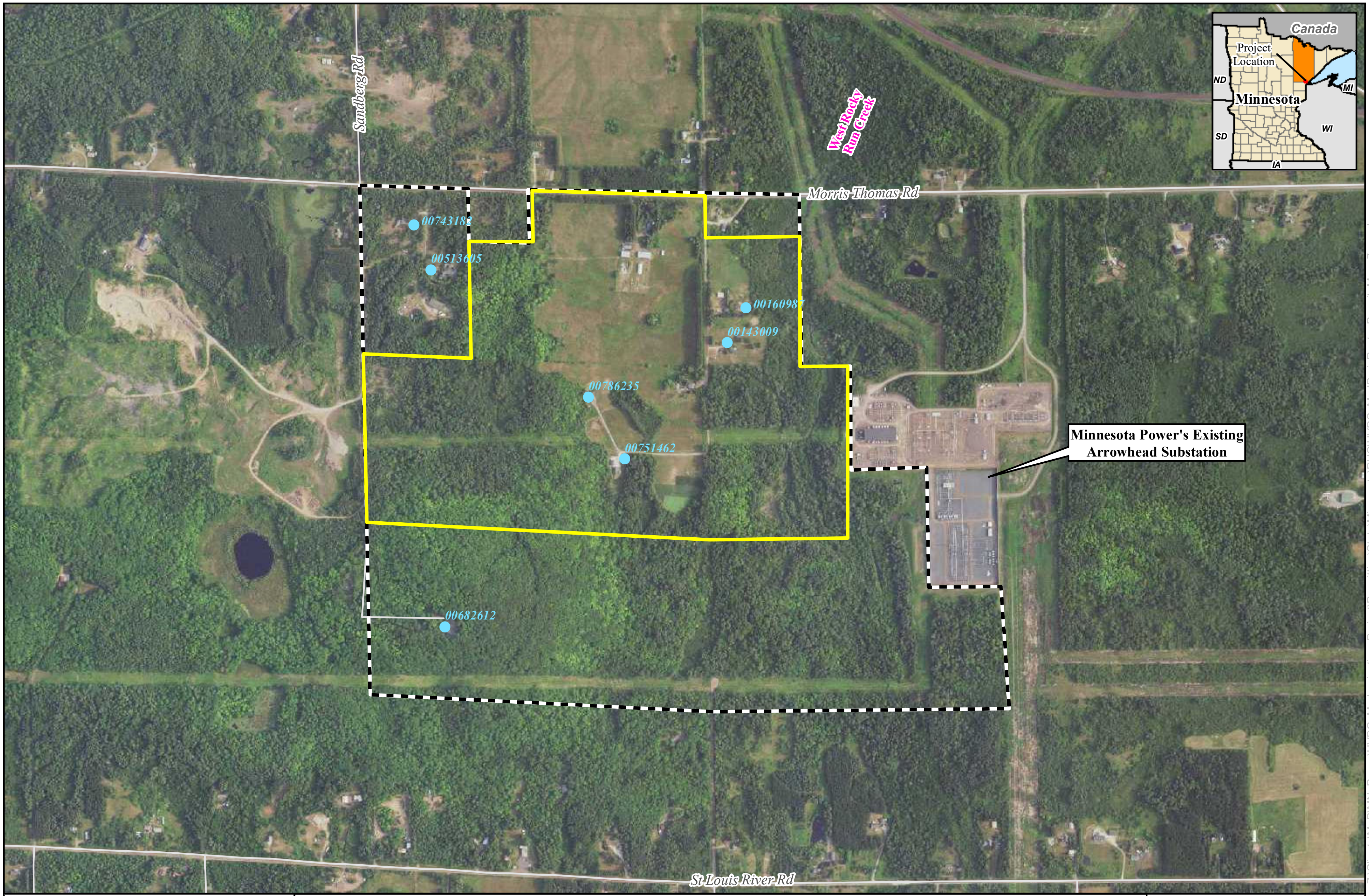

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Feet

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Map 7a - Groundwater Resources
HVDC Modernization Project
St. Louis County, Minnesota

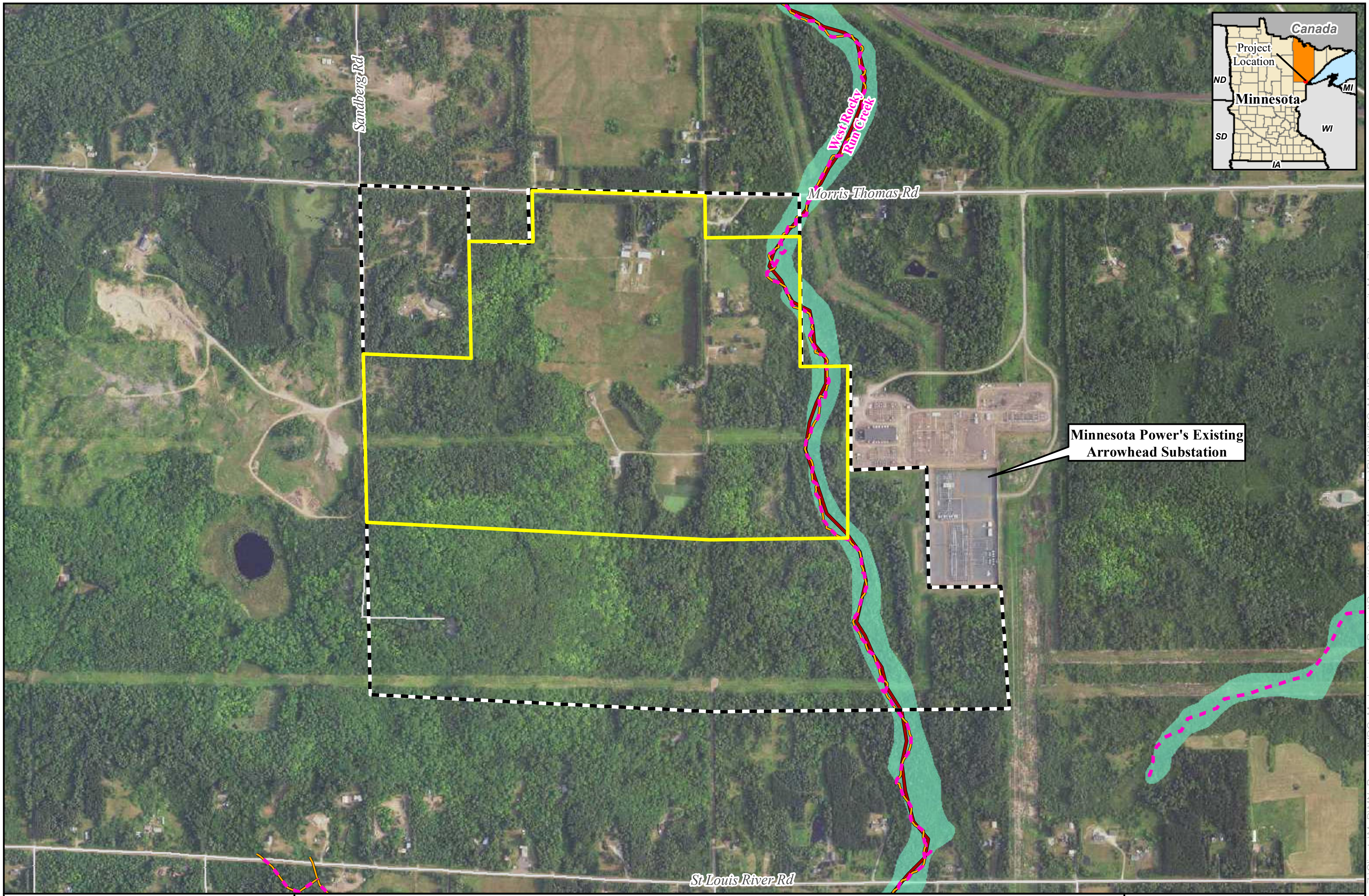
● Well

▭ Proposed Route

⬚ Project Study Area

Appendix L
HVDC Modernization Project
MPUC Docket No. E015/TL-22-611
MPUC Docket No. E015/CN-22-607

Date: (5/31/2023) Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_7a.mxd



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Feet
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Map 7b - Surface Water Public Designations
HVDC Modernization Project
St. Louis County, Minnesota

🟨 Proposed Route
▭ Project Study Area
⋯ Public Waters Watercourse
〰 Impaired Stream 2022
〰 Designated Trout Stream
⬭ 100-year Floodplain

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_7b.mxd

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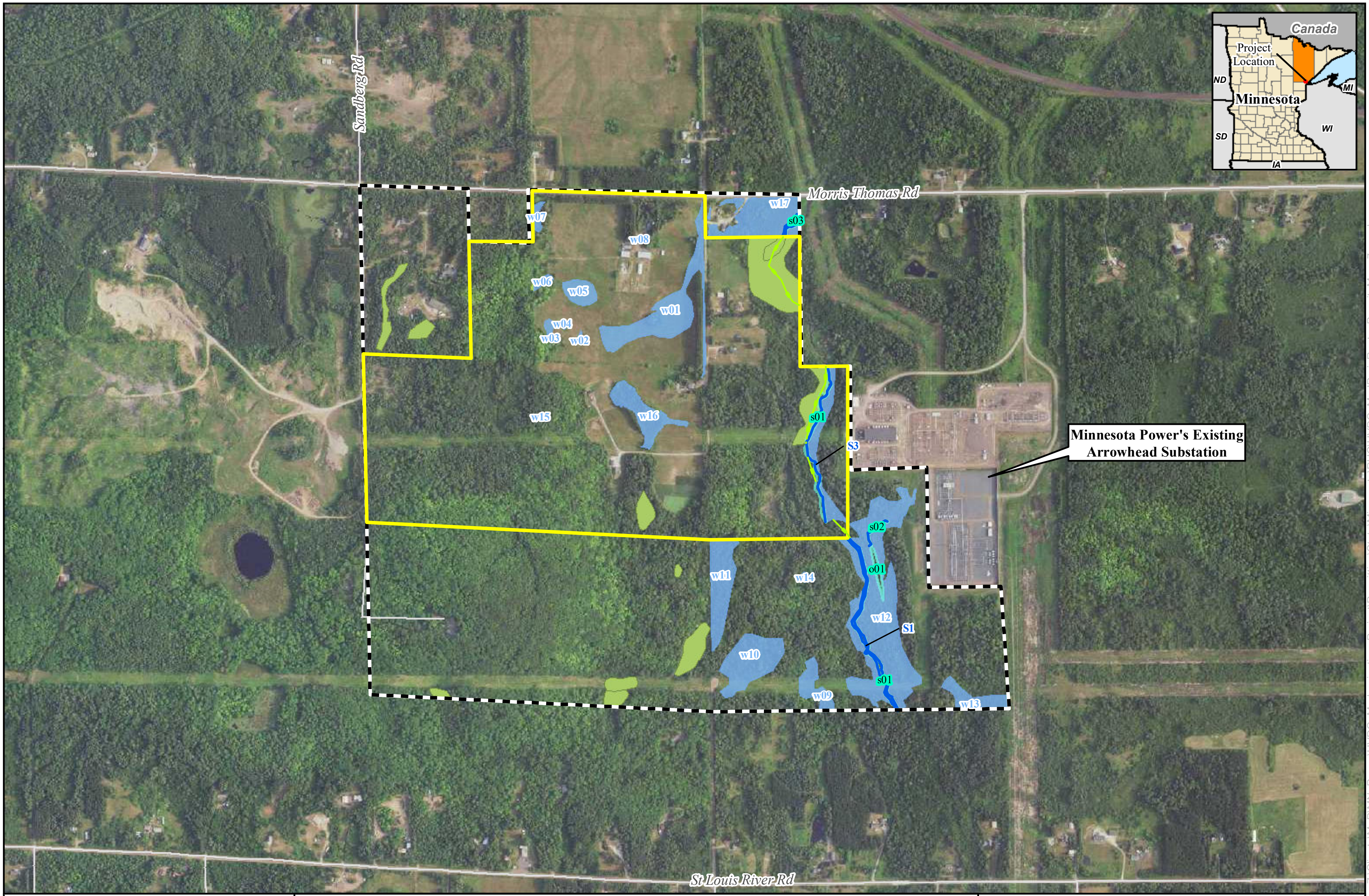

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Map 7c - Surface Water Survey Results
HVDC Modernization Project
St. Louis County, Minnesota

🟨 Proposed Route	NHD Waterbody
Project Study Area	NWI (MDNR Update)
Delineated Waterway	
Delineated Waterbody	
Delineated Wetland	

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_7c.mxd

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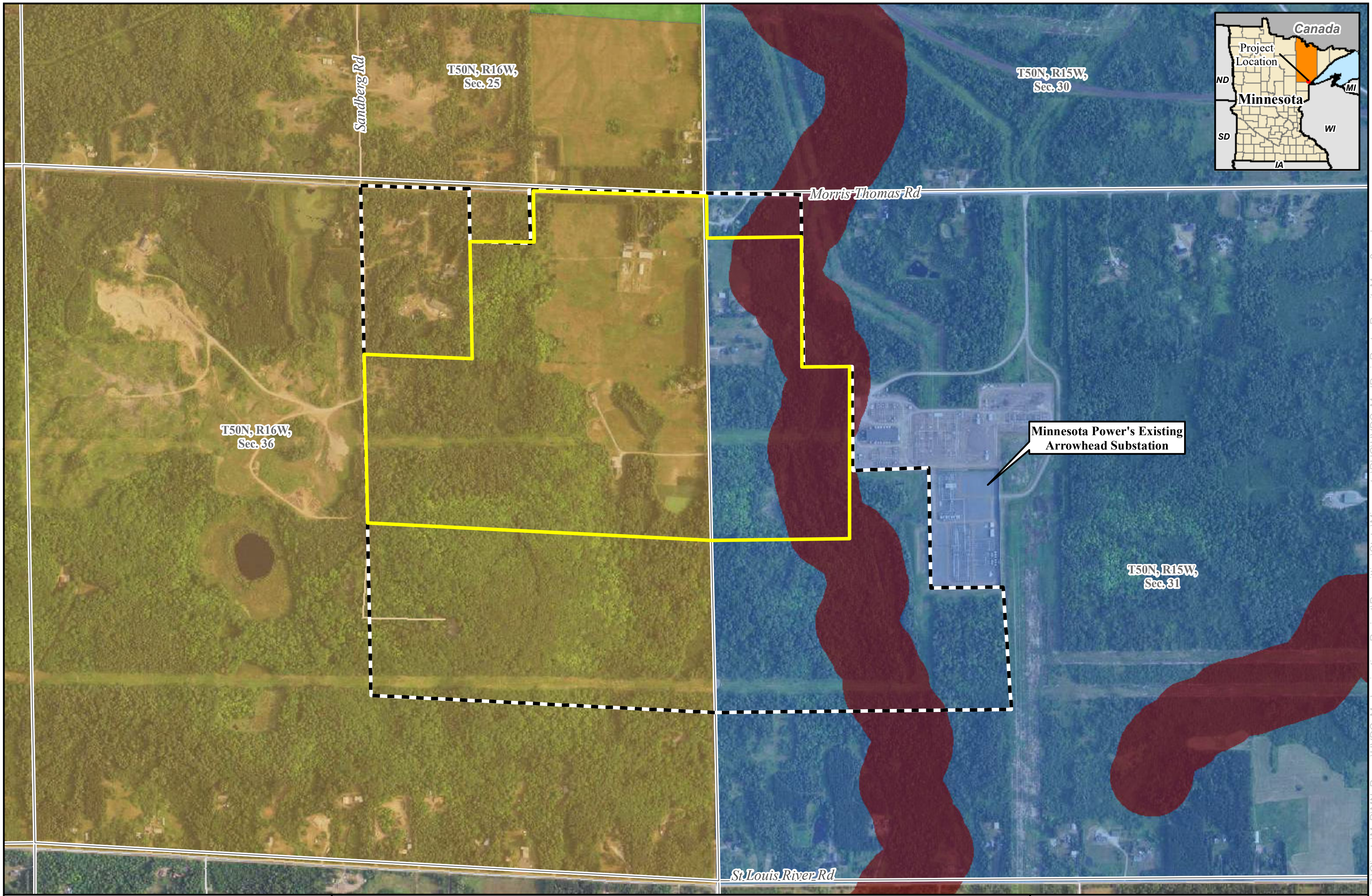

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Feet
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Map 8 – Zoning
HVDC Modernization Project
St. Louis County, Minnesota

🟨 Proposed Route
▢ Project Study Area
▢ TRS Boundary

Zoning
🟩 Forest Agricultural Management
🟧 Residential (RES-3)
🟦 Rural Residential (S1)
🟥 Natural Environment Shoreland Zone

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_8.mxd

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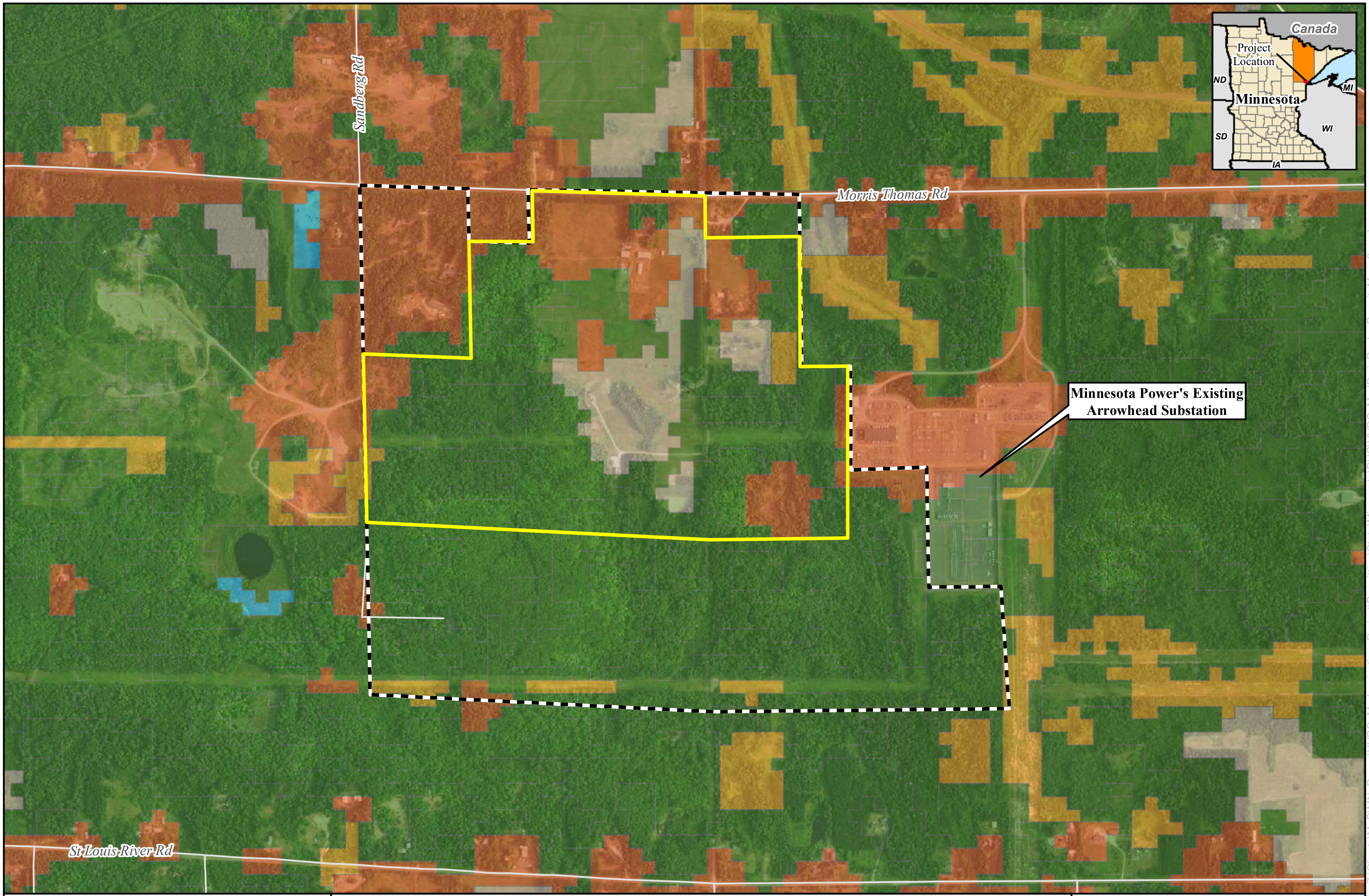

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Map 9 – Land Cover
HVDC Modernization Project
St. Louis County, Minnesota

Proposed Route
Project Study Area

Land Cover (GAP)
Aquatic
Forested Land
Cropland
Developed
Grassland

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_9.mxd

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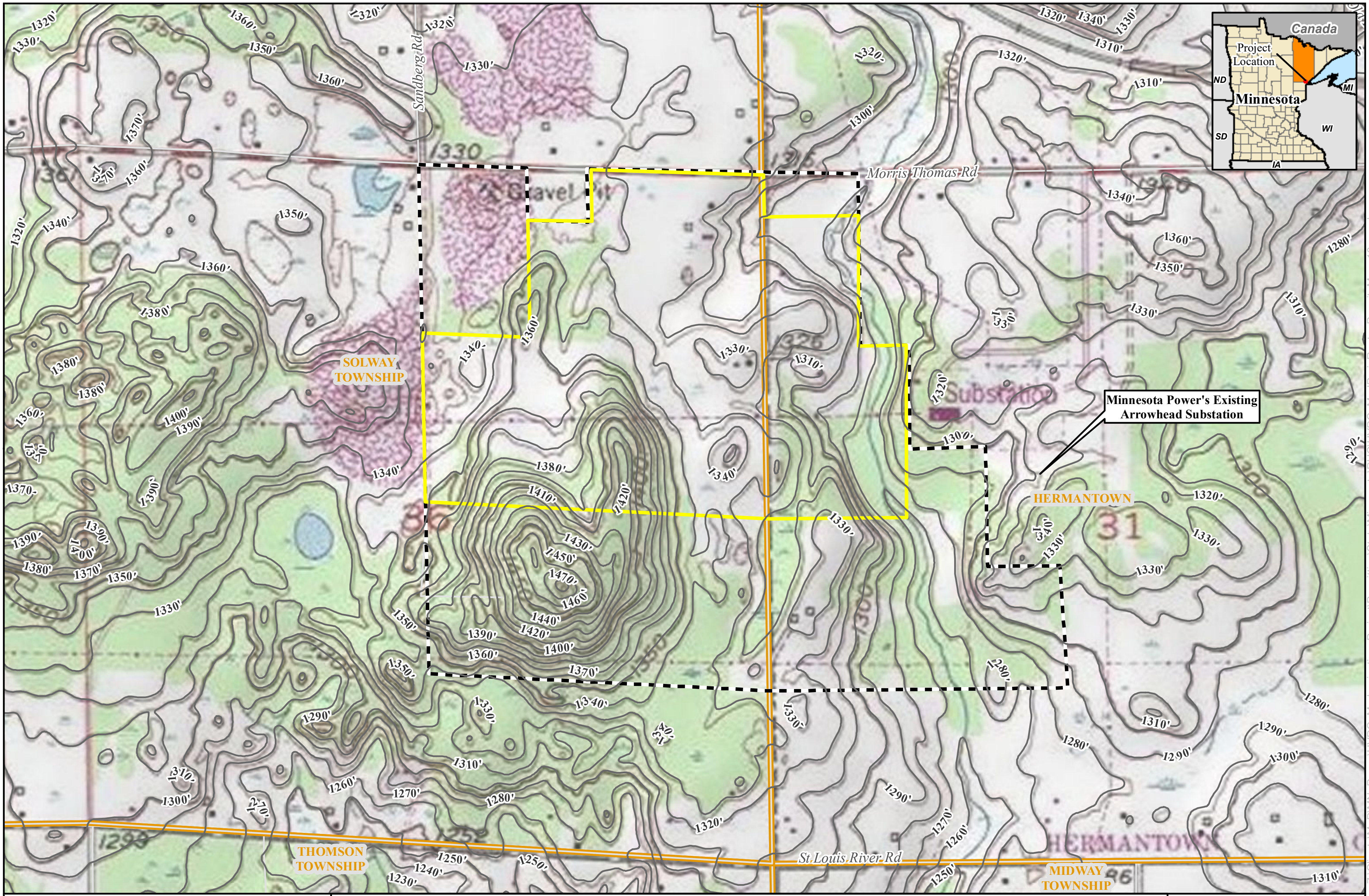

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Feet
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Map 10a – Physiographic Features - Topography
HVDC Modernization Project
St. Louis County, Minnesota

10' Contour
🟨 Proposed Route
Project Study Area
Municipal Boundary

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_10a.mxd

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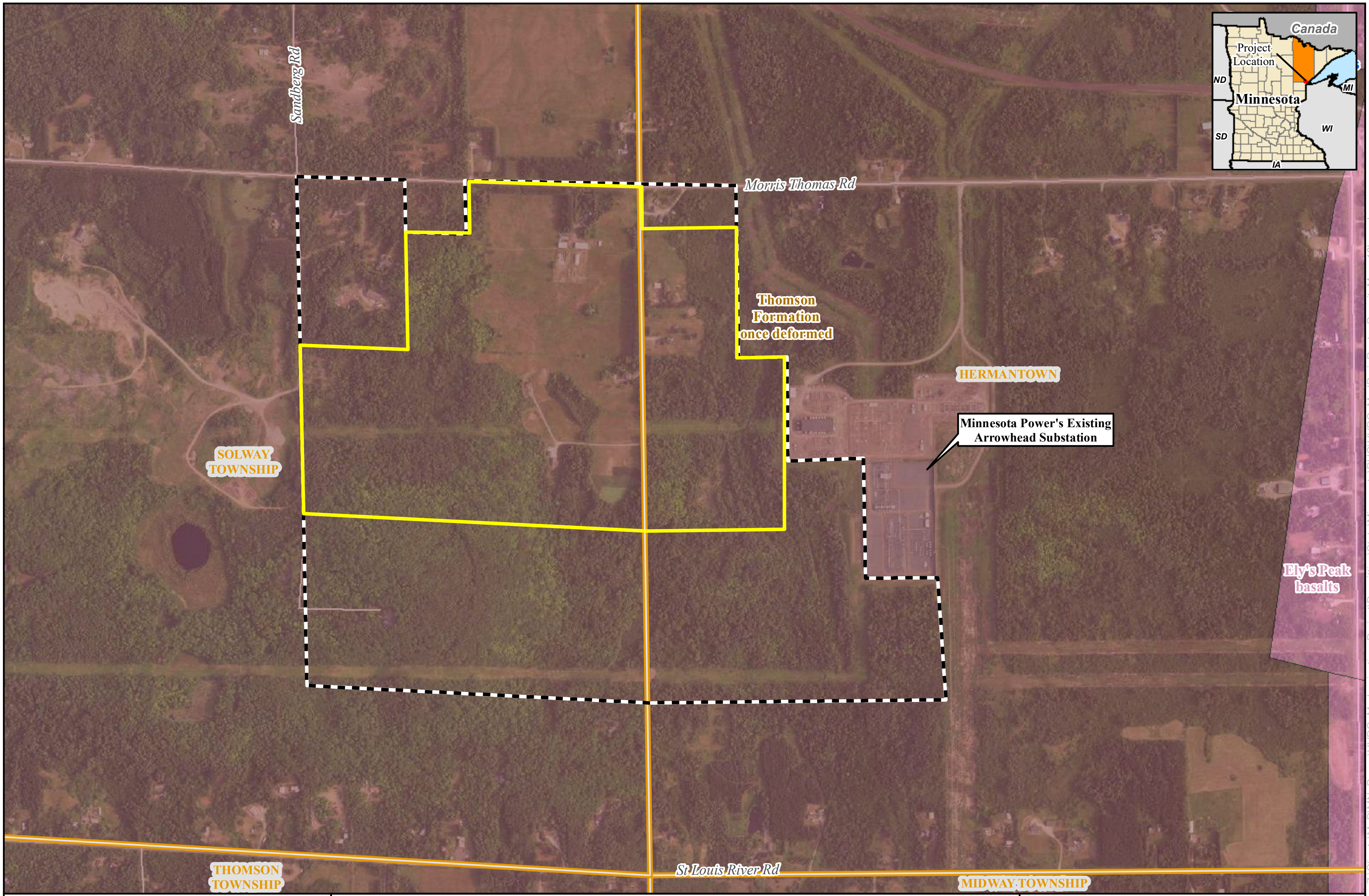

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Map 10b – Physiographic Features - Bedrock Geology
HVDC Modernization Project
St. Louis County, Minnesota

🟨 Proposed Route

▯ Project Study Area

🟧 Municipal Boundary

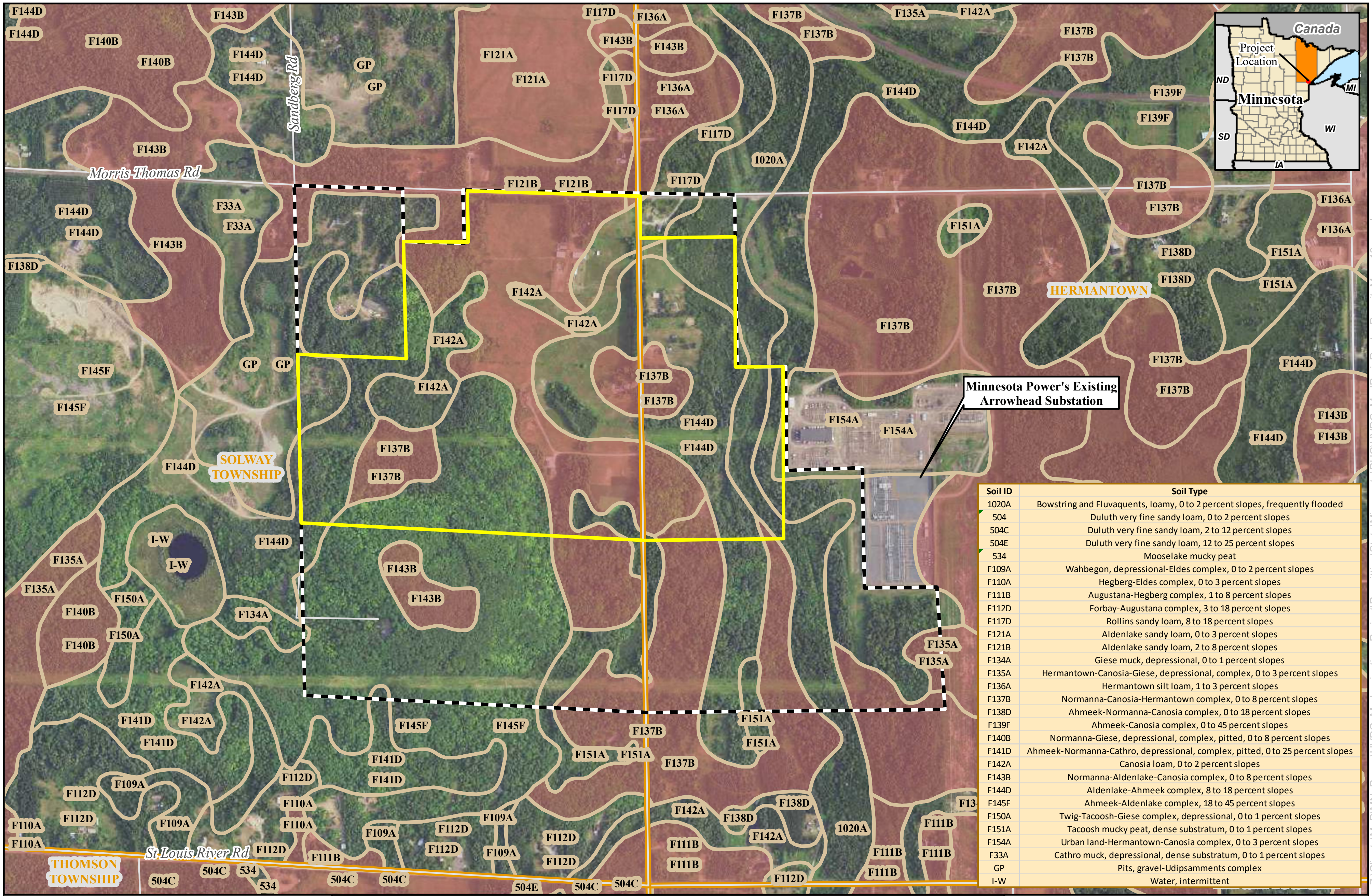
Precambrian Bedrock

🟪 Ely's Peak basalts

🟫 Thomson Formation once deformed

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_10b.mxd

Date: (5/31/2023)



Soil ID	Soil Type
1020A	Bowstring and Fluvaquents, loamy, 0 to 2 percent slopes, frequently flooded
504	Duluth very fine sandy loam, 0 to 2 percent slopes
504C	Duluth very fine sandy loam, 2 to 12 percent slopes
504E	Duluth very fine sandy loam, 12 to 25 percent slopes
534	Mooselake mucky peat
F109A	Wahbegon, depressional-Eldes complex, 0 to 2 percent slopes
F110A	Hegberg-Eldes complex, 0 to 3 percent slopes
F111B	Augustana-Hegberg complex, 1 to 8 percent slopes
F112D	Forbay-Augustana complex, 3 to 18 percent slopes
F117D	Rollins sandy loam, 8 to 18 percent slopes
F121A	Aldenlake sandy loam, 0 to 3 percent slopes
F121B	Aldenlake sandy loam, 2 to 8 percent slopes
F134A	Giese muck, depressional, 0 to 1 percent slopes
F135A	Hermantown-Canosia-Giese, depressional, complex, 0 to 3 percent slopes
F136A	Hermantown silt loam, 1 to 3 percent slopes
F137B	Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes
F138D	Ahmeek-Normanna-Canosia complex, 0 to 18 percent slopes
F139F	Ahmeek-Canosia complex, 0 to 45 percent slopes
F140B	Normanna-Giese, depressional, complex, pitted, 0 to 8 percent slopes
F141D	Ahmeek-Normanna-Cathro, depressional, complex, pitted, 0 to 25 percent slopes
F142A	Canosia loam, 0 to 2 percent slopes
F143B	Normanna-Aldenlake-Canosia complex, 0 to 8 percent slopes
F144D	Aldenlake-Ahmeek complex, 8 to 18 percent slopes
F145F	Ahmeek-Aldenlake complex, 18 to 45 percent slopes
F150A	Twig-Tacoosh-Giese complex, depressional, 0 to 1 percent slopes
F151A	Tacoosh mucky peat, dense substratum, 0 to 1 percent slopes
F154A	Urban land-Hermantown-Canosia complex, 0 to 3 percent slopes
F33A	Cathro muck, depressional, dense substratum, 0 to 1 percent slopes
GP	Pits, gravel-Udipsamments complex
I-W	Water, intermittent

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Map 10c – Physiographic Features - Soil Type
HVDC Modernization Project
St. Louis County, Minnesota

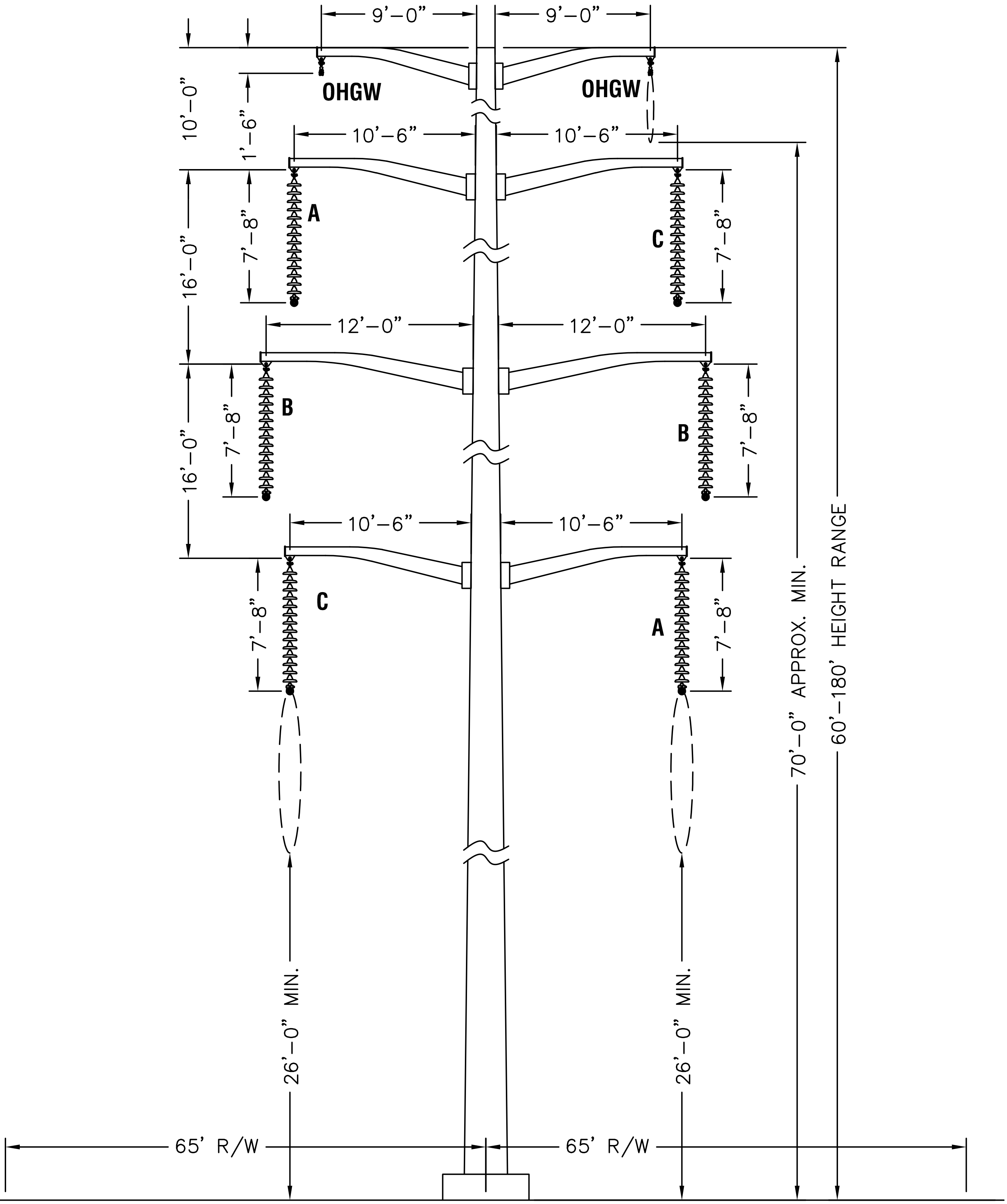
- 🟨 Proposed Route
- ▭ Project Study Area
- ▭ Municipal Boundary
- ○ SSURGO Soil Unit
- ● Farmland of statewide importance

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_10c.mxd

Date: (5/31/2023)

Appendix M

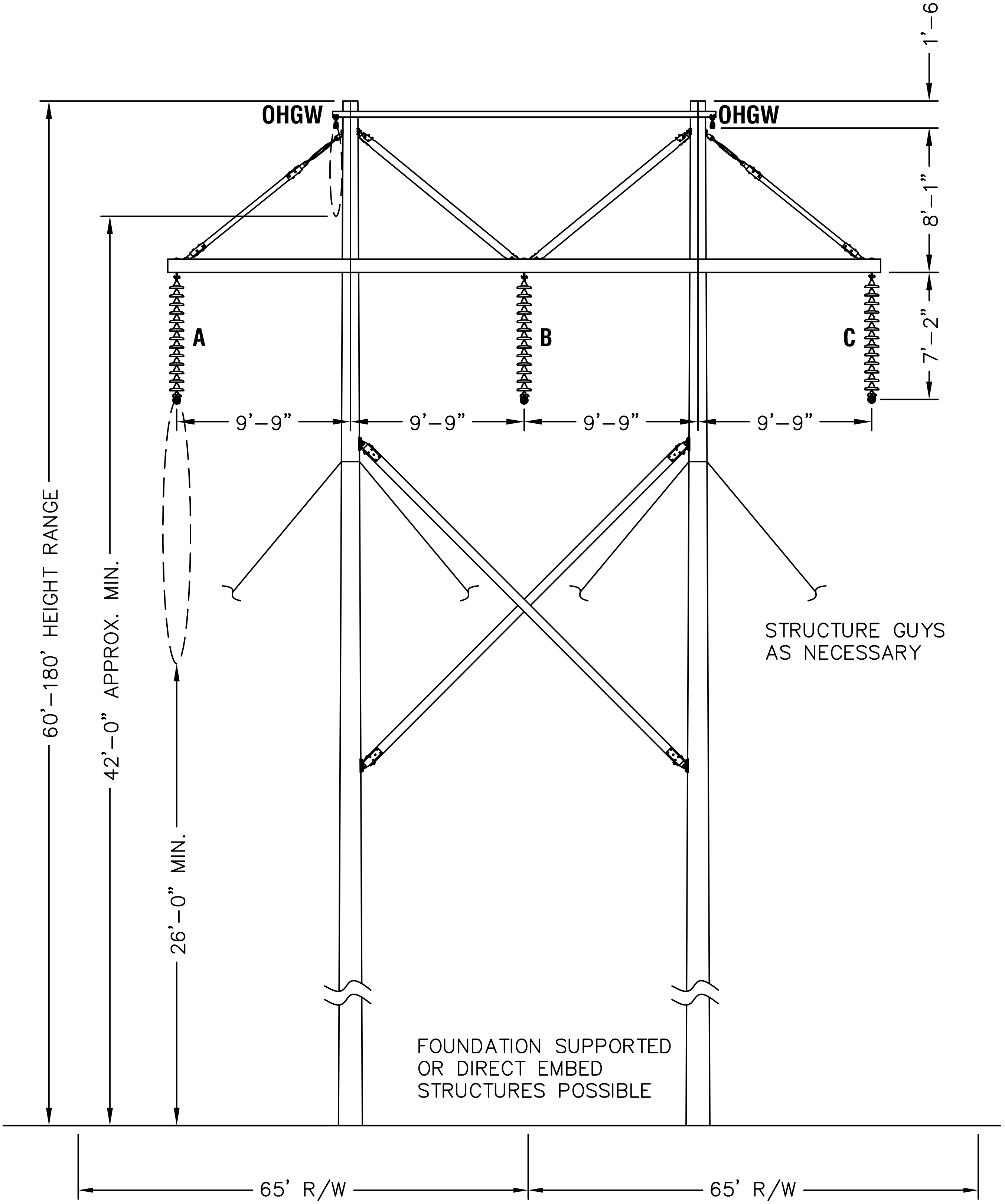
Technical Drawings of Proposed Structures



TYPICAL STRUCTURE NOTES:

1. DRAWINGS ARE CONCEPTUAL AND NOT TO SCALE.
2. GROUND CLEARANCE DIMENSIONS TO CONDUCTORS REPRESENT TYPICAL VALUES FOR NEW DESIGN TARGETS FOR COMMON GROUND CLEARANCE. DESIGN CLEARANCE VALUES WILL VARY FOR SPECIFIC LAND USES AND FEATURES. ACTUAL CLEARANCE VALUES WILL VARY.
3. TYPICAL VERTICAL DIMENSIONS FROM STRUCTURE TOP TO CONDUCTOR AND OVERHEAD GROUND WIRE POSITIONS INDICATED SHOULD BE CONSIDERED NOMINAL, BUT COULD VARY BASED ON SPECIFIC WIRES AND HARDWARE USED AND AS NECESSARY FOR STRUCTURE SPECIFIC FRAMING.
4. TYPICAL HEIGHT RANGES INDICATE THE AVERAGE EXPECTED HEIGHT OF THE MAJORITY OF STRUCTURES BASED ON SIMILAR FACILITIES. ACTUAL STRUCTURE HEIGHT IS A FUNCTION OF SPAN PROPERTIES AND TOPOGRAPHY AND MAY VARY OUTSIDE TYPICAL VALUES AS NECESSARY.
5. TYPICAL STRUCTURES PROVIDED ARE TANGENT TYPE STRUCTURES WHICH MAY NOT BE THE MOST COMMON TYPE OF STRUCTURE ON A GIVEN LINE FOR THIS PROJECT. OTHER STRUCTURE CONFIGURATIONS FOR DEADENDS, ANGLES, CROSSINGS, AND TRANSPOSITIONS WILL ALSO BE NECESSARY.

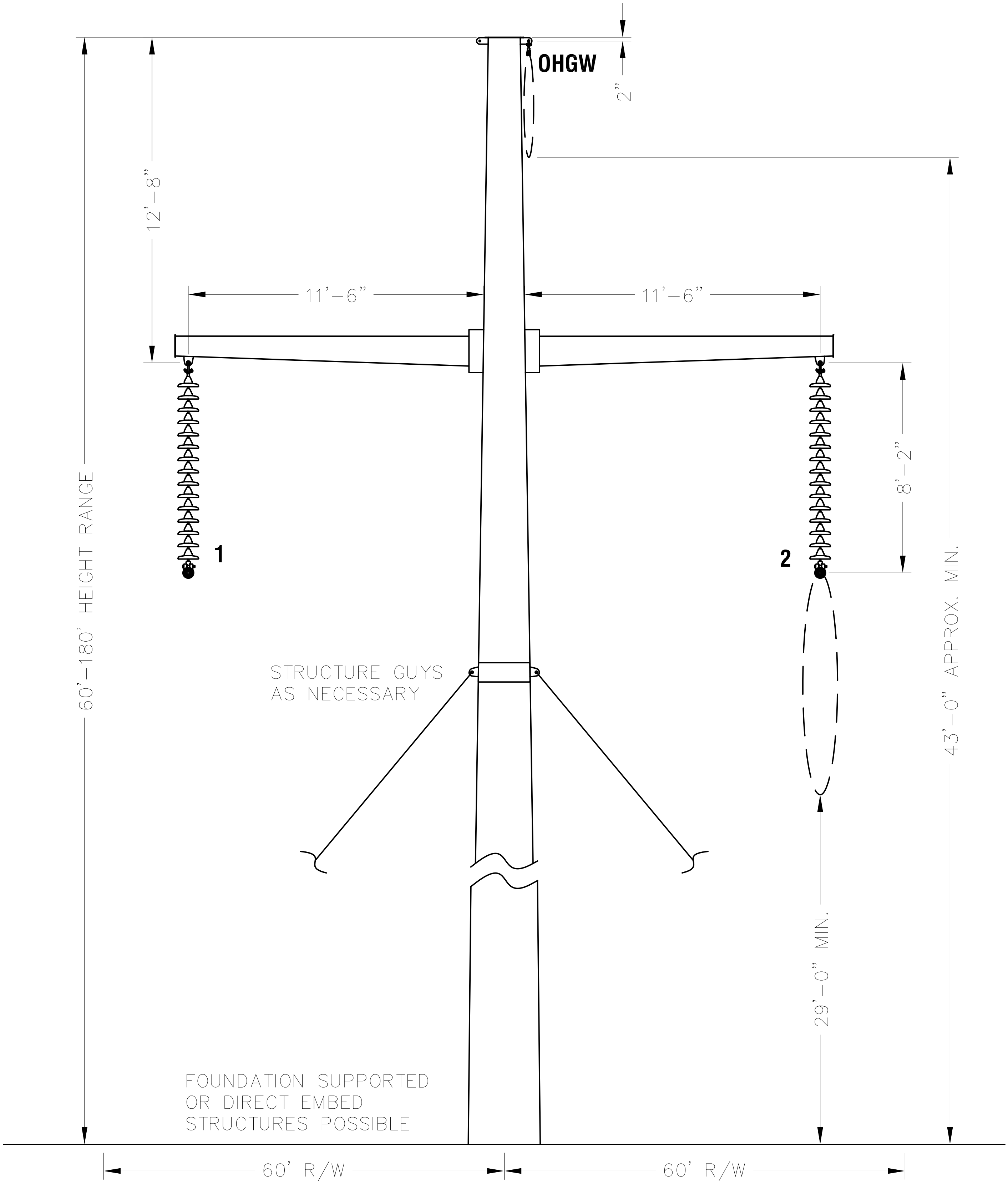
TYPICAL 230kV SINGLE POLE



TYPICAL STRUCTURE NOTES:

1. DRAWINGS ARE CONCEPTUAL AND NOT TO SCALE.
2. GROUND CLEARANCE DIMENSIONS TO CONDUCTORS REPRESENT TYPICAL VALUES FOR NEW DESIGN TARGETS FOR COMMON GROUND CLEARANCE. DESIGN CLEARANCE VALUES WILL VARY FOR SPECIFIC LAND USES AND FEATURES. ACTUAL CLEARANCE VALUES WILL VARY.
3. TYPICAL VERTICAL DIMENSIONS FROM STRUCTURE TOP TO CONDUCTOR AND OVERHEAD GROUND WIRE POSITIONS INDICATED SHOULD BE CONSIDERED NOMINAL, BUT COULD VARY BASED ON SPECIFIC WIRES AND HARDWARE USED AND AS NECESSARY FOR STRUCTURE SPECIFIC FRAMING.
4. TYPICAL HEIGHT RANGES INDICATE THE AVERAGE EXPECTED HEIGHT OF THE MAJORITY OF STRUCTURES BASED ON SIMILAR FACILITIES. ACTUAL STRUCTURE HEIGHT IS A FUNCTION OF SPAN PROPERTIES AND TOPOGRAPHY AND MAY VARY OUTSIDE TYPICAL VALUES AS NECESSARY.
5. TYPICAL STRUCTURES PROVIDED ARE TANGENT TYPE STRUCTURES WHICH MAY NOT BE THE MOST COMMON TYPE OF STRUCTURE ON A GIVEN LINE FOR THIS PROJECT. OTHER STRUCTURE CONFIGURATIONS FOR DEADENDS, ANGLES, CROSSINGS, AND TRANSPOSITIONS WILL ALSO BE NECESSARY.

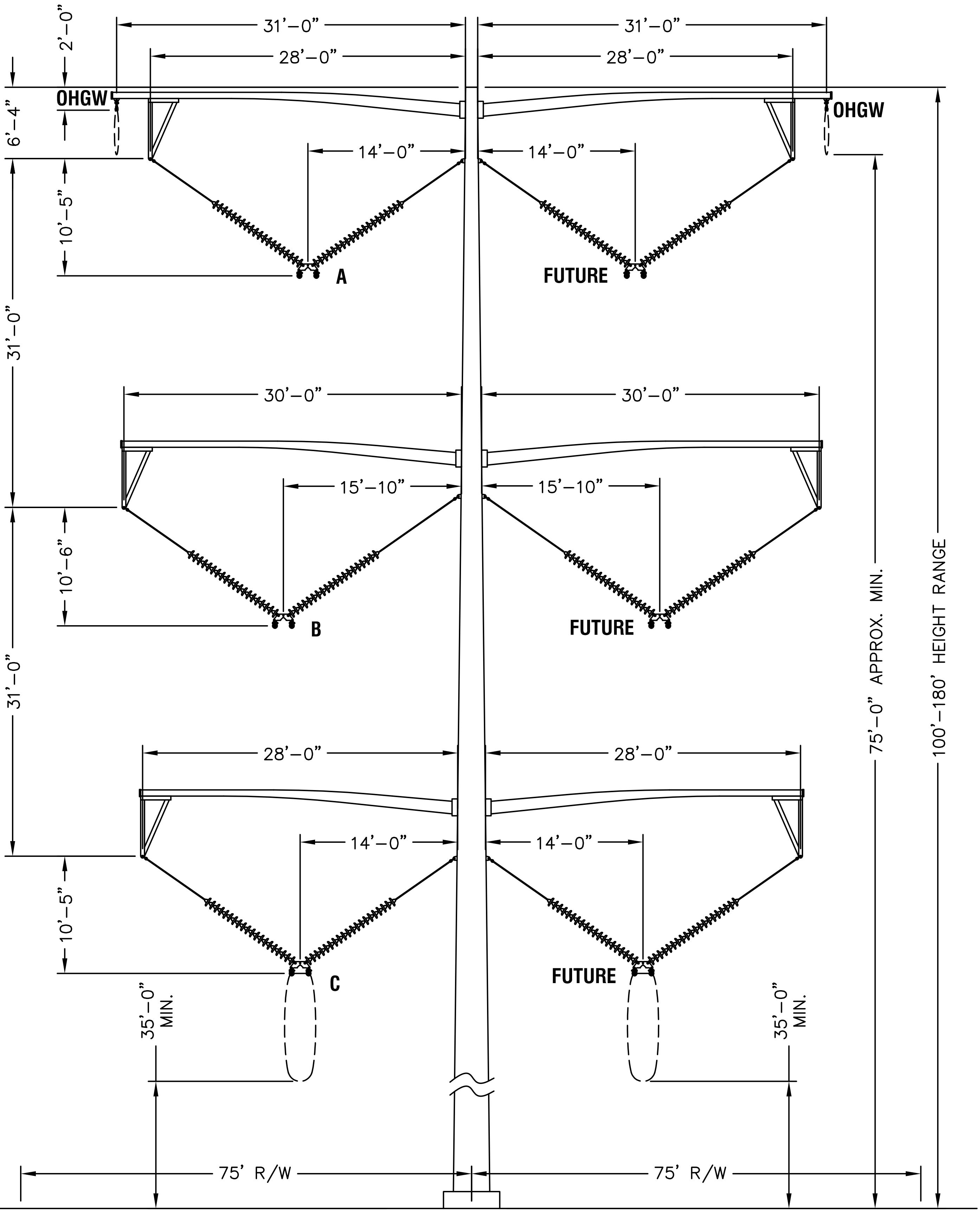
TYPICAL 230kV H-FRAME



TYPICAL STRUCTURE NOTES:

1. DRAWINGS ARE CONCEPTUAL AND NOT TO SCALE.
2. GROUND CLEARANCE DIMENSIONS TO CONDUCTORS REPRESENT TYPICAL VALUES FOR NEW DESIGN TARGETS FOR COMMON GROUND CLEARANCE. DESIGN CLEARANCE VALUES WILL VARY FOR SPECIFIC LAND USES AND FEATURES. ACTUAL CLEARANCE VALUES WILL VARY.
3. TYPICAL VERTICAL DIMENSIONS FROM STRUCTURE TOP TO CONDUCTOR AND OVERHEAD GROUND WIRE POSITIONS INDICATED SHOULD BE CONSIDERED NOMINAL, BUT COULD VARY BASED ON SPECIFIC WIRES AND HARDWARE USED AND AS NECESSARY FOR STRUCTURE SPECIFIC FRAMING.
4. TYPICAL HEIGHT RANGES INDICATE THE AVERAGE EXPECTED HEIGHT OF THE MAJORITY OF STRUCTURES BASED ON SIMILAR FACILITIES. ACTUAL STRUCTURE HEIGHT IS A FUNCTION OF SPAN PROPERTIES AND TOPOGRAPHY AND MAY VARY OUTSIDE TYPICAL VALUES AS NECESSARY.
5. TYPICAL STRUCTURES PROVIDED ARE TANGENT TYPE STRUCTURES WHICH MAY NOT BE THE MOST COMMON TYPE OF STRUCTURE ON A GIVEN LINE FOR THIS PROJECT. OTHER STRUCTURE CONFIGURATIONS FOR DEADENDS, ANGLES, CROSSINGS, AND TRANSPOSITIONS WILL ALSO BE NECESSARY.

TYPICAL 250kV HVDC



TYPICAL STRUCTURE NOTES:

1. DRAWINGS ARE CONCEPTUAL AND NOT TO SCALE.
2. GROUND CLEARANCE DIMENSIONS TO CONDUCTORS REPRESENT TYPICAL VALUES FOR NEW DESIGN TARGETS FOR COMMON GROUND CLEARANCE. DESIGN CLEARANCE VALUES WILL VARY FOR SPECIFIC LAND USES AND FEATURES. ACTUAL CLEARANCE VALUES WILL VARY.
3. TYPICAL VERTICAL DIMENSIONS FROM STRUCTURE TOP TO CONDUCTOR AND OVERHEAD GROUND WIRE POSITIONS INDICATED SHOULD BE CONSIDERED NOMINAL, BUT COULD VARY BASED ON SPECIFIC WIRES AND HARDWARE USED AND AS NECESSARY FOR STRUCTURE SPECIFIC FRAMING.
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TYPICAL 345kV SINGLE POLE

Appendix N

Annual Electric Utility Forecast Report

Appendix N

Minnesota Power's July 2022 Annual Electric Utility Forecast Report

Pursuant to Minn. R. 7849.0270, subp. 1 and Minn. R. 7849.0270, subp. 2(A)-2(D), a Certificate of Need application must provide information related to peak demand and annual consumption data for an applicant's entire service territory and system. Minnesota Power requested and was granted an exemption from this rule requirement by the Minnesota Public Utilities Commission.[1] In lieu of the information required by Minn. R. 7849.0270, Minnesota Power agreed to provide substitute data in the form of forecast information from Minnesota Power's most recent Annual Electric Utility Forecast Report ("AFR").[2]

Minnesota Power filed its 2022 AFR filing with the Commission on June 28, 2022 in Docket No. E-999/PR-22-11. A copy of the 2022 AFR filing is provided in this appendix.

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[1] *In re Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project*, Docket No. E015/CN-22-607, ORDER (Feb. 1, 2023).

[2] *In re Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project*, Docket No. E015/CN-22-607, Exemption Request (Nov. 30, 2022); *In re Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project*, Docket No. E015/CN-22-607, Reply Comments of Minnesota Power – Exemption Request and Notice Plan Petition (Jan. 9, 2023).

minnesota power
AN ALLETE COMPANY

30 West Superior Street
Duluth, MN 55802-2093
www.mnpower.com

June 28, 2022

VIA E-FILING
Ms. Anne Sell
Department of Commerce – Division of Energy Resources
85 7th Place East, Suite 280
St. Paul, MN 55101-2198

Re: Minnesota Power's 2022 Annual Electric Utility Forecast Report
Docket No.: E-999/PR-22-11

Dear Ms. Sell:

Enclosed please find Minnesota Power's 2022 Annual Electric Utility Forecast Report pursuant to Minn. Stat. § 216C.17, subd. 2 and Minn. Rules Chapter 7610. As an electric utility with Minnesota service areas, Minnesota Power (or the "Company") is required to submit to the Minnesota Department of Commerce – Division of Energy Resources ("Department") by July 1 of each year an annual report specifying its short- and long-term energy demand forecasts and the facilities necessary to meet the demand.

Information included in the "**ELEC_68_2021 Largest Customer List.xlsx**" and "**ELEC_68_2021 Forecast Report.xlsx**" Excel workbooks, as well as the **Methodology** document has been designated as **TRADE SECRET**.

Minnesota Power has excised material from the public version of the attached report documents as they identify and contain confidential, competitive information regarding Minnesota Power's methods, techniques and process for supplying electric service to its customers. The energy usage by specific customers and generation by fuel type has been consistently treated as Trade Secret in individual filings before the Minnesota Public Utilities Commission. Minnesota Power follows strict internal procedures to maintain the privacy of this information. The public disclosure of this information would have severe competitive implications for customers and Minnesota Power.

Minnesota Power is providing this justification for the information excised from the attached report and why the information should remain trade secret under Minn. Stat. 13.37. Minnesota Power respectfully requests the opportunity to provide additional justification in the event of a challenge to the Trade Secret designation provided herein.

The following documents have been uploaded to the Department and Minnesota Public Utilities Commission eDockets/eFiling system using Docket Number 22-11:

- ELEC_68_2021 Annual Report.xlsx
- ELEC_68_2021 Forecast Report.xlsx (**TRADE SECRET** & Public versions)
- ELEC_68_2021 Largest Customer List.xlsx (**TRADE SECRET**)
- ELEC_68_2021 Monthly Power Cost Adjustments.xlsx
- ELEC_68_2021 MN Service Area Map.pdf
- ELEC_68_2021 USDOE EIA-861.pdf
- ELEC_68_2021 Rate Schedules.pdf
- METHOD22.pdf (**TRADE SECRET** & Public versions)

Please don't hesitate to contact me if you need additional paper copies or have any questions.

Sincerely,

Benjamin Levine
Customer Insights and Forecasting Analyst Senior
Minnesota Power
218-355-3120
blevine@mnpower.com

BL:th
Attach.

cc: Leah Peterson
David Moeller
Jennifer Cady
Lori Hoyum

STATE OF MINNESOTA) AFFIDAVIT OF SERVICE VIA
) ss ELECTRONIC FILING
COUNTY OF ST. LOUIS)

Tiana Heger of the City of Duluth, County of St. Louis, State of Minnesota, says that on the 28th day of June, 2022, she served Minnesota Power's Annual Electric Utility Forecast Report in **Docket No. E-999/PR-22-11** on the Minnesota Public Utilities Commission and the Energy Resources Division of the Minnesota Department of Commerce via electronic filing. The persons on E-Docket's Official Service List for this Docket were served as requested.

Tiana Heger

Table of Contents

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of Minnesota Power's
2022 Annual Electric Utility Forecast Report

Docket No. E-999/PR-22-11

I. INTRODUCTION

The utility customer load forecast is the initial step in electric utility planning. Capacity and energy resource commitments are based on forecasts of energy consumption and seasonal peak demand requirements. Minnesota Power's forecast process combines a sound econometric methodology and data from reputable sources to produce a reasonable long-term outlook suitable for planning.

Minnesota Power (or the Company) is committed to continuous forecast process improvement, process transparency, forecast accuracy, and gaining customer insight. This 2022 forecast methodology document demonstrates Minnesota Power's continued efforts to meet these goals through comprehensive documentation, implementation of more systematic and replicable processes, and thorough analysis of results.

A history of increasing accuracy in load forecasting also speaks to the Company's commitment to innovate and enhance its forecast processes. Minnesota Power owes its record of forecast accuracy to a combination of close contact with customers, continuous validation of forecast model inputs, and steady improvements in statistical analytic capabilities.

Since the 2019 Annual Forecast Report (AFR), Minnesota Power has included estimated impacts of energy efficiency, distributed generation (solar), and electric vehicles in the Expected scenario outlook. This expanded approach to forecasting can then be integrated into the Company's proactive and flexible planning to better inform the critical electric resource decisions ahead. Minnesota Power's forecasting approach helps keep the potential demand and energy outcomes transparent and robust.

A. 2022 FORECAST RESULTS OVERVIEW

Table 1 below shows the Expected case forecast for annual energy sales and seasonal peak demand. Annual energy sales are projected to remain flat (on average) from 2021 through 2036.[1] Summer and Winter peak demands are projected to increase at average annual rates of 0.2 percent. See Figures 1 and 2 on page 4 below for graphical representations of energy and peak demand. The AFR 2022 load forecast reflects 42 megawatts (MW)[2] of system load growth by 2036.

Table 1: Expected Case Energy Sales and Seasonal System Peak Demand Outlook

Total Energy Sales			System Peak Demand					
	MWh	Y/Y Growth		Summer (MW)	Y/Y Growth		Winter (MW)	Y/Y Growth
2011	10,988,200		2011	1,746		2011	1,780	
2012	11,107,357	1.1%	2012	1,790	2.5%	2012	1,774	-0.3%
2013	10,985,809	-1.1%	2013	1,782	-0.5%	2013	1,751	-1.3%
2014	11,038,979	0.5%	2014	1,805	1.3%	2014	1,821	4.0%
2015	10,059,466	-8.9%	2015	1,597	-11.5%	2015	1,554	-14.6%
2016	9,830,787	-2.3%	2016	1,609	0.8%	2016	1,692	8.9%
2017	10,654,217	8.4%	2017	1,688	4.9%	2017	1,789	5.7%
2018	10,638,692	-0.1%	2018	1,723	2.1%	2018	1,707	-4.5%
2019	10,482,913	-1.5%	2019	1,668	-3.2%	2019	1,687	-1.2%
2020	9,230,235	-11.9%	2020	1,487	-10.8%	2020	1,646	-2.4%
2021	10,290,154	11.5%	2021	1,625	9.3%	2021	1,663	1.1%
2022	9,673,239	**-6.0%**	2022	1,592	**-2.0%**	2022	1,642	**-1.3%**
2023	9,873,355	**2.1%**	2023	1,634	**2.6%**	2023	1,641	**-0.1%**
2024	9,940,872	**0.7%**	2024	1,641	**0.4%**	2024	1,650	**0.5%**
2025	9,910,637	**-0.3%**	2025	1,640	**-0.1%**	2025	1,651	**0.1%**
2026	9,904,322	**-0.1%**	2026	1,639	**-0.1%**	2026	1,652	**0.1%**
2027	10,105,178	**2.0%**	2027	1,671	**2.0%**	2027	1,694	**2.5%**
2028	10,273,994	**1.7%**	2028	1,681	**0.6%**	2028	1,694	**0.0%**
2029	10,231,667	**-0.4%**	2029	1,680	**-0.1%**	2029	1,695	**0.0%**
2030	10,230,191	**0.0%**	2030	1,679	**-0.1%**	2030	1,695	**0.0%**
2031	10,229,080	**0.0%**	2031	1,678	**0.0%**	2031	1,697	**0.1%**
2032	10,265,530	**0.4%**	2032	1,677	**0.0%**	2032	1,699	**0.1%**
2033	10,230,380	**-0.3%**	2033	1,677	**-0.1%**	2033	1,700	**0.1%**
2034	10,231,017	**0.0%**	2034	1,675	**-0.1%**	2034	1,703	**0.1%**
2035	10,231,808	**0.0%**	2035	1,674	**-0.1%**	2035	1,705	**0.1%**
2036	10,264,096	**0.3%**	2036	1,673	**-0.1%**	2036	1,709	**0.3%**

Minnesota Power remains a Winter peaking utility and will continue to expect an approximate 20 MW difference in this seasonal profile. Figures 1 and 2 below show the projected energy sales and system peak demand, respectively for AFR 2022 compared to AFR 2021.

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[2] 42 MW = 2036 winter Peak (1,705 MW) – 2021 Winter Peak (1,663 MW).

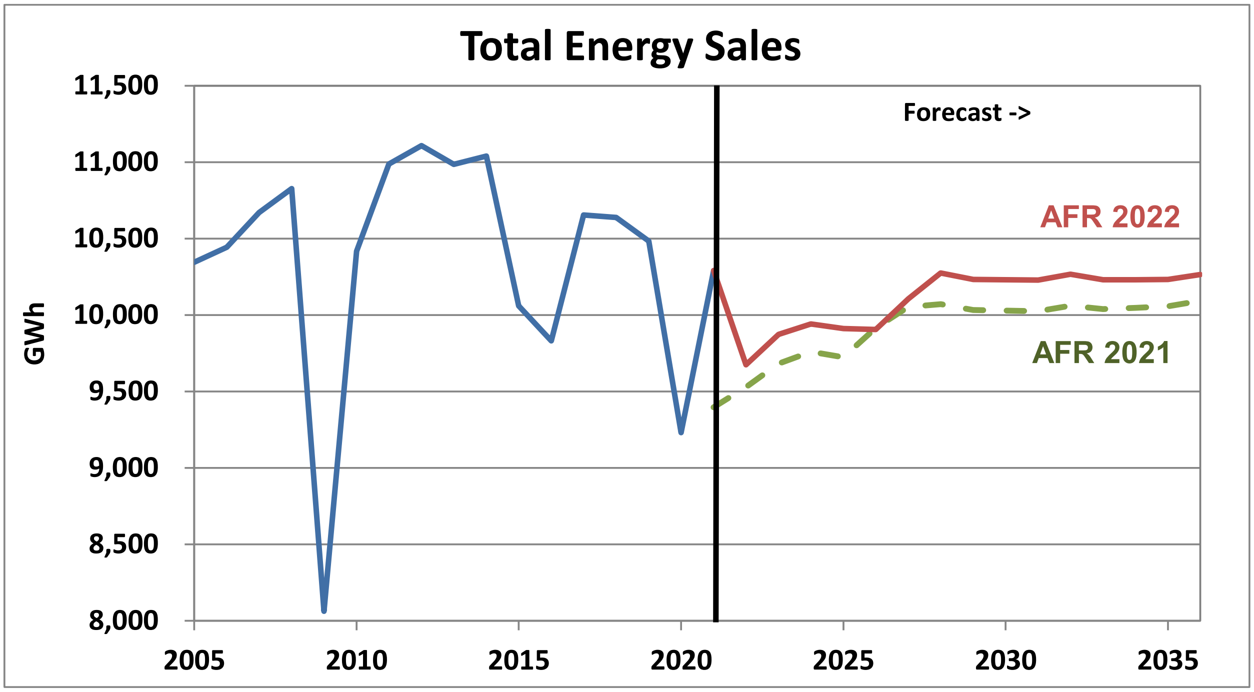

Figure 1: Expected Case Energy Sales Outlook

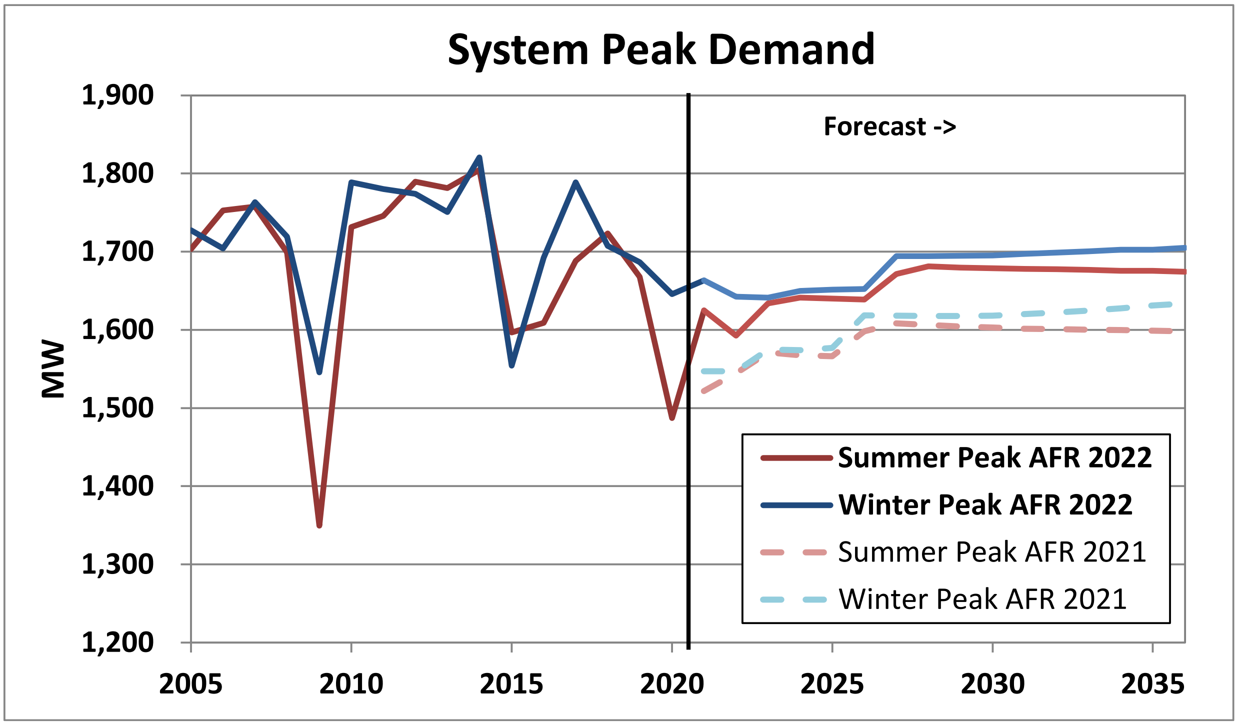

Figure 2: Expected Case Peak Demand Outlook

B. Document Structure

This report details the construction of the energy sales and demand forecast for Minnesota Power for the 2022-2036 timeframe. Each section is designed to convey the report requirements per Minn. Rules Chapter 7610, and give insight into the Company's forecasting process and results.

Section II: *Forecast Methodology, Data Inputs, and Assumptions* details the development of customer count, peak demand, and energy sales forecasts. This section contains a step-by-step description of Minnesota Power's forecasting process and details the development of databases and models.

Other information included in Section II:

- Descriptions of all forecast models used in the development of this year's forecasts, including:
  - Model specifications
  - Model statistics
  - Resulting forecast's growth rates
  - A discussion of each model's econometric merits and potential issues, as well as an explanation/justification of each variable
- Additional steps taken in 2022 to improve the forecast process and final product
- Strengths and weaknesses of Minnesota Power's methodology
- All data inputs and sources, including an overview of key economic assumptions
- A description of all changes made to the forecast database since last year's forecast
- A discussion of Minnesota Power's sensitivity to Large Industrial customer contracts
- Minnesota Power's confidence in the forecast

Section III: *Forecast Results* presents the Expected scenario forecast Minnesota Power developed for the AFR 2022 forecast. This forecast is the product of a robust econometric modeling process and careful consideration of potential industrial and resale customer load developments.

Section IV: *Other Information* presents other report information required by Minnesota law and cross-references the specific requirements to specific sections in this document.

II. FORECASE METHODOLOGY, DATA INPUTS AND ASSUMPTIONS

A. Overall Framework

Minnesota Power's forecast models are the result of an analytical econometric methodology, extensive database organization, and quality economic indicators. Forecast models are structural, defined by the mathematical relationship between the forecast quantities and explanatory factors. The forecast models assume a normal distribution and are "50/50"; given the inputs, there is a 50 percent probability that a realized actual will be less than forecast and a 50 percent probability that the realized actual will be more than forecast.

The Minnesota Power forecast process involves several interrelated steps: 1) data gathering, 2) data preparation and development, 3) specification search, 4) initial review and verification, and 5) internal company review and approval. The steps of the forecast process are sequential and the process is diagrammed in Figure 3 below and discussed in more detail in Section B.

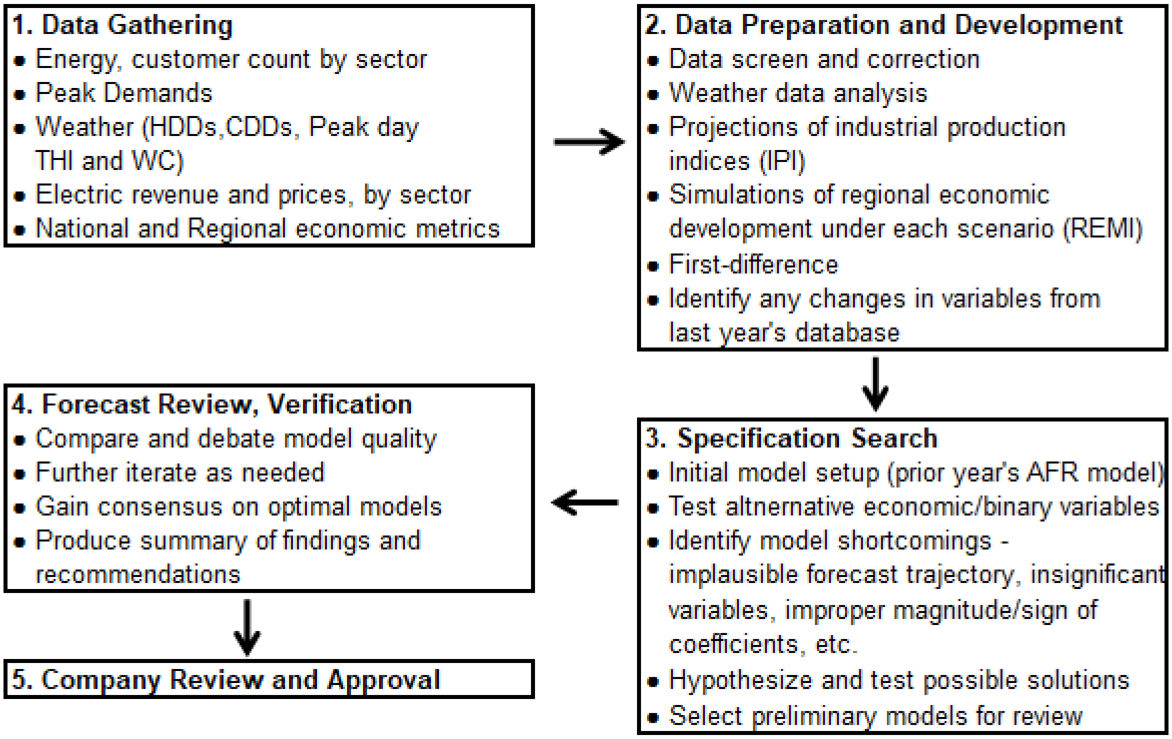

Figure 3: Minnesota Power's Forecast Process

B. Minnesota Power's Forecast Process

1. Process Description

1. _Data Gathering_ involves updating or adding to the forecast database. The data used in estimation can be broadly categorized as follows:

- *Historical quantities of the variables to be forecast,* which consists of energy sales and customer counts for Minnesota Power's defined customer classes, energy sales, and peak demand.
- *Regional Demographic and Economic data:*
    - *Duluth Metropolitan Statistical Area (MSA)* consists of population, households, sector-specific employment, income metrics, regional product, and other local indicators.
    - *Aggregate 13-County Minnesota Power service territory (13-Co)* consists of population, Gross Regional Product (a Regional Gross Domestic Product (GDP) metric), sector-specific employment, and income metrics.
    - *Individual 13-County Minnesota Power service territory (13-Co)* consists of sector-specific employment and income metrics for each individual County.
- *Indicators of National economic activity* such as the Industrial Production Indexes (IPI) or Macroeconomic indicators such as U.S. GDP or Unemployment.
- *Weather and related data* including heating degree days (HDD), cooling degree days (CDD), temperature, humidity, dew point, and wind speed.
- *Electricity and Alternative Fuel prices*, which includes the price of electricity, natural gas, and heating oil by sector for the Minnesota Power service territory.

After gathering these data, Minnesota Power compares all series to the previous year's database to identify any changes. The cause of any change to the historical data should be explained and justified. This is explained further in Section C: *Inputs and Sources*.

2. *Data Preparation and Development* involves adjusting raw data inputs and then reviewing the data through diagnostic testing. The purpose of this step is to develop consistently defined and formatted data series for use in regression analysis. Adjustments made to specific raw data inputs are described in the "Inputs and Source" section of this document. General data preparation techniques such as *Data Transformation* and *Interpolation* are described in the *Specific Analytical Techniques* section of this document.

3. *Specification Search* involves selecting an appropriate set of variables as the key explanatory factors of customer count, energy sales, and peak demand.[3] For AFR 2022, Minnesota Power implemented a new model development process that leverages the knowledge gained during past AFR specification search processes. This new model development process involves iteration and gradual, targeted improvement of a regression model instead of the previous process of bulk model production, filtering, and selection of final models. The process update greatly improved forecasting efficiency (eliminated the need for bulk model production as mentioned above) while still maintaining Minnesota Power's high standards regarding statistical quality. The AFR 2022 modeling process starts with the prior year's AFR model for each dependent variable (e.g. residential customer count), and follows the steps listed below to improve this existing, proven model's predictive capability or model statistics:

   - Test the model by adding or removing variables and noting changes in statistical quality or ability to accurately predict changes in customer behavior during economic disruptions such as the Great Recession (2007-2009) or the COVID-19 Recession (2020).

   - Identify any shortcomings of this preliminary model, which may include: implausible forecast trajectory, insignificant variables, improper magnitude and/or sign of coefficients, etc. This step also highlights any general statistical issues such as: Multicollinearity, Autocorrelation, and Heteroscedasticity.

   - Form a hypothesis as to the reasons for these shortcomings and test possible solutions, including:

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[3] Specific analytical techniques applied during this step are detailed in Section C.

    - Create binary variables to account for any observable step-changes in the dependent variable.
    - Utilize alternative forms of key economic variables such as first-differenced transformation to address issues of multicollinearity.
    - Conduct a compressive search for economic or demographic variables that explain high forecast errors during a specific timeframe (e.g. during recessions).
  - Repeat the process of testing and evaluation until a model has a plausible forecast, and meets Minnesota Power's existing statistical criteria as defined in the *Modeling Techniques* section of this document. At this point, the proposed, or preliminary model is ready for *Forecast Review and Verification*.

4. *Forecast Review and Verification* involves reviewing the preliminary model for each of the dependent series. During this step, analysts compare and debate the quality of each selection and its corresponding outlook. This step also inherently shares aspects of the *Specification Search* process as analysts further iterate and gradually improve upon each model. The goal is to perform an in-depth review and verification in order to reach a consensus around a final set of optimal models to put forward for *Company Review and Approval*.
5. *Company Review and Approval* involves internally vetting all forecasts to ensure that consistent use of forecast information was employed and that the forecasts are reasonable.

2. Specific Analytical Techniques

Data Transformation Schema for Economic Variables: Transformations are used to maintain consistency of definition in a variable series and identify different potential relationships between predictor variables and the dependent variable. Minnesota Power uses several data transformations in data development: constant-dollar deflating/inflating, per-day conversion, de-trending/de-seasonalizing, first difference, and exponential.

- *Constant-dollar Deflating/Inflating* - is the process of deflating/inflating all dollar-denominated series to the same base year to maintain consistency of definition. Minnesota Power utilized 2012 as its base year in the 2020 forecast. The 2012 base year is the current standard among public and private data providers such as IHS Global Insight and the Bureau of Economic Analysis (BEA).

- *Per-day Conversion* – divides monthly billed energy use or monthly Heating/Cooling Degree Days by the number of days in the specified month. This transformation normalizes for the effect of varying days-per-month on a monthly aggregate like energy use or Heating/Cooling Degree Days. This results in consistently defined series that are more appropriate for linear regression modeling.
- *De-trend and De-seasonalize* – is the process of removing the historical trend/seasonality from a data series. This reduces the potential for the spurious, or *false,* correlation that often results from mistaking similarity of *trends* with similarity of *variation* between a predictor and the dependent variable (peak demand).
- *First Difference* – changes the definition of the series from *level* (e.g. the number of customers in a month) to *change* (e.g. the customers gained or lost from one month to the next) by subtracting the previous value from the current. The *first difference* transformation reduces the series to only *variation* (change) so there is no potential to mistake similarity of *trend* with similarity of *variation*.
- *Exponential* – is the application of an exponent to the series; either squaring or cubing the series. This transformation of raw data was only applied to the temperature variables in the Peak Demand model so the non-linear relationship of load to temperature could be more accurately quantified.

The Company has discontinued use of natural log and first difference of natural log transformations, as well as lead/lag transformations for transparency and ease of model interpretation. The addition of these transformations to past reports was exploratory. Minnesota Power forecasters have found these transformations add minimal predictive value, but make resulting model specifications difficult to interpret and difficult to compare year-to-year changes in model inputs.

Interpolation Technique – Minnesota Power collects and utilizes raw monthly-frequency data whenever possible. However, some data series are not available at a monthly-frequency (e.g. U.S. GDP is only available in quarterly and annual frequencies). Interpolation allows annual or quarterly data to be used in monthly-frequency regression modeling by converting it to a monthly variable.

The specific interpolation function utilized in Minnesota Power's forecast process is known as a "Cubic Spline" interpolation. This technique is widely used because it produces a smooth monthly series by constraining the first and second derivatives of the variable to be continuous on the entire time interval.

The spline interpolation procedure was conducted in Statistical Analysis System (SAS) using the "Proc Expand" command with the method specified as "Spline" and the observed as "Middle." The "Middle" specification denotes that an annual-to-monthly interpolation should assume the annual value as June, and July through May should be interpolated points. Quarterly-to-monthly interpolation should assume Quarter 1 as February, Quarter 2 as May, Quarter 3 as August, and Quarter 4 as November; all other months are interpolated points. The cubic spline interpolation function is in piecewise cubic polynomial form:[4]

$$Y_i(t) = a_i + b_i t + c_i t^2 + d_i t^3$$

Where: $0 \leq t \leq 1$

$i = 1, 2, \ldots, n - 1$

Y_i = i^{th} piece of the spline

a_i, b_i, c_i, and d_i are estimated polynomial coefficients

The cubic spline method of interpolation has been in use since the Company's AFR from 2014 and was an improvement over previously-utilized interpolation methods.

Modeling Techniques – Most of the 32 dependent count and energy variables are modeled using a trend variable to explain general, underlying growth and one or two economic/demographic variables to explain any economically-driven divergence from this trend. This approach to regression modeling reduces the potential for an independent variable to be erroneously identified as significant due to spurious, or *false,* correlation.

- _Leveraging Binary Variables to Account for Recent Trends_ – Several of Minnesota Power's largest industrial and resale customers are in a time of significant change, and an accurate load forecast depends on properly identifying and accounting for these changes.

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[4] http://mathworld.wolfram.com/CubicSpline.html.

In AFR 2014, Minnesota Power began adjusting historical sales series to "back-out" recent large customer load additions to avoid double-counting customer usage in the forecast timeframe; once (partially) embedded in the econometric projection, and again through a post-regression load adjustment.

This approach is appropriate when the load addition/loss is quantifiable (e.g. a new customer, or a new customer-owned generator), but shouldn't be used when the load addition/loss cannot be accurately quantified (an existing customer's recent expansion); adjusting raw historical sales data with an estimate would just introduce additional uncertainty to the estimate.

Minnesota Power continues to adjust historical series for known/measurable recent load additions, and has supplemented this approach with the use of binaries and trend variables that account for large changes in load that cannot be precisely quantified (such as a customer expansion that is not metered separately).

The variables denote and account for a structural shift in a dependent variable (historical sales), and are then terminated at the start of the forecast timeframe to effectively "back out" this recent change so it can be accurately quantified and explicitly applied through a post-regression adjustment to the econometric series.

- *Polynomial temperature specification for peak demand* – The AFR 2022 peak demand model uses a third-degree (cubed) temperature series alongside an un-adjusted temperature series to capture the non-linear relationship of load to temperature. The two variables (cubed and un-adjusted) create a polynomial temperature specification.

  This approach was first used in AFR 2016 and was a change from prior AFRs that leveraged either a monthly interaction specification or a spline-type (temperature range) specification. These previous approaches model the effect of temperature on demand, and identify the non-continuous or non-linear relationship of load to temperature, but neither approach is the simplest solution.

  A polynomial temperature specification is continuous/not segmented, so it can always be leveraged for weather-normalization. This specification is much simpler and commonly used in demand modeling. The Company has avoided using this specification in the past, believing that the coefficients associated with the spline-segments efficiently and clearly conveyed information about load's response to weather in a specific temperature range. However, the testing of after-the-fact weather-normalization has convinced Minnesota Power Load Forecasting that a Polynomial specification is superior.

- *Modeled Peak Demand using hour-specific weather observations* – Prior to AFR 2017, the Company modeled peak demand using monthly HDD/CDD or daily high/low temperatures. Since AFR 2017, Minnesota Power has modeled peak demand as a function of the weather observations specific to the hour in which the peak occurred. The Company identified the historical peak date/times and queried an hourly weather observation dataset to identify the hourly temperature, humidity, and wind-chill coincident with the system peak. In theory, the temperature at the time of the peak should be more closely related with the load than a daily high or low temperature (for example). The Company has witnessed improved model statistics using this approach.

As a rule, all models are OLS, which are simple, transparent, explainable, and produce optimal estimates of the coefficients. All input variables' coefficients must be significant at a 90 percent confidence level (as indicated by a HAC-adjusted P-value less than 10 percent) and the Variance Inflation Factor (VIF) of each variable's coefficient must be less than five (indicating minimal multicollinearity). A constant, trend, or binary variable with a P-value greater than 10 percent or VIF greater than five may be retained if it is critical to the model structure.

- Test for multicollinearity using VIFs - multicollinearity is generally unacceptable in the final models but is assessed in the context of other variables and model statistics. The VIF of a variable is a measurement of its correlation with every other variable in the model whereas a correlation matrix would only identify the correlation of two variables to each other at each point in the matrix. Thus, VIFs are superior to a correlation matrix as a method of identifying multicollinearity. VIFs are assessed according to these criteria:

  - VIF less than 3 is optimal - correlation with the remaining variables is less than 82 percent.
  - VIF of 3-5 is acceptable, but is assessed in context with other diagnostics.
  - VIF of 5-10 is generally unacceptable, but is assessed in context with other diagnostics. A VIF greater than 5 implies correlation with remaining variables is greater than 90 percent.
  - VIF greater than 10 is unacceptable correlation for any economic variable. In this case the correlation with the remaining variables is greater than 95 percent.

  VIFs on economic and demographic variables in all models are well within acceptable limits or the variable serves an important function within the model and the causation of the high VIF metric (i.e. its high correlation with other variables) is understood, explainable, and unconcerning. Minnesota Power considers high VIFs on certain binaries variables inconsequential since the cause of this correlation is clear; it's interacting with the intercept, weather variables, or other binaries. Because these binaries are important to the structure of the model, they are not excluded in the same way an economic variable could be if found to have high multicollinearity with other variables.

- Heteroscedasticity and Autocorrelation Consistent (HAC) - adjusts the standard errors of regression coefficients to correct t-statistics and P-values for biases resulting from autocorrelation and/or heteroscedasticity. Minnesota Power computes the HAC-adjusted P-values using a common HAC specification.[5] These HAC-adjusted P-values are used to determine inclusion/exclusion in the model. Coefficients themselves are not affected by this adjustment.

  The AFR 2022 HAC-adjustment procedure simultaneously corrects P-values for both autocorrelation and heteroscedasticity. This automated adjustment streamlines model testing and selection, and produces a more robust final forecast.

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[5] Developed using Andrews (1991).

Models that meet the above criteria, have plausible outputs (forecasts), and have intuitive econometric interpretations are put forward as potential final models for review during the *Forecast Review and Verification* step (AFR 2022 Forecast Process page 8).

Once forecast models are verified and finalized, they form the basis of the "econometrically-determined" outlook for energy sales, peak demand, and customer count. Assumptions for future load additions/losses and/or adjustments to account for recent customer expansions are applied to the econometric outlook to produce Minnesota Power's final energy sales, peak demand, and customer count outlook.

3. Treatment of Demand Side Management, Conservation Improvement Programs, Distributed Generation, and Electric Vehicles in the Forecast

Demand Side Management (DSM) programs represent activities that a utility undertakes to change the configuration or magnitude of the load shape of individual customers or a class of customers.

Minnesota Power has engaged in several different types of DSM:

- *Conservation* - Conservation results in a reduction in total electric energy consumed by a customer and the potential to reduce both on-peak and off-peak demand. Conservation, in the context of Minnesota Power conservation programs,[6] may also include process efficiency, which limits the energy input per unit of production and results in avoided energy consumption.
- *Peak Shaving* - Peak shaving reduces peak demand without affecting off-peak demand. Minnesota Power's dual-fuel load control and Large Power (LP) interruptible programs are peak shaving programs for economic and emergency conditions.
- *Load Shifting* - Electric demand is shifted from on-peak to off-peak hours. In 2014, Minnesota Power initiated a Time-of-Day (TOD) Rate Pilot and in 2015 extended the program.[7] Under this rate, customers pay more for usage during on-peak hours and

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[6] Minnesota Power's Power of One program is made available to home and business customers. Refer to on-line conservation resources at http://www.mnpower.com/EnergyConservation for more information. However, this Company branding will be discontinued in 2022.

[7] Details of the program extension can be found under Docket Number E015/M-12-233 filed on March 25, 2018.

critical peak pricing events, and receive a discount for usage during off-peak hours. The goal of this pilot is to gauge customer interest in new rate offerings that incentivize load shifting and to further inform decisions about broader program implementation and infrastructure investment.

Accounting for Conservation in the Forecast:

Prior to AFR 2019, the effect of conservation programs were assumed implicit in the energy sales forecasts. This approach was favored since it's highly objective, involves no manipulation of the historical energy sales data prior to regression modeling, and required no exogenous adjustment for energy efficiency to be applied to the raw econometric model results. Whether this method can fully capture the recent, escalating effects of conservation on energy sales has come into question.

After thorough research, testing, review by colleagues at other Midwest utilities, and discussions with Minnesota Department of Commerce (DOC) Staff, the Company has identified a preferred approach to forecasting energy efficiency: use energy efficiency as an input variable to the regression models, referred to as "EE as RHS var" or "Energy Efficiency as a Right Hand Side Variable." The "EE as RHS var" methodology has several advantages over other common energy efficiency forecasting methodologies:

- Avoids double-counting energy efficiency impacts in the forecast timeframe.[8]
- Accounts for historical and projected conservation resulting from both Company programs and organic, customer-driven efforts.[9]
- Leverages raw sales data in regression modeling: sales data are not adjusted for conservation impacts prior to modeling.[10]

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[8] The historical impact of conservation is effectively captured by the □x (coefficient x variable) series for the energy efficiency variable that spans the historical and forecast timeframes. There are no exogenous assumptions or adjustments for energy efficiency, and, in theory, no double counting.

[9] Company-driven energy efficiency is used as an *indicator* of energy sales, and the regression model will assign this variable more or less weight depending on the variable's observed correlation with sales. If the observed decrease in sales is greater than the increase in the energy efficiency variable (i.e. Company-driven energy efficiency), the model is inferring some organically-driven conservation.

[10] Another common method entails "adding-back" historical conservation to actual sales to reconstruct a history in which conservation effects have been removed. This series is modeled, projected, and then modified for future savings. This approach to forecasting sales with conservation impacts seems intuitive, but it involves modifying

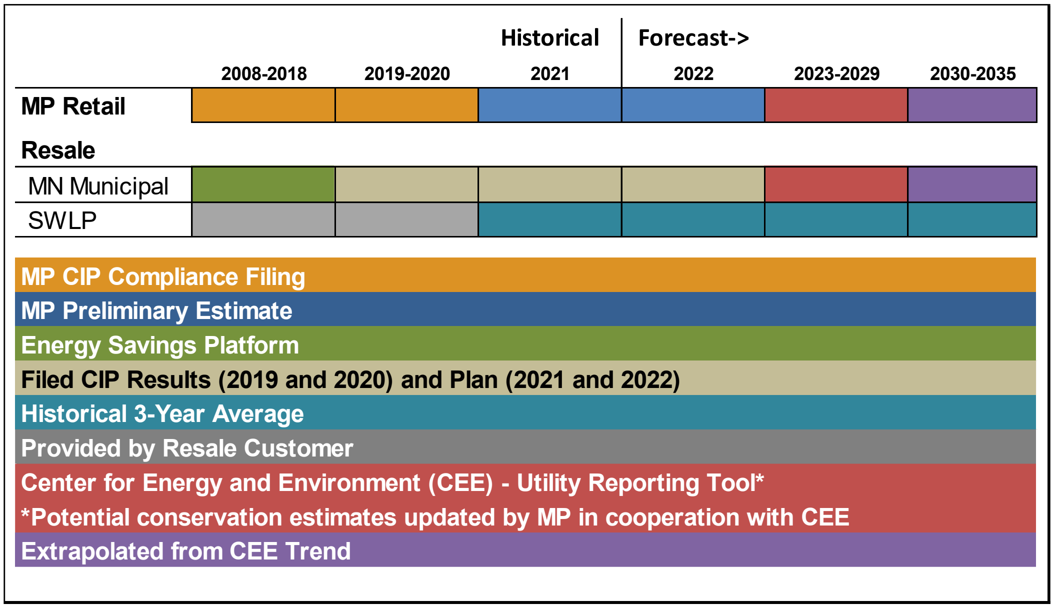
- Doesn't require after-the-fact adjustments to econometric outputs: the energy sales forecasts already contain the effects of energy efficiency.

An "Energy Efficiency" variable explains recent trends in customer consumption that cannot be explained by economic, demographic, or weather effects. Further, this method allows the Company to quantify the volume of Conservation Improvement Programs (CIP) energy efficiency embedded in the load forecast, which will be useful in a number of applications including resource plan modeling.

Discussion of the interpretation, role/function, and justification for use of a particular energy efficiency variable within a model is documented in Section II.E "Econometric Model Documentation."

Development of the "Energy Efficiency" variable began by gathering savings data for each retail customer class, Superior Water Light and Power, and the Company's 15 municipal customers. Incremental (i.e. first year) savings data for the historical and forecast timeframe was assembled from a number of sources. Table 2 documents the derivation of energy savings assumptions for each historical and forecast period.

Table 2: Energy Efficiency Variable Data Source



			Historical	Forecast->		
	2008-2018	2019-2020	2021	2022	2023-2029	2030-2035
MP Retail	🟧	🟧	🟦	🟦	🟥	🟪
Resale						
MN Municipal	🟩	🟨	🟨	🟨	🟥	🟪
SWLP	⬜	⬜	▩	▩	▩	▩

🟧 **MP CIP Compliance Filing**
🟦 **MP Preliminary Estimate**
🟩 **Energy Savings Platform**
🟨 **Filed CIP Results (2019 and 2020) and Plan (2021 and 2022)**
▩ **Historical 3-Year Average**
⬜ **Provided by Resale Customer**
🟥 **Center for Energy and Environment (CEE) - Utility Reporting Tool***
***Potential conservation estimates updated by MP in cooperation with CEE**
🟪 **Extrapolated from CEE Trend**

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the historical series using an estimated series (historical CIP savings), which can create uncertainty in the resulting model and forecast.

Historical incremental savings data for Minnesota Power was obtained from the Company's past CIP compliance filings, Minnesota Municipal customers' historical savings information was obtained from the Minnesota "Energy Savings Platform."[11] Superior Water Light and Power provided its own historical savings information to Minnesota Power.

Forecast assumptions for Minnesota Power's residential and commercial savings in 2019 and 2020 were derived from the Company's most recent preliminary estimates of achieved 2019 savings/plan for 2020, and energy savings assumptions[12] beyond 2020, were derived primarily from the Center for Energy and Environment's (CEE) new Utility Reporting Tool.[13] In cooperation and close coordination with CEE, the Company modified CEE's estimates of "Program" potential[14] savings at the generator in two ways:

1. The Program potential savings were re-estimated using CEE's methodology and working papers, but updated using the Company's most recent outlook (AFR 2019) for energy consumption by CIP-participating customers. The outlooks for energy usage growth have decreased considerably since CEE conducted its analysis; therefore the potential for energy efficiency savings have decreased.
2. Projections of municipal customer cumulative savings (starting in 2020) were scaled to align with recent historical savings (a five-year average).[15]

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[11] http://mncipdata.cloudapp.net/Default.aspx

[12] Resale customer assumptions for near-term (2019) incremental savings were not available in CEE's tool, so the Company assumed a five-year historical average. Superior Water Light and Power's incremental savings outlook was assumed as a five-year historical average normalized for large customer conservation projects that are unlikely to occur with any frequency and should not bias the forecast.

[13] https://www.mncee.org/cmsctx/pv/emmaappleman/culture/en-US/wg/bc32b2f9-415e-43fc-885f-a6b77d7329a9/h/7c8c2cd92b01eaff3e98ba1b2941fc39e8cad43c23c520dbe32102e613a9ee03/-/cms/getdoc/5b0746d4-4ad0-49b9-9a85-7d4212b56a03/pv.aspx

[14] CEE projected three levels of potential savings: Program, Economic, and Max Potential. Minnesota Power leveraged the "Program" potential savings figures in its data development since the Program metric aligned most closely with the Company's 2017 Triennial filing and past achieved savings.

[15] The CEE forecast of municipal customer incremental savings for 2020 (first forecast year) were, in total, about 50% greater than the five-year historical average of incremental savings for these same municipals. The Company inferred from this that CEE's projections of Cumulative savings were inflated by a similar amount. Scaling the CEE cumulative savings estimates prevented a large step change in the final "energy efficiency" variables for each municipal customer.

For each of the retail classes and resale customers, the Company cumulated the historical and projected incremental savings[16] to produce a "cumulative energy savings" series.[17] This cumulative series is the optimal variable format/definition for modeling energy sales; Figures 4 and 5 below demonstrate why this is the case by plotting incremental and cumulative residential energy savings (at meter) since the passage of the U.S. "Energy Independence and Security Act" of 2007 and the MN "Next Generation Energy Act" of 2007.

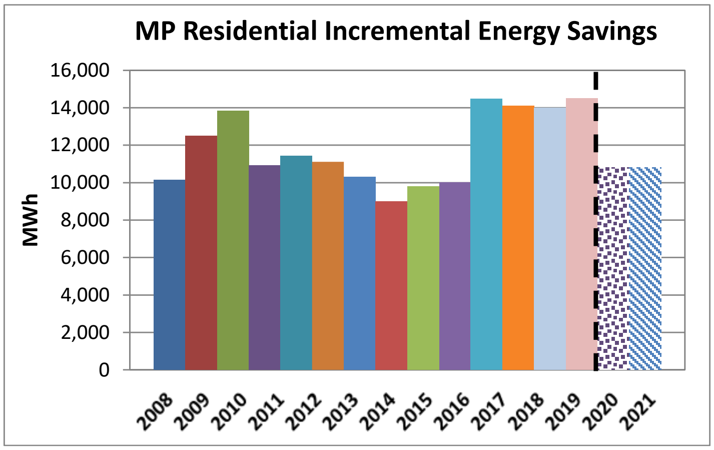

Figure 4: Residential Incremental Energy Savings

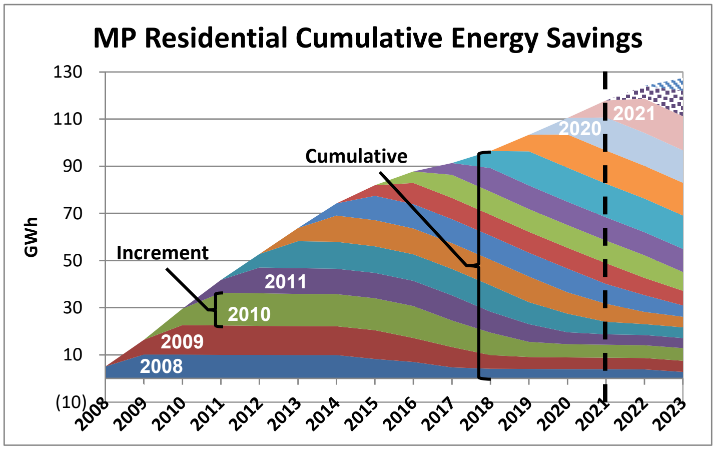

Figure 5: Residential Cumulative Energy Savings

Incremental energy savings are the "first year" or single year savings achieved via a portfolio of efficiency measures implemented in a single year. Incremental residential savings at meter are fairly constant from year-to-year, around 11,000 megawatt hours (MWh); from an econometric modeling perspective, this variable might indicate a constant shift in the level of annual sales, but it would not indicate a change in growth rate or trajectory of annual sales.

A cumulative savings metric represents the lasting impacts of conservation programs[18] by aggregating or *cumulating* the savings from all past conservation measures. This cumulative

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[16] For municipal customer savings, the cumulative savings series was calculated by 1) cumulating all incremental savings pre-2021, and adding this to 2) CEE's projection of cumulative savings post-2021. This was computationally easier, and required fewer assumptions on the part of the Company. A similar process for retail classes that leveraged CEE's cumulative savings was not possible since the customer class-level savings needed to be scaled per the composition of past achieved savings.

[17] Using internal estimates of Minnesota Power's past programs' life of measures. A Life of Measure (LoM) is the approximate time a conservation measure will reduce energy consumption. Most conservation measures have a 10-20 year life. A portfolio from any particular program year will contain measures that end earlier than others, so the overall impact of measures implemented in a program year will fade over time.

[18] Figure 5 above also shows how these conservation measure impacts fade over time as, for example, households replace the aging appliances.

series grows substantially from 2008-to-present; a timeframe in which Minnesota Power's residential energy sales growth has largely stalled. From an econometric modeling perspective, a cumulative savings format/definition is indicative of a change in growth rate/trajectory of annual sales. This is precisely the phenomenon that requires explanation and quantification, and why the "cumulative" series is the optimal variable format/definition for modeling energy sales.

Note that accumulating the *annual* incremental series only produces *annual* cumulative savings series, whereas Minnesota Power's energy models are *monthly*-frequency. The Company used the same annual cumulative savings value for all 12 monthly observations of a particular year,[19] and did not attempt to estimate monthly energy savings by distributing or interpolating the annual values. Estimation of monthly savings values would have 1) involved additional assumptions on the part of Minnesota Power forecasters, and 2) potentially imparted bias to the final model through the weather coefficients. A key strength of the "Energy Efficiency as a Right Hand Side Variable" methodology is that it involves making relatively few assumptions, leveraging raw data as much as possible, and relying on the regression modeling process to objectively "solve for" unknown variables such as the seasonality of energy efficiency impacts.

The Company used a cumulative savings, annual "Energy Efficiency" variable in regression models for sales to the residential, commercial, and public authorities classes, as well as three of the Company's 16 resale customers modeled in AFR 2022. The cumulative energy sales assumptions used in regression modeling (i.e. the "Energy Efficiency" variables) and corresponding incremental savings assumptions are shown in the tables below by year. [*Note: The commercial-sector "Energy Efficiency" variable was utilized in the public authorities model since: 1) both customer groups are served by the same CIP program (Power of One Business*[20] *and Residential/Multifamily/Business Direct), and 2) the overall trend of conservation in public authorities is likely very similar to commercial customers*.]

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[19] Note that the Company did not divide the annual values by 12. Dividing or multiplying a variable by a constant (e.g. 12) prior to regression modeling has no effect on the resulting forecast; the regression model would adjust the parameter estimates (i.e. coefficient) to maintain a least squared error function. Dividing a variable by 12 would result in a coefficient that's 12 times larger.

[20] Beginning in 2022, Minnesota Power will no longer be using "Power of One" branding.

Table 3: Cumulative Energy Sales Assumptions **Table 4: Incremental Energy Savings Assumptions**

[TRADE SECRET DATA BEGINS

[redacted]

TRADE SECRET DATA ENDS]

Accounting for Distributed Generation (DG):

Prior to AFR 2019, the Company did not make explicit, exogenous assumptions for Distributed Generation: Solar (DG Solar), but noted that "it may become possible/necessary to account for this transition in the load forecast."[21] Minnesota Power has identified a viable methodology for this transition, has projected DG Solar adoption, and has adjusted the energy sales and peak demand forecasts per this DG Solar outlook.

New DG Solar installations were projected using the exponential growth observed in recent years (since 2010) where the number of new solar installations has grown by about 40 percent

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[21] In Section 1.B.iv. "Treatment of Demand-Side Management (DSM), Conservation Improvement Programs (CIP), and Distributed Generation (DG)" of AFR's 2017 and 2018.

per year in both residential and commercial sectors. This outlook for the number of new installs is combined with assumptions for the sizing (kilowatt (kW) capacity) of those new installations, an expected capacity factor, and seasonal production characteristics to produce estimates of monthly energy production and peak reduction. The energy sales and peak demand forecasts are only adjusted for *new* installations (i.e. installations expected to come online in the forecast timeframe). The effects of currently installed arrays are presumed to be embedded in the forecast.

The Company projects that about 2,400 new DG Solar installations will connect to the Minnesota Power grid by 2036 (i.e. installed in years 2022-2036), generating almost 30,000 MWh per year and reducing sales by an equivalent amount. The Company adjusted the energy sales and peak demand outlook per all DG Solar adoption in the forecast timeframe (2022-2036); current DG Solar is assumed inherent in the econometric forecast.

Currently, there are nearly 600 small-scale (<40kW)[22] Distributed Generation (DG) Solar installations with a combined nameplate capacity of about 5.5 MW, reducing sales by an estimated 5,500 MWh/year (0.25 percent of combined residential and commercial sales in 2021). The Company projects that its customers will have installed about 30 MW of new small-scale solar,[23] displacing about 30,000 MWh in energy sales by 2036.

The process of forecasting DG solar generation involves two separate assumptions: 1) the rate of adoption (i.e. number of new installations each year), and 2) the average size of those new installations. When calculating both assumptions, the Company opted to segment the DG solar customer population into Residential and Commercial customers; the two classes show separate rates of historical adoption and have tended to install different sized arrays.

The adoption rate was forecasted by modeling historical adoption using annual incentive spend data and exponential trend variables (a “time trend” and square of “time trend”). The exponential trend variables describe the organic early adoption of new technologies and the Company’s solar incentive spending describes divergence from that underlying, organic trend;

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[22] AFR 2019 considered “Small-scale” to be <60KW. For AFR 2020 and AFR 2022, Using the <40KW more closely aligns with other major filings and current policy.

[23] This is Customer installations only, and does not include Minnesota Power developments like Community Solar.

e.g. the sizable increase in incentive spending explains the spike in 2019 DG installations. The forecasts of residential and commercial DG solar are shown as the dotted lines in Figure 6 below.

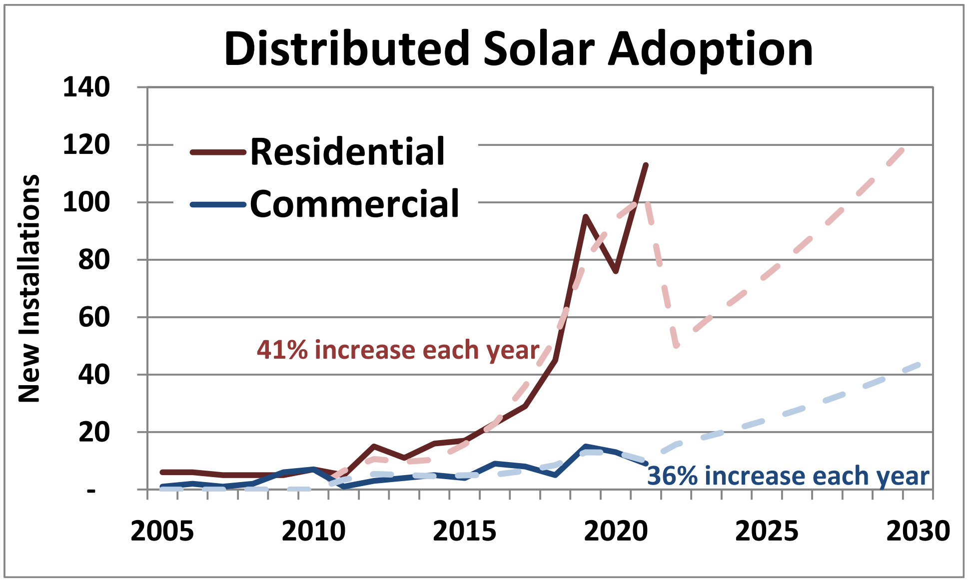

Figure 6: Residential and Commercial Distributed Solar Adoption

The average size (capacity) of new installations in the forecast timeframe is assumed as a simple historical average of installation size by class: residential customer DG solar installations have averaged a capacity of about 8.7 kW and commercial customer DG solar installations have averaged about 21.3 kW.[24]

The adoption rate series is combined with the average installation size assumption to arrive at an estimate of total kW installed per year in the forecast timeframe for both the residential and commercial classes. The “kW installed per year” series (for both commercial and residential) are transformed into cumulative series that represent the total kW installed as of a point in time, inclusive of all installations from the current and prior years.

Finally, the Company calculated the estimated impact of new DG solar on energy sales by converting the capacity series (kW) to an energy series (kWh) using an 11 percent capacity

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[24] Extremely large outliers were omitted. The Company recognizes that installations are often sized per the energy requirements of the customer, and if per-customer usage declines due to conservation it’s likely that installation size will similarly decrease. The Company also recognizes the potential, past and present, for rouge installations (i.e. installations that are not reported to Minnesota Power); this forecast does not account for this potential.

factor[25] assumption for new distributed installations. Table 5 below shows the core assumptions of the Company's annual DG solar outlook.

Table 5: Minnesota Power Outlook for New (post-2021) Distributed Solar

Minnesota Power Outlook for NEW Distributed Solar

	New Installation Count	Cumulative Capacity (kW)	Energy Production (MWh)
2022	66	1,964	1,921
2023	77	2,872	2,821
2024	88	3,907	3,846
2025	99	5,077	5,006
2026	111	6,394	6,311
2027	124	7,869	7,772
2028	138	9,511	9,399
2029	152	11,332	11,203
2030	168	13,341	13,194
2031	184	15,550	15,382
2032	201	17,968	17,778
2033	219	20,607	20,393
2034	237	23,476	23,236
2035	257	26,587	26,318
2036	277	29,949	29,649

Identifying the impact of DG solar on the monthly peak demand outlook involves calculating the amount of solar generation that is likely during a specific month's likely peak time (i.e. historical median peak hour) using a simulated hourly solar production curve.[26] Minnesota Power typically peaks at 6 or 7 PM (well after sun-set) in winter months, so DG solar at the time of the peak is zero percent and projected winter peaks are not reduced. In summer months, Minnesota Power has historically peaked at 3 or 4 PM when DG solar is on average

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[25] This is the observed average capacity factor of metered solar installations on Minnesota Power's System.

[26] The Company used PVSYST software to simulate eight different 10 kW systems per a Typical Meteorological Year. The eight systems varied by location within Minnesota Power's service territory, and by tilt, azimuth, and tracking ability. Each simulated profile was then weighted per the installed kW by location and array specification, and all profiles were totaled. This totalized curve was used to determine the capacity factor of DG solar for each month. Note that this curve was based on 2011 weather information and installations as this was readily available. Simulating with more current information or aggregating actual metered production data would have been time-intensive and likely would have yielded similar results with regards to the capacity factor, which was the only assumption derived from this simulated production curve.

55 percent of installed capacity (the effective load carrying capacity or "ELCC" is 0.55).[27] Summer peak forecasts are reduced by 55 percent of the projected new installed solar capacity; this equates to a 1 MW reduction in the 2022 summer peak, growing to an approximate 17 MW reduction in summer peak by 2036.

Accounting for Adoption of Electric Vehicles (EV):

Minnesota Power recognizes the potential load growth that could result from this new electric end-use and has incorporated an outlook for Electric Vehicle (EV) adoption into the residential energy sales and peak demand forecasts.

Fleet vehicles and commercial charging are not addressed in AFR 2022. Fleet EV adoption in Minnesota Power's territory is too limited to gauge the pace of organic adoption or draw meaningful parallels between local and national adoption rates. Projecting public EV charging usage will also require further study. For the sake of simplicity, and until the Company has more data on EV adoption, the Company attributes all new electric vehicle usage to the residential class. Minnesota Power will continue to gather data and refine its methods to model and incorporate new electric end-uses like EVs into the annual forecast.

The exact number of each type of EV is unknown at this time, but regional ownership is assumed to be predominantly light duty vehicles. Currently, there are 239 known electric vehicles in Minnesota Power's service territory,[28] [29] and the Company estimates there are about 550 light duty (i.e. passenger vehicles) EVs in Minnesota Power's retail service territory.[30] This equates to a 0.4 percent penetration rate for household vehicle ownership and an estimated 590 MWh of energy consumption in 2022. This level of energy consumption represents just 0.06 percent of all sales to residential customers. According to EV data posted

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[27] DG solar output is less than 100 percent during the peak for several reasons, including: 1) diversity in installation arrangement and geography (every solar installation will not experience max output at the same time), 2) the likely Minnesota Power system peak timing is well after noon (12-to-1 PM would be the highest solar output hour), and 3) probabilistic variance in weather is taken into account (although its likely to be sunny and hot on the day of the system peak, that does not guarantee perfect conditions at the precise hour of the peak).

[28] http://www.dot.state.mn.us/sustainability/electric-vehicle-dashboard.html.

[29] Terwilliger, Hanna. Pers. Comm. "RE: 2020 EV Registration Data". April 22, 2022.

[30] As of year-end 2020, based on available EV registration data, projected 2022 EV adoption, and pace of national-level vehicle sales.

on the Commission's website in February of 2020, electric vehicles in Minnesota Power's service territory accounted for about 1.4 percent of all EVs in the state, which is considerably less than Xcel Energy (70 percent of all EVs in Minnesota), but more than Otter Tail Power (about 0.5 percent). The Company is aware of the Duluth Transit Authority's seven electric transit buses.

Under the AFR 2022 expected scenario, Minnesota Power customers own about 3,250 EVs by 2030, which would represent just over 1.6 percent of regional vehicle ownership, and roughly 3 percent of homes would own at least one EV, on average. This equates to about 7,600 MWh in additional energy requirements from the residential sector and an estimated increase of 1 MW and 3.6 MW in the 2030 summer and winter peaks (respectively). By 2035, Minnesota Power customers are projected to own about 11,300 EV's and the added energy requirements from post-2020 EV adoption increases to about 28,000 MWh. This level of EV ownership would increase summer peak coincident demand by about 3.5 MW and winter peak demand by 12.75 MW.

The EV adoption rate forecast for the Minnesota Power service territory follows a projected national adoption rate, but lagged by about 6 years. To-date, the average household EV ownership rate among Minnesota Power customers trails the nation by about 6 years: in 2020 Minnesota Power customers had an approximate EV saturation of 0.2 percent whereas the national saturation rate[31] was about 1.5 percent. The National EV saturation rate was last at 0.2 percent between 2013 and 2014, so – for the purposes of forecasting – the Company assumed its customers' EV adoption would continue to lag the nation by about 6 years and would follow the national trend forecast from Bloomberg.[32] Figure 7 shows the adoption rates of Minnesota Power customers and the U.S.

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[31] Inside EVs (https://insideevs.com) was used to gather actual EV sales data, and the U.S. household count was derived from the U.S. Census (https://www.census.gov/data/tables/time-series/demo/families/households.html). There are approximately 1.4 million EVs on U.S. roads and about 125 million households in the U.S., so - on average - roughly 1.15% of US households own an EV.

[32] Bloomberg's 2020 Electric Vehicle Outlook (EVO). The 2022 Electric Vehicle Outlook (EVO) was released too late in the forecast's development to be included AFR 2022, but the overall adoption rate does not differ significantly from the 2020 adoption outlook.

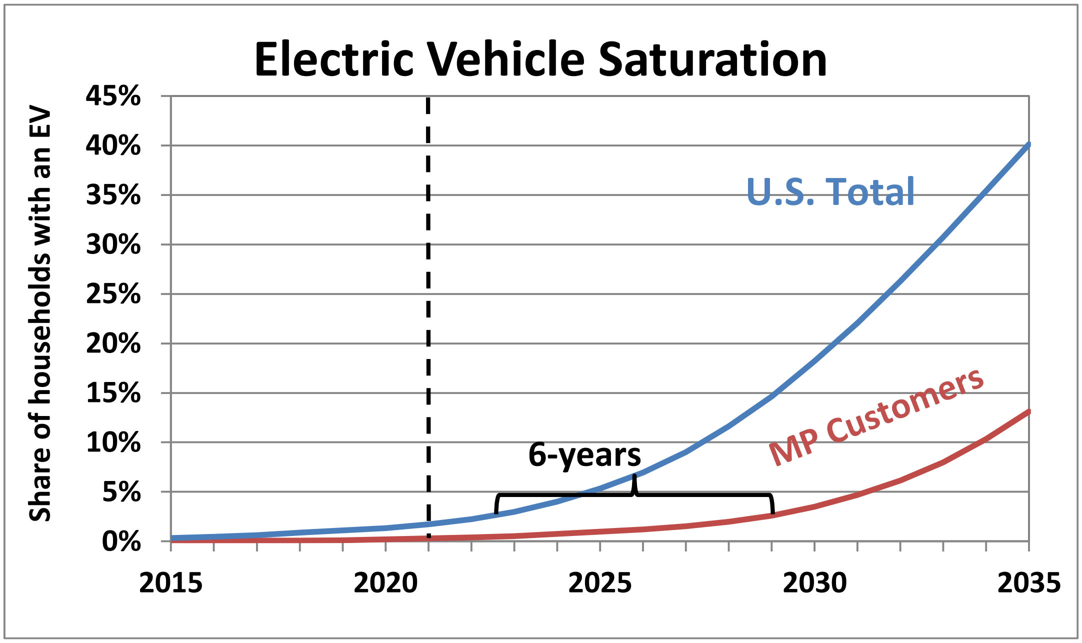

Figure 7: Minnesota Power vs. U.S. Electric Vehicle Saturation

The annual saturation rate outlook (shown in Figure 7) is then multiplied by Minnesota Power's residential customer count[33] to estimate the total number of EVs in Minnesota Power's service territory. The annual EV energy requirements forecast was calculated by multiplying the EV count and an estimate of per-unit energy requirements, which the Company assumes is about 2,520 kWh per year.[34] Table 6 shows the outlook for EVs in the Minnesota Power's service territory.

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[33] Count of Standard Residential and All Electric accounts – excludes Dual Fuel and Controlled Access to avoid double counting and inflating the estimate of households served.

[34] General Motors estimates the annual energy use of a Chevy Volt is 2,520 kWh – https://www.energy.gov/eere/electricvehicles/charging-home – Rough estimates of energy requirements based on regional commuting distances and 33 kWh per 100 miles (Nissan Leaf rated efficiency) produced 2,580 kWh, so the Chevy Volt estimate is likely an accurate enough assumption for long-term forecasting.

Table 6: Minnesota Power Residential Electric Vehicle Outlook

	Vehicle Count	Saturation	Energy Requirements (MWh)
2021	326	0.3%	280
2022	444	0.4%	579
2023	596	0.5%	961
2024	827	0.7%	1,543
2025	1,096	1.0%	2,221
2026	1,345	1.2%	2,849
2027	1,674	1.5%	3,679
2028	2,098	1.9%	4,747
2029	2,598	2.3%	6,007
2030	3,244	2.9%	7,634
2031	4,154	3.7%	9,927
2032	5,386	4.8%	13,032
2033	6,978	6.2%	17,044
2034	8,994	8.0%	22,125
2035	11,359	10.1%	28,084

The Company did not attempt to modify this annual energy requirement estimate (2,520 kWh) per regional commute distances or regional climate and related efficiency; both estimates would involve comparisons of national and regional characteristics that are difficult to make at this early stage of adoption. However, the Company did leverage regional temperature information to impart a seasonal (i.e. monthly) distribution to the overall annual EV energy requirements estimates.

EV energy requirements/efficiency will vary with temperature; consequently, EV efficiency will also vary by month. The Company combined regional weather information[35] with observations of the Nissan Leaf's seasonal efficiency[36] to identify this seasonal variance in energy requirements. The results suggest that EV efficiency is optimal between 60 and 70 degrees Fahrenheit which is the average daily temperature during the summer months in northeastern Minnesota.[37] During winter months, when the average daily temperature is just 15 degrees Fahrenheit, EVs will require about 40 percent more energy than during optimal conditions.

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[35] The Company used a twenty-year historical average temperature by month at Duluth International Airport. This is consistent with weather assumptions used in energy and peak demand forecasting.

[36] https://pubs.acs.org/doi/suppl/10.1021/es505621s/suppl_file/es505621s_si_001.pdf

[37] The Company recognizes that temperature during a summer day may vary considerably, and that overall efficiency in summer months should be lower than optimal. More accurate assumptions for

Identifying the impact of EV charging on monthly peak demand requires information on charging patterns/characteristics – i.e. how/when customers will tend to charge their vehicles. A National Renewable Energy Laboratory (NREL) value assessment study of electric vehicles[38] contained modeled EV charging patterns for several customer types. For the purposes of determining EV charging load coincident with the system peak demand, Minnesota Power assumed the charging profile representative of: level 1 charging, at a single family dwelling, with *no* Time of Use (TOU) restriction or rate.

Per these profiles, approximately 12 percent of daily residential EV energy requirements are met at the most typical winter peak hour (6 PM) and about 6 percent of daily EV energy requirements are met during the likely summer peak hour (3 PM).[39]

The Company projects that by 2035, about 10 percent of Minnesota Power customers will own an EV, and Minnesota Power will be the primary service provider to about 11,400 EVs. This outlook assumes Minnesota Power customers' EV penetration and adoption continues to lag the U.S. by about 6 years. The Company attributes this lag in adoption to issues of income, population density/cost-efficiency of commercial charging station locations, and reduced efficiency in cold-weather. These factors may be overcome with technological advancement or a rapid escalation in gasoline costs, or Minnesota Power customers may "catch-up" to the rest of the country in EV adoption regardless of these limiting factors. The Company will refresh its EV forecast and methodology each year, and will publish the results along with any substantive methodological changes or key findings in the AFR.

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seasonal/temperature-related efficiency would involve more complicated assumptions for driving times and coincident temperatures. This is something the Company will investigate in the future. The Company opted for simplicity of assumption in this regard for this inaugural EV forecast.

[38] https://www.nrel.gov/docs/fy17osti/66980.pdf

[39] The Company recognizes that these assumptions do not capture the mid-day load potential for commercial or "at work" charging, and only accounts for home charging patterns. This is not an oversight. The Company does not currently have sufficient information to project commercial charging, but will re-evaluate in future iterations of the AFR.

4. Methodological Strengths and Weaknesses

The Company's forecast process combines econometric modeling with a sensible approach to modifying model outputs for assumed changes in large customer loads or new technology adoption. An econometric approach, utilizing regression modeling, is optimal for estimating a baseline projection with a given economic outlook and capturing the historical and projected effects of energy efficiency. However, a fully econometric process would not imply any of the substantial industrial expansions that are likely in the Minnesota Power service territory. A combined "econometric/large customer load addition" approach produces the most reasonable forecast.

The Company's econometric modeling process has two key strengths: it is both highly replicable, and adept at narrowing the list of potential models to only those that are most likely to produce quality results which allows more time for in-depth statistical testing and critical review of each model.

That said, there are some weaknesses to a combined "econometric/large customer load addition" approach. For instance, there is some subjectivity in the perceived likelihood of individual large customer load additions/losses since their magnitude or timing is difficult to estimate in a probabilistic way. To minimize subjectivity on the part of Minnesota Power, the Company utilizes information that has been publicly communicated by prospective customers in its scenario planning.

Minnesota Power is highly sensitive to large industrial customer decisions as large taconite, paper, and pipeline customers represent more than half of Minnesota Power's system demand and energy sales at any given point in time. The Company addresses this potential for error by maintaining close contact with existing and potential customers to keep current on their plans.

C. Inputs and Sources

Minnesota Power draws on a number of external data sources and vendors for its indicator variables. Each year, the forecast database is updated with the most current economic and demographic data available. This involves an update of the entire historical timeframe since these data are frequently revised. Special attention is given to identifying any changes from previous years' data and data sources. Changes from last year's database are clarified later in this section.

1. AFR 2022 Forecast Database Inputs

Weather

Weather data for Duluth, Minnesota was collected for historical periods from the National Oceanic and Atmospheric Administration (NOAA) and from Weather Underground (WU).[40] Minnesota Power utilizes Monthly HDDs and CDDs in energy sales forecasting and peak-day weather conditions in peak demand forecasting.

Monthly total HDD and CDD are sourced from NOAA. The monthly total HDD and CDD values are normalized for the number of days in a month by dividing the monthly HDD or CDD count by the number of days in the month. This results in the "per-day" series HDDpd and CDDpd. For example:

The "per-day" value of 46.1 HDDpd in January 1990 was calculated as follows:

> Duluth Minnesota's HDD count for January 1990 (1428) is divided by the number of days in January (31) to produce an HDDpd value of 46.1.

Normalizing the series by transforming to a per-day unit allows for a more accurate estimate of the weather's impact on energy sales. The forecast assumes a twenty-year historical average for each month (Jan 2001 – Dec 2020). For example, January's forecast assumption is an average of Jan-01, Jan-02, Jan-03, etc. through Jan-20.

Temperature, humidity, and wind-chill data used to model peak demand are derived from Schneider Electric. In previous forecasts, the Company has leveraged either NOAA or WU for daily or monthly-frequency values. The AFR 2022 forecast database features weather observations that are specific to the historical peak hour (i.e. the temperature, humidity, and wind-chill at the time of the peak). This closer alignment between the peak demands and the weather that induced them should produce a more accurate estimate of weather-sensitivity and a more accurate forecast of future peak demand.

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[40] http://www.wunderground.com/.

Development of the historical weather series begins by establishing the date and time of historical monthly peaks. Weather observations for these date/times is then gathered and organized into a monthly-frequency weather series.

Calculating a twenty-year historical average of peak-time weather for use as a forecast assumption requires recorded peak dates for the timeframe prior to the establishment of the current electronic database (1998-1999). Minnesota Power uses the Federal Energy Regulatory Commission (FERC) Form 1 to identify the dates for peaks prior to 1999 and then gathers the corresponding weather data. Forecast assumptions for peak-day weather can be calculated from the completed twenty-year history.

A Temperature-Humidity Index (THI)[41] is utilized to take into account the effect of heat and, when applicable, humidity on summer peaks. The THI is only applicable when temperatures exceed 75 degrees. A Wind-Chill (WC) index[42] was also utilized to capture the cold temperatures and, when applicable, the cooling effects of wind speed. The WC index is only applicable when temperatures drop below 40 degrees and wind speeds are greater than 3 miles per hour.

IHS Global Insight

IHS Global Insight is the singular source for all economic and demographic outlooks used in Minnesota Power's load forecast.[43] A single source for National, Metropolitan Statistical Area (MSA), and County-level outlooks ensures internal consistency of forecast assumptions.

IHS Global Insights data development process begins with producing a national-level forecast. County-level and MSA data for Northeast Minnesota is then calculated through a "Top-down/Bottom-up" approach; the Minnesota Power area economy is modeled independently, considering unique local conditions, and is then linked to the national economy to ensure consistency across the national, regional, state, and MSA levels.

Since 2009, Minnesota Power has utilized IHS Global Insight estimates of historical and forecast economic activity in Northeast Minnesota as key inputs to energy and customer count

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[41] http://www.wpc.ncep.noaa.gov/html/heatindex_equation.shtml.

[42] http://www.nws.noaa.gov/os/windchill/index.shtml.

[43] With the exception of two series that are derived from REMI: Population and GRP for the 13-County Planning Region.

models. Recent years' forecast processes have featured an expansion of IHS Global Insight data use, and AFR 2022 continues this trend towards greater granularity and constancy.

AFR 2014 featured the adoption of IHS Global Insight's national-level economic indicators as inputs to Industrial Production Index (IPI) modeling process. IHS Global Insight provided access to more national-level variables than the previous source[44] and allowed Minnesota Power to expand its IPI forecast database. The data source change also maintained consistency of assumption in all areas of Minnesota Power's forecast process and among all levels of geographic granularity.

In both AFR 2015 and AFR 2016, the Company expanded the forecast database to include more geographically-granular indicators to add predictive power by more-closely aligning with the area containing Minnesota Power's customer base. AFR 2015 featured the addition of Duluth Metropolitan Statistical Area (Duluth MSA)[45] economic indicators, and the AFR 2016 database was expanded to include economic indicators for all *individual* counties in the 13-County Planning Area in addition to the 13-County Planning Area Aggregate.[46] This expanded the number of economic/demographic predictor variables from 78 (in AFR 2015 database) to 454 (in the AFR 2016 and subsequent databases).

IHS Global Insight utilizes the most current historical data available from public data sources, which is updated frequently. These updates flow through IHS Global Insight's process to ultimately effect the historical series used in Minnesota Power's forecast database. Thus, the historical regional employment and income data has changed from last year's database.

The frequency of the raw Duluth MSA and National-level economic data is quarterly, and interpolation to a monthly frequency is necessary for use in Minnesota Power's monthly forecasting process. The interpolation method used is described in the *Specific Analytical Techniques* section.

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[44] Blue Chip Economic Indicators.

[45] The Duluth MSA is defined as St. Louis and Carlton counties in Minnesota, and Douglas County in Wisconsin.

[46] Minnesota Power's 13-County Planning Area is defined as: Carlton, Cass, Crow Wing, Hubbard, Itasca, Koochiching, Lake, Morrison, Pine, Saint Louis, Todd, and Wadena counties in Minnesota, and Douglas County Wisconsin.

Regional Economic Models, Inc. (REMI)

Minnesota Power subscribes to the latest REMI Policy Insight version (PI+) for northeastern Minnesota. This input/output econometric simulation software combines a national economic outlook[47] with specified regional economic conditions to produce a forecast for a 13-County Planning Area such as employment by sector, population, economic output by sector, and Gross Regional Product (GRP).

For AFR 2022, REMI was used to quantify the indirect economic effects of known and expected changes in regional employment (i.e. expansions and layoffs/closures) to produce an expected economic outlook for the region.

IHS Global Insight economic indicators for both 13-County Planning Area and the Duluth MSA are calibrated using the results of REMI's economic simulations. As the REMI outlook is adjusted for alternative planning scenarios, the monthly employment and income outlooks are changed accordingly.

Some indicators such as population and GRP are not provided by IHS Global Insight for the 13-County Planning area. These series are derived directly from REMI outputs, and are of annual frequency. Interpolation to a monthly frequency is necessary for use in Minnesota Power's monthly forecasting process. The interpolation method used is described in the *Specific Analytical Techniques* section.

Like IHS Global Insight, REMI relies on data from public sources that are subject to revision. These revised data inputs result in revised historical values for the economic and demographic indicators used in Minnesota Power's database.

Indexes of Industrial Production (IPI series)

The indexes of industrial production are measures of sector-specific production in a given month relative to a base year, 2012 in this case (that is, 2012 = 100). The indexes exhibit a high degree of correlation with Minnesota Power's historical industrial energy sales and are, therefore, ideal for forecasting future energy sales to the class.

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[47] Prior to simulation, REMI is calibrated to the IHS Global Insight National Economic Outlook.

The historical national-level IPI data were obtained from the Board of Governors of the Federal Reserve. The historical data is regularly revised to incorporate better data, better methods, and to update the base year. To capture these revisions, Minnesota Power updates the entire historical data series each year. These revisions are explained on the Federal Reserve's website.[48]

Forecasts for each national-level IPI were developed from the projections of national-level economic indicators from IHS Global Insight, and are, therefore, consistent with all other AFR 2020 forecast assumptions. These macroeconomic drivers are used to model and forecast the national-level IPI series.

The historical Minnesota iron IPI was developed using actual iron ore production data from the U.S. Geological Survey website (USGS).[49] The projected Minnesota iron IPI was developed by scaling the national-level Iron IPI forecast using an assumption of the industry's composition going forward. Minnesota now comprises about 83 percent of U.S. product, so the Minnesota iron IPI equals the national-level IPI x 0.83. The entire historical and forecast Minnesota iron IPI was then indexed to 2012 for consistency with past AFRs, the other IPI series used in AFR 2022, and the U.S. Federal Reserve's current standard index year.

Note that Minnesota Power opted to utilize an already de-seasonalized series from the external source rather than applying its own de-seasonalizing function. Both the seasonally-adjusted and unadjusted series are available from the Board of Governors of the Federal Reserve. The 2022 forecast database utilizes the seasonally adjusted historical indexes.

Energy Prices

Estimates of future Minnesota Power rate changes are incorporated into the average electric price forecasts as generally indicative of the intention and anticipation of changes in the Company's rate structure and prices.

Average energy prices, history and forecast data, are from the Department of Energy (DOE) and Energy Information Administration (EIA). The fuel types considered are electricity and natural gas. End-use class energy price data is categorized by DOE/EIA into residential,

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[48] http://www.federalreserve.gov/releases/g17/revisions/Current/g17rev.pdf.

[49] https://minerals.usgs.gov/minerals/pubs/commodity/iron_ore/.

commercial, and industrial. DOE's Annual Energy Outlook (AEO) is used for the forecast period. DOE provides historical energy price data for Minnesota, forecast energy price data for the West North Central (WNC) region, and the national total. Minnesota Power's historical average electric price data are from the Company's FERC Form 1 and represent annual class revenue divided by annual class energy. All energy prices are deflated by the 2012 base year GDP implicit price deflator (IPD).

Energy Efficiency, Distributed Solar, and Electric Vehicles

Refer to section II.B.4. "Treatment of DSM, CIP, DG, and EV in the Forecast" for all data and assumption sources concerning Energy Efficiency, Distributed Solar, and Electric Vehicles.

2. Adjustments to Raw Energy Use and Customer Count Data

Minnesota Power made a limited number of adjustments to internally developed data for AFR 2022, which fall into three general categories:

1. Adjustments to raw customer count data for billing anomalies
2. Adjustments to raw sales and peak demand data for large load additions and losses
3. Adjustments to convert sales data into overall energy requirements data

Adjustments to raw customer count and energy sales data for billing anomalies – Minnesota Power's historical customer count and energy sales data contain a number of anomalous or missing observations that can affect modeling and resulting forecasts.

Employing a binary variable during modeling or adjusting the raw data prior to modeling are two common techniques used to avoid biasing models with anomalous observations. Prior to the AFR 2014 process, Minnesota Power used both techniques, but their application was not entirely consistent. The Company's current database and modeling policy is as follows:

> *Where there is a systemic shift (e.g. seasonal billing in residential customers count), Minnesota Power does not adjust the raw data and instead utilizes a binary variable in modeling. When there are less than 3 consecutive anomalous observations, Minnesota Power adjusts the raw data prior to regression using straight-line interpolation. In general, an observation was considered anomalous if it varied by more than 0.5 percent from a straight-line-interpolated value.*

The 2022 customer count and energy sales database contains 469 monthly points (about 4.2 percent of all monthly points) that have been adjusted in this way.

Adjustments to raw sales and peak demand data to account for large load additions and losses – All adjustments to the historical database are described below in detail and organized by sector. The impact of this methodological change on the forecast for each customer class is discussed in the *Model Documentation* section.

[TRADE SECRET DATA BEGINS

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TRADE SECRET DATA ENDS]

Notes on Adjustments to historical series:

- When assessing the ability of economic variables to reflect the above mentioned structural breaks, Minnesota Power identified those instances when the raw energy sales series could be modeled more accurately than the adjusted series; in these cases when the economic data explains the change, the use of the raw sales series is appropriate. When the adjusted series can be modeled more accurately than the raw series, then it is evident that the economic data cannot adequately explain the shift and the adjusted historical sales series should be utilized. However, it should be noted that it is the Company's preference to use binary variables in these instances when the relationship between variables has changed by some measurable constant. This technique utilizes the raw data series (unadjusted) as a result.
- When recent load additions or losses can be accurately quantified, they are removed from the historical sales and peak series prior to modeling and a post-regression

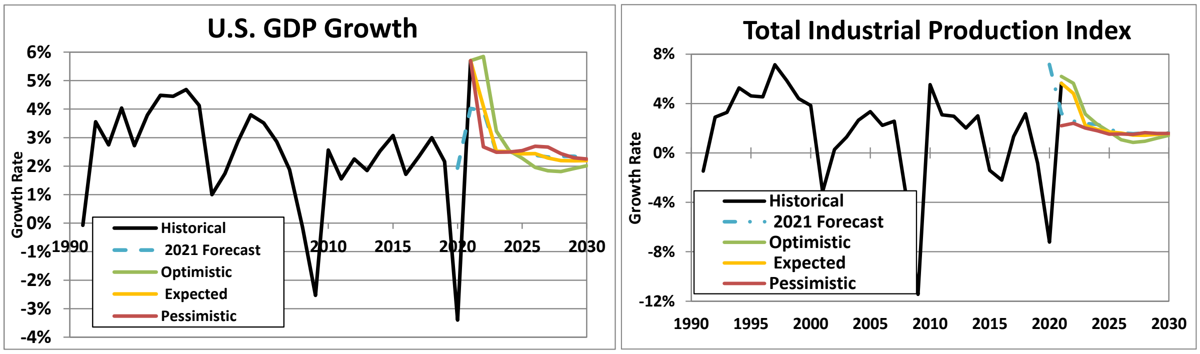
adjustment is used to account for the load addition or loss in the forecast timeframe. When it is not possible to accurately quantify this recent change (e.g. if a customer is served by a municipal customer and their usage data is not accessible by Minnesota Power), then no adjustment is made to the historical data. In this case, a post-regression adjustment is still applied to account for the load addition in the forecast timeframe. When it's evident that this load addition or loss is reflected in the econometric forecast or the change can be modeled with a binary variable, Minnesota Power will cease the application of a specific post-regression adjustment.

D. Overview of Key Inputs/Assumptions

1. National Economic Assumptions

The national economic outlook is derived from IHS Global Insight and serves as the basis for Minnesota Power's regional economic model simulations. Some of the key outputs of the national economic forecast are GDP, IPI, unemployment rates, and auto sales. These variables are shown in Figures 8-11 below, for the Expected, Optimistic, and Pessimistic cases.

Figures 8 and 9: National Economic Outlook (GDP and Industrial Production)



The Expected case (yellow) macroeconomic outlook (yellow) serves as the underlying assumption for AFR 2022. In the Expected case, U.S. GDP and IPI growth average 2.6 and 2.1 percent per year from 2022-2035, respectively.

Figures 10 and 11: National Economic Outlook (Unemployment Rate and Auto Sales)

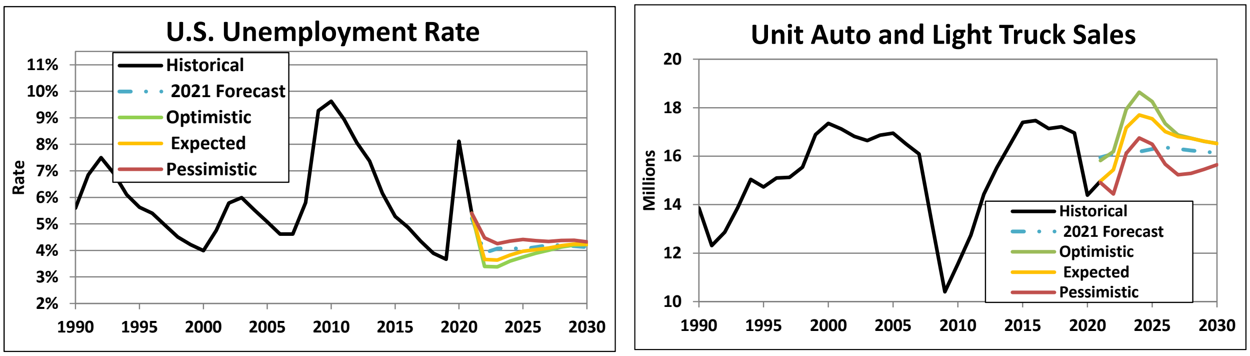
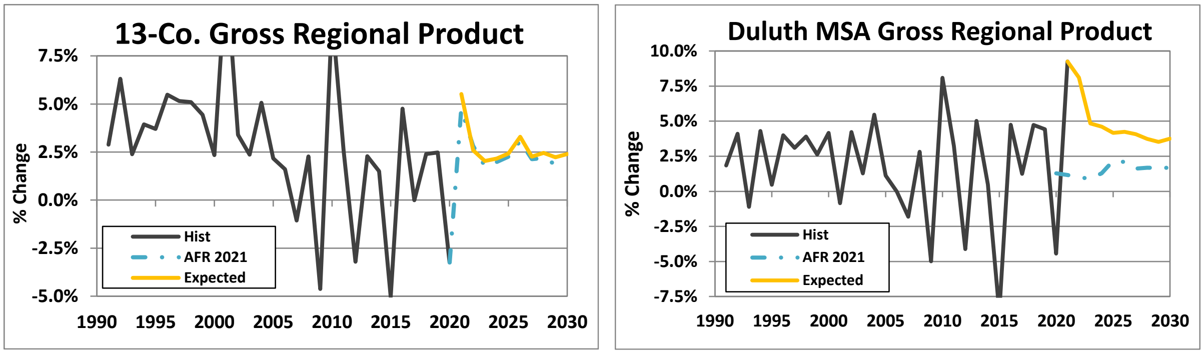


Figure 10 shows the unemployment rates in the three national outlooks all fluctuate in the first few years of the forecast timeframe before reaching long term labor market stability consistent with the assumed rate of GDP growth. Assumptions of unit auto and light truck sales in Figure 11 show a similar pattern in the forecast timeframe with moderate increases in the short-term and stabilization in the long-term.

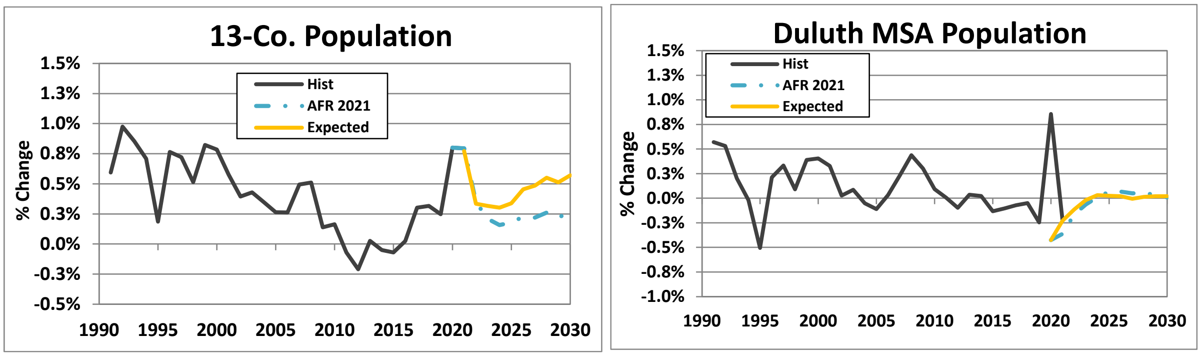
2. Regional Economic Assumptions

The Regional Economic Model provided by REMI is calibrated to the geographic area additively defined as 13 counties, 12 counties in Minnesota (Carlton, Cass, Crow Wing, Hubbard, Itasca, Koochiching, Lake, Morrison, Pine, Saint Louis, Todd, and Wadena) and one county in Wisconsin (Douglas). This is referred to as the “13-County Planning Area.” Minnesota Power expanded its database to include economic and demographic indicators at the Metropolitan Statistical Area level (this includes St. Louis and Carlton counties in Minnesota and Douglas County Wisconsin).The regional economic outlooks are further specified by incorporating scenario-specific inputs into REMI, as described in Section II.C. Figures 12 and 13 compare the historical and projected growth rate of both regions’ product.



Figures 12 and 13: Regional Economic Outlooks (13-County Product and Duluth MSA Product)

The 13-County Planning Area's Gross Regional Product averages 2.4 percent per-year growth in the forecast timeframe whereas the Duluth MSA product averages just 1.7 percent per-year in the forecast timeframe. Population growth rates show a similar trend: the 13-County Planning Area grows at about 0.5 percent in the forecast timeframe and the Duluth MSA area population declines at 0 percent per-year. The difference in the two regions' historical and projected growth, shown below in Figures 14 and 15, demonstrates why Minnesota Power expanded its database to include both Duluth MSA and the 13-County regional data.



Figures 14 and 15: Regional Economic Outlooks (13-County Population and Duluth MSA Population)

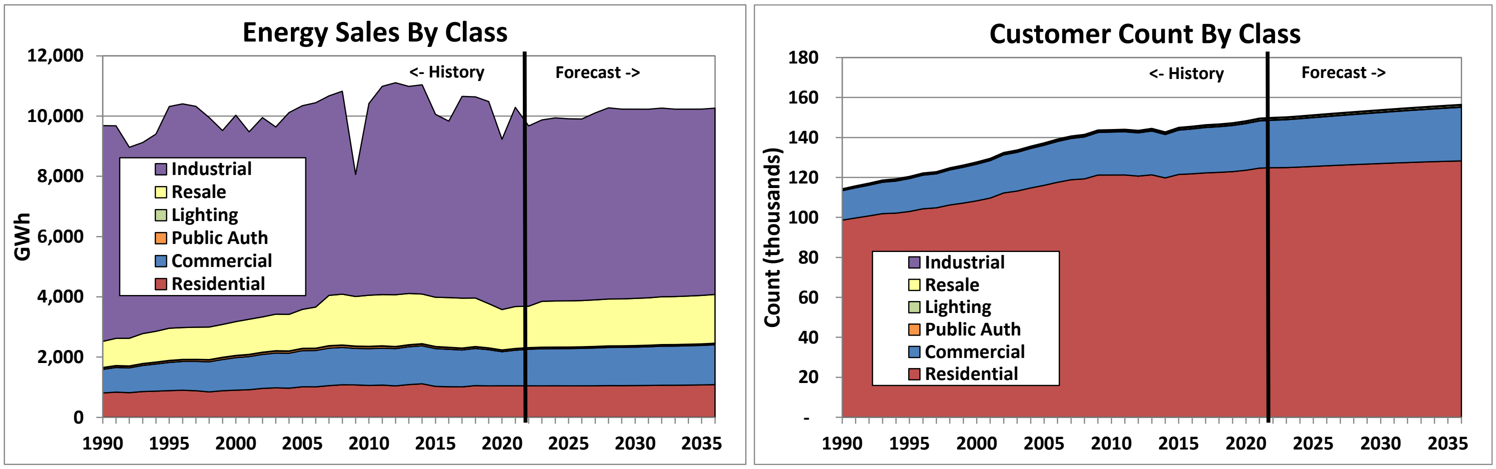
E. Econometric Model Documentation

This section presents the statistical detail of all models utilized in the development of the AFR 2022 forecast. The model's structure, key diagnostic statistics, forecast results, and a discussion of the model are provided for added transparency.

Models are shown with each variable's coefficient, t-statistic, P-value, and VIF. A graph displays the historical series, growth rates for timeframes of interest, and compares this year's forecast to last year's forecast. A table shows a more focused view of the forecast with a shorter historical timeframe to examine year-over-year growth rates. Key diagnostic statistics for the OLS model are shown in a table in the bottom left corner of each page. Specific diagnostic criteria and modeling techniques discussed in this section are described in detail in Section B. Minnesota Power's Forecast Process under the heading *Specific Analytical Techniques.*

Minnesota Power offers a discussion of the modeling approach, econometric interpretations of key variables, and potential model issues for each model. This portion of the model documentation also compares this year's model with last year's model and notes any interesting findings or insights gained.

The forecast values shown in the chart and tables for each model combine the econometric output with specific load, energy, and customers count additions. The total energy sales outlook is shown below (left) with the total customer count outlook (right).



Figures 16 and 17: Projection of Energy Sales and Customer Count by Class

Minnesota Power did not develop a model to forecast Resale customer count. Minnesota Power currently has 16 resale customers, each of which has signed a service agreement. The loss or gain of a resale customer is therefore better accounted for by reviewing these agreements and communicating with customers. Econometric models are not appropriate for estimating future resale customer counts.

Residential Customer Count - Expected Scenario

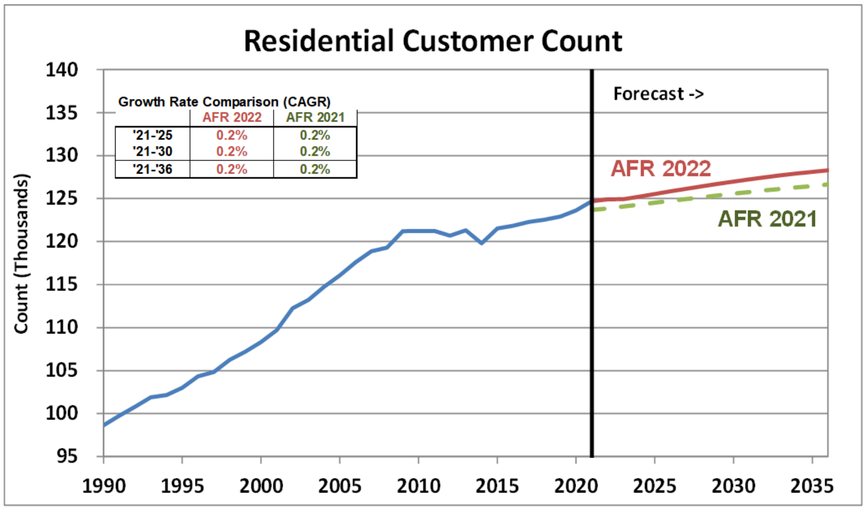
Estimation Start/End:	1/1990 - 12/2021
Unit Modeled/Forecast:	Monthly Customer Count

	Model Specifications		
Variable	Coefficient	P-Value	HAC-P-Value
CONST	98,156.37	0.00%	0.00%
Bill_Res_1	(2,136.71)	0.00%	0.00%
Bill_Res_2	(2,797.47)	0.00%	0.00%
Bi_2009_2036	8,196.67	0.00%	0.00%
Trend_2009_2036	(33.25)	0.00%	0.00%
Res_C_2021_2036	1,751.23	0.00%	0.00%
MSA_HousStart_Cumulative	1.07	0.00%	0.00%

Residential Customer Count

	Count	Y/Y Growth
2011	121,251	
2012	120,697	-0.5%
2013	121,314	0.5%
2014	121,601	0.2%
2015	121,515	-0.1%
2016	121,836	0.3%
2017	122,295	0.4%
2018	122,557	0.2%
2019	122,926	0.3%
2020	123,617	0.6%
2021	124,691	0.9%
2022	124,899	**0.2%**
2023	124,940	**0.0%**
2024	125,212	**0.2%**
2025	125,528	**0.3%**
2026	125,851	**0.3%**
2027	126,152	**0.2%**
2028	126,431	**0.2%**
2029	126,706	**0.2%**
2030	126,979	**0.2%**
2031	127,235	**0.2%**
2032	127,478	**0.2%**
2033	127,707	**0.2%**
2034	127,919	**0.2%**
2035	128,111	**0.2%**
2036	128,288	**0.1%**

Model Statistics	Magnitude
Adjusted R^2	99.8%
AIC	5718
Durban-Watson	0.7
MAPE	0.27
In-Sample RMSE	410



Model Discussion

Both AFR 2022 and AFR 2021 forecasts for residential customer count had annual growth rates of 0.2%, but AFR 2022 starts from a slightly higher level.

The key economic variable driving the residential customer count projection was Duluth MSA Cumulative Housing Starts, which is a rolling accumulation of annual housing starts beginning in 1990 . This transformation converts a rate variable into a level variable, which better describes the underlying long-term trend of customer growth.

A combination of binary and trend variables ("Bi_2009_2036"" and "Trend_2009_2036") denote post-recession shifts in the relationship of MSA housing starts and residential customer count; housing starts continued, but customer counts stalled. This may be due in part to a shift towards suburban construction, where home construction continued but just outside Minnesota Power service territory. Without these corrective binary and a trend variables, the model would overestimate customer counts in recent historical years and, presumably, in the forecast timeframe.

The "Res_C_2021_2036" binary variable begins in mid-2021 and denotes a realignment of the MSA housing starts metric and customer counts; the mid-pandemic increase in demand for housing appears to be driving residential development in Minnesota Power's service territory, leading to customer growth. Two binary variables (Bill_Res) account for divergence from long-term trends due to "seasonal billing" between 1994 and 2001. This accounting practice recorded customer counts from November to May as 2,000-6,000 lower than from June to October.

This year's model is highly comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a high goodness-of-fit, and the AIC indicates a highly parsimonious model that's not over fit. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant. In-sample error metrics such as the MAPE indicate model accuracy is comparable to bot the AFR 2021 (0.2%) and 2020 (0.3%) models.

Commercial Customer Count - Expected Scenario

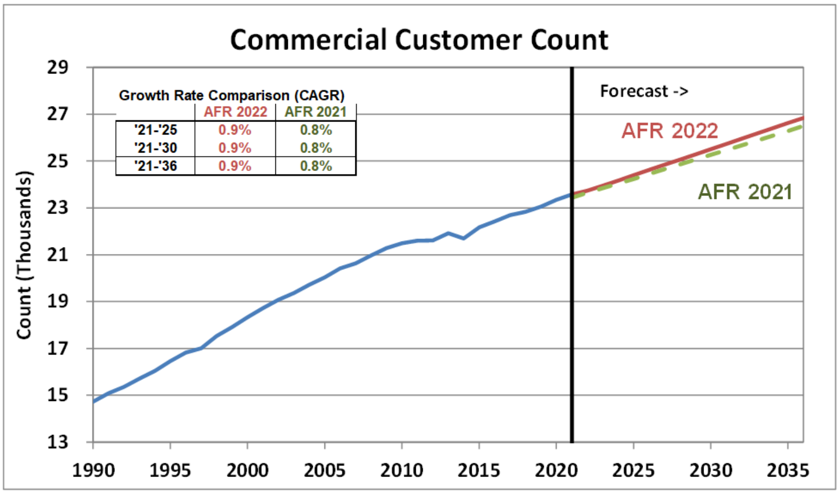
Estimation Start/End:	1/1990 - 12/2021
Unit Modeled/Forecast:	Monthly Customer Count

	Model Specifications		
Variable	Coefficient	P-Value	HAC-P-Value
CONST	13,682.10	0.00%	0.00%
T	27.65	0.00%	0.00%
Bi_2010_2036	2,382.84	0.00%	0.00%
Trend_2010_2036	(11.23)	0.00%	0.00%
MSA_Real_GMP	0.10	0.00%	0.00%

Commercial Customer Count

	Count	Y/Y Growth
2011	21,603	
2012	21,614	0.1%
2013	21,915	1.4%
2014	22,096	0.8%
2015	22,170	0.3%
2016	22,420	1.1%
2017	22,695	1.2%
2018	22,834	0.6%
2019	23,059	1.0%
2020	23,346	1.2%
2021	23,580	1.0%
2022	23,732	**0.6%**
2023	23,947	**0.9%**
2024	24,168	**0.9%**
2025	24,401	**1.0%**
2026	24,621	**0.9%**
2027	24,841	**0.9%**
2028	25,062	**0.9%**
2029	25,281	**0.9%**
2030	25,505	**0.9%**
2031	25,729	**0.9%**
2032	25,955	**0.9%**
2033	26,177	**0.9%**
2034	26,399	**0.8%**
2035	26,622	**0.8%**
2036	26,844	**0.8%**

Model Statistics	Magnitude
Adjusted R^2	99.8%
AIC	4700
Durban-Watson	1.1
MAPE	0.40
In-Sample RMSE	109



Model Discussion

The AFR 2022 forecast of commercial customer count is similar to the AFR 2021 outlook despite the COVID-19 recession, which did not appear to significantly impact commercial customer counts. The forecast's long-term annual growth rate increased slightly from AFR 2021 (0.8%) to 0.9%.

The key economic driver of customer growth was Duluth MSA Real Gross Metro Product (GMP). Local GMP has historically tracked well with commercial customer counts, but COVID-19 caused the two series (GMP and commercial counts) to diverge. GMP contracted sharply, following national GDP, while commercial customer counts remained steady, likely due to government supports like the Paycheck Protection Program (PPP) and Minnesota Power suspending disconnections for small business (general service) customers facing financial hardship in relation to the coronavirus pandemic. A Trend variable accounts for some of this underlying customer count growth that appears unrelated to immediate economic conditions.

A combination of binary and trend variables ("Bi_2010_2036" and "Trend_2010_2036") denote a post-Great Recession, abrupt shift in customer count growth – customer counts grew at an average rate of 2.0% prior to 2010, and only 0.8% since. Without these corrective binary and trend variables, the model would overestimate customer counts in recent historical years and, presumably, in the forecast timeframe.

This year's model is highly comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a high goodness-of-fit, and the AIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant. In-sample error metrics are very similar: MAPE is the same as the 2021 model (0.4%), and RMSE is 109 vs. 107 in the 2021 model.

Industrial Customer Count - Expected Scenario

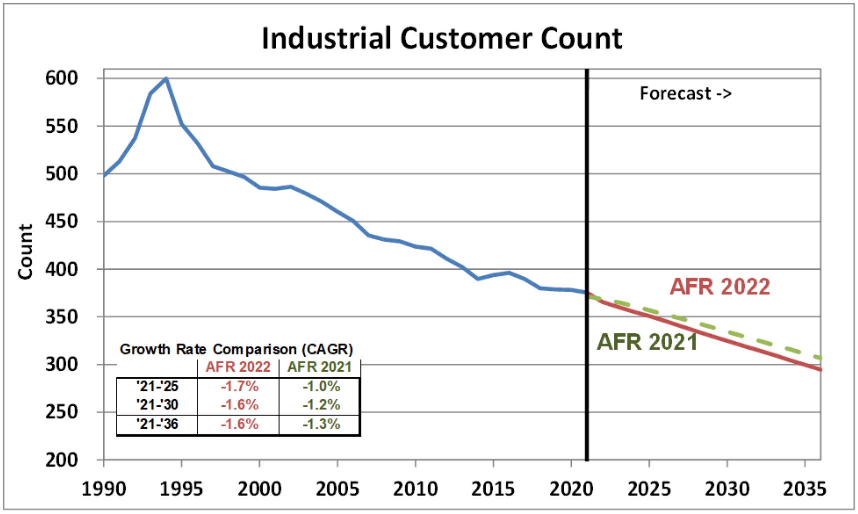
Estimation Start/End:	1/1990 - 12/2021
Unit Modeled/Forecast:	Monthly Customer Count

	Model Specifications		
Variable	Coefficient	P-Value	HAC-P-Value
CONST	428.70	0.00%	0.00%
Time_Trend	(0.36)	0.00%	0.00%
Ind_1991_1997	41.93	0.00%	0.00%
MFG_13	0.005	0.00%	0.00%

Industrial Customer Count

	Count	Y/Y Growth
2011	421	
2012	411	-2.4%
2013	402	-2.2%
2014	394	-2.0%
2015	394	-0.1%
2016	396	0.6%
2017	390	-1.6%
2018	380	-2.5%
2019	379	-0.3%
2020	378	-0.2%
2021	375	-0.7%
2022	366	**-2.6%**
2023	360	**-1.5%**
2024	355	**-1.4%**
2025	351	**-1.3%**
2026	346	**-1.4%**
2027	340	**-1.6%**
2028	335	**-1.5%**
2029	330	**-1.5%**
2030	325	**-1.5%**
2031	320	**-1.5%**
2032	315	**-1.6%**
2033	310	**-1.6%**
2034	305	**-1.6%**
2035	300	**-1.7%**
2036	295	**-1.7%**

Model Statistics	Magnitude
Adjusted R^2	92.8%
AIC	3268
Durban-Watson	0.1
MAPE	2.25
In-Sample RMSE	17



Growth Rate Comparison (CAGR)

	AFR 2022	AFR 2021
'21-'25	-1.7%	-1.0%
'21-'30	-1.6%	-1.2%
'21-'36	-1.6%	-1.3%

Model Discussion

The AFR 2022 forecast annual growth rate for industrial customer count decreased from -1.3% to -1.6%, but the customer count projection is similar; AFR 2022 is just 11 customers lower than the AFR 2021 outlook by 2035.

The key economic driver of industrial customer count was Manufacturing sector employment (13-County). This sector was a good representation of Minnesota Power's industrial customers as it encompasses the range of business sectors in this class, including: wood products, pulp/paper/paperboard mills, food products, foundries, and petroleum refining.

"Ind_1991_1997" is a binary variable that denotes the January-1991 through December-1997 timeframe where Industrial customer counts increased and then decreased very rapidly: a 23.7% increase from January-1991 to June-1994, followed by a 36.2% decrease from June-1994 to December-1997. These dramatic swings in customer counts were most likely due to accounting classifications of customers at the time and this binary variable effectively "backs-out" these points from consideration to avoid biasing the model.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's moderate goodness-of-fit, and the AIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant. The MAPE has improved: 2.25% vs. 2.3% in the AFR 2021 model, and RMSE is unchanged at 17 from last year's model.

Public Authorities Customer Count - Expected Scenario

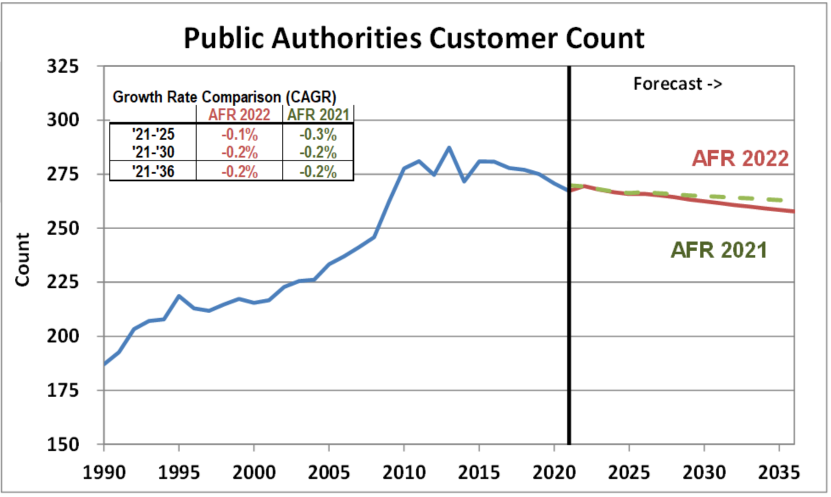
Estimation Start/End:	1/1990 - 12/2021
Unit Modeled/Forecast:	Monthly Customer Count

	Model Specifications		
Variable	Coefficient	P-Value	HAC-P-Value
CONST	128.35	0.00%	0.00%
Bi_7_2009	38.16	0.00%	0.00%
Bi_2015_2036	100.86	0.00%	0.00%
Trend_2015_2036	(0.32)	0.00%	0.00%
GRP_13	4.68	0.00%	0.00%

Public Auth. Customer Count

	Count	Y/Y Growth
2011	281	
2012	275	-2.3%
2013	287	4.6%
2014	282	-1.9%
2015	281	-0.4%
2016	281	-0.1%
2017	278	-1.0%
2018	277	-0.3%
2019	275	-0.7%
2020	271	-1.5%
2021	267	-1.4%
2022	269	**0.8%**
2023	268	**-0.6%**
2024	267	**-0.5%**
2025	266	**-0.3%**
2026	266	**0.0%**
2027	265	**-0.3%**
2028	264	**-0.3%**
2029	263	**-0.4%**
2030	262	**-0.3%**
2031	262	**-0.3%**
2032	261	**-0.3%**
2033	260	**-0.3%**
2034	259	**-0.3%**
2035	258	**-0.3%**
2036	258	**-0.3%**

Model Statistics	Magnitude
Adjusted R^2	97.2%
AIC	2386
Durban-Watson	0.4
MAPE	1.71
In-Sample RMSE	5.4



Growth Rate Comparison (CAGR)

	AFR 2022	AFR 2021
'21-'25	-0.1%	-0.3%
'21-'30	-0.2%	-0.2%
'21-'36	-0.2%	-0.2%

Model Discussion

The AFR 2022 forecast annual growth rate for public authorities customer count is identical to the AFR 2021 model at -0.2%.

The key economic driver of customer growth was 13-County Gross Regional Product (GRP). GRP is a measure of general economic health that correlates with local government revenues, and presumably local government accounts with Minnesota Power. A binary variable starting in July-2009 accounts for a step-change or "systematic shift" in the historical accounting data. The corrective binary variables shift the forecast up slightly to avoid improbable decreases in customer counts, but do not impact the forecast trajectory; this is determined by the economic variables.

The combination of a binary and a trend variable for the 2015-2036 timeframe mark a shift in the level and trend of the estimate to align with recent customer growth. These variables effectively shift the first forecast year (2022) to align with the last historical year (2021). Without these corrective variables, a small but growing divergence between actual and predicted customer growth suggests the economic indicators alone would overstate customer count, and the 2022 forecast value confirms this. Without these binary and trend variables, the model would project an abrupt and unreasonably large increase in customers in 2022.

This year's model is highly comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a high goodness-of-fit, and the AIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant. In-sample error metrics are comparable to the AFR 2021 model: MAPE is unchanged 1.7%, and RMSE is unchanged at 5.4.

Street Lighting Customer Count - Expected Scenario

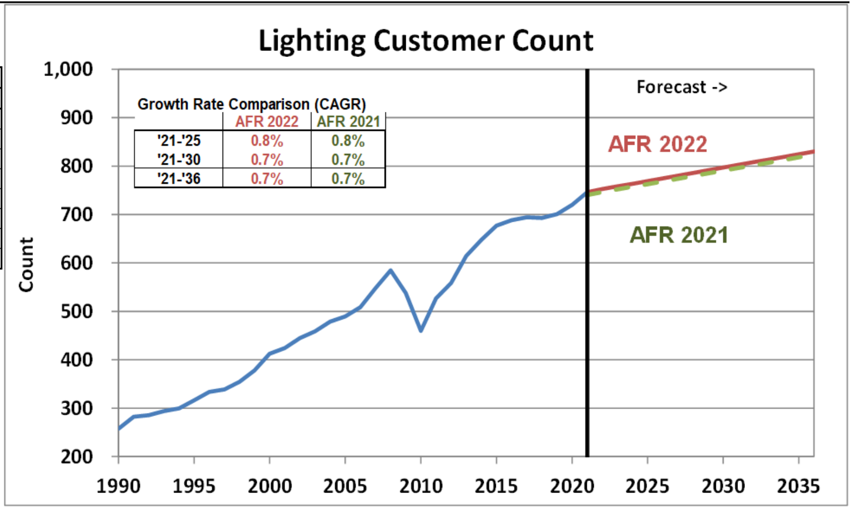
Estimation Start/End:	1/1990 - 12/2021
Unit Modeled/Forecast:	Monthly Customer Count

	Model Specifications		
Variable	Coefficient	P-Value	HAC-P-Value
CONST	227.20	0.00%	0.00%
Time_Trend	1.47	0.00%	0.00%
Bi_2009_2014	(723.40)	0.00%	0.00%
Trend_2009_2014	2.46	0.00%	0.00%
Bi_2015_2036	310.64	0.00%	0.00%
Trend_2015_2036	(1.01)	0.00%	0.00%
Bi_2020_2036	5.57	51.54%	2.81%
Trend_2020_2036	2.20	0.50%	0.00%

Lighting Customer Count

	Count	Y/Y Growth
2011	5,335	
2012	6,414	20.2%
2013	655	-89.8%
2014	660	0.8%
2015	673	2.0%
2016	689	2.4%
2017	695	0.9%
2018	693	-0.3%
2019	701	1.1%
2020	720	2.7%
2021	746	3.7%
2022	753	**0.8%**
2023	758	**0.7%**
2024	764	**0.7%**
2025	769	**0.7%**
2026	775	**0.7%**
2027	780	**0.7%**
2028	786	**0.7%**
2029	791	**0.7%**
2030	797	**0.7%**
2031	803	**0.7%**
2032	808	**0.7%**
2033	814	**0.7%**
2034	819	**0.7%**
2035	825	**0.7%**
2036	830	**0.7%**

Model Statistics	Magnitude
Adjusted R^2	99.1%
AIC	3157
Durban-Watson	0.1
MAPE	2.66
In-Sample RMSE	15



Model Discussion

The AFR 2022 forecast annual growth rate for street lighting customer count is nearly identical to AFR 2021.

A combination of a binary and trend variable starting in July-2009 account for a step-change or "systematic shift" in the historical accounting data and extends through December-2014.

A combination of a binary variable and trend variable denoting the 2015-2036 timeframe pick up where the 2009-2014 variable left off, shifting the level and trend of the estimate to align with the updated accounting data going forward.

The combination of a binary and a trend variable for the 2020-2036 timeframe (beginning early-2020) mark a shift in the level and trend of the estimate to align with recent customer growth (this was in addition to the 2015-2036 change in forecast trajectory captured by the variables above). These variables effectively shift the first forecast year (2022) to align with the last historical year (2021). Without these corrective variables, 2022 monthly forecasted values would be understated.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a quality goodness-of-fit, and the AIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant. In-sample error metrics such as MAPE and RMSE are nearly identical.

Other Industrial Remaining Customer Count - Expected Scenario

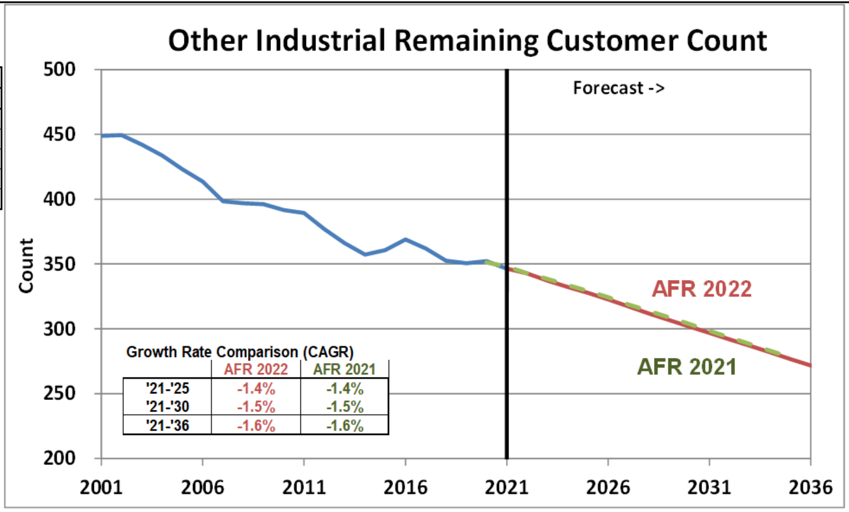
Estimation Start/End:	1/2001 - 12/2021
Unit Modeled/Forecast:	Monthly Customer Count

	Model Specifications		
Variable	Coefficient	P-Value	HAC-P-Value
CONST	452.10	0.00%	0.00%
Time_Trend	(0.42)	0.00%	0.00%
Remaining_2019_2036	10.33	0.00%	0.01%
GRP_13_diff	24.89	0.00%	0.29%
MFG_13	0.002	0.00%	0.00%

Oth Ind Remaining Cust Count

	Count	Y/Y Growth
2011	389	
2012	377	-3.2%
2013	366	-2.9%
2014	357	-2.4%
2015	361	1.0%
2016	369	2.3%
2017	362	-1.9%
2018	353	-2.6%
2019	351	-0.5%
2020	352	0.4%
2021	346	-1.6%
2022	343	**-1.1%**
2023	337	**-1.6%**
2024	332	**-1.5%**
2025	328	**-1.4%**
2026	323	**-1.5%**
2027	317	**-1.7%**
2028	312	**-1.7%**
2029	307	**-1.7%**
2030	302	**-1.6%**
2031	297	**-1.6%**
2032	292	**-1.7%**
2033	287	**-1.7%**
2034	282	**-1.8%**
2035	277	**-1.8%**
2036	272	**-1.8%**

Model Statistics	Magnitude
Adjusted R^2	96.0%
AIC	1683
Durban-Watson	0.3
MAPE	1.35
In-Sample RMSE	6.8



Growth Rate Comparison (CAGR)

	AFR 2022	AFR 2021
'21-'25	-1.4%	-1.4%
'21-'30	-1.5%	-1.5%
'21-'36	-1.6%	-1.6%

Model Discussion

AFR 2022 continued the approach implemented in AFR 2021, which featured a more granular approach to forecasting the Other Industrial sector of the industrial class, and independently modeled the Pipelines, Foundries, Food Product Manufacturing, and Remaining industrial sectors individually. The "Other Industrial: Remaining" customer count includes all industrial customers not assigned to Mining, Paper, Pipelines, Foundries, or Food Product Manufacturing, and accounts for about 90% of the total industrial customer count. The Pipelines, Foundries, and Food Products sectors' customer counts have been fairly stable over time, but the "Other Industrial: Remaining" sector tends to be more acutely affected by national business cycles or regional economic conditions, and requires modeling.

Key economic drivers of customer count were 13-County Gross Regional Product (GRP) and Manufacturing sector employment (13-County). GRP is a measure of overall economic health and correlates well with the number of industrial entities doing business in Minnesota Power's service territory. Manufacturing sector employment encompasses the majority of their businesses, including: nonferrous metal production/processing, chemical manufacturing, etc.

A binary variable ("Remaining_2019_2036") begins in late-2019 and denotes a shift in the relationship between the economic variables and remaining industrial customer count not fully explained by economic variables alone. This may be due to customers in this class being better suited to handle the COVID-19 recession based on their business model. Without this corrective binary variable, the model would underestimate customer counts in recent historical years (by 2-4%) and, presumably, in the forecast timeframe.

The Adjusted R-Squared indicates there's high goodness-of-fit, and the AIC indicates a highly parsimonious model. In-sample MAPE and RMSE are nearly identical to the AFR 2021 model 1.35% and 6.8 respectively. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant.

Residential Energy Use - Expected Scenario

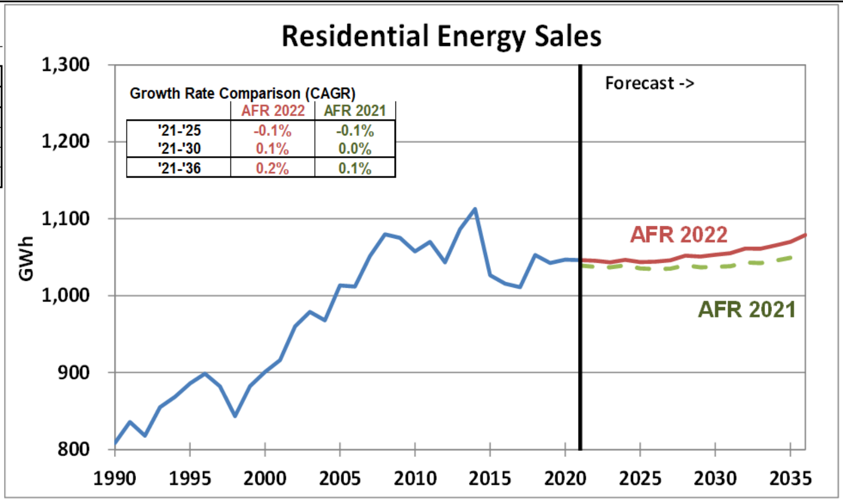
Estimation Start/End: 1/1990 - 12/2021
Unit Modeled/Forecast: Monthly Per-Customer, Per-Day Use (kWh)

	Model Specifications		
Variable	Coefficient	P-Value	HAC-P-Value
CONST	15.66	0.00%	0.00%
EE_Res	(0.0000015)	0.55%	0.49%
Dul_HDDpd	0.26	0.00%	0.00%
Dul_CDDpd	1.44	0.00%	0.00%

Residential Energy Sales

	MWh	Y/Y Growth
2011	1,069,856	
2012	1,043,281	-2.5%
2013	1,086,481	4.1%
2014	1,112,579	2.4%
2015	1,026,454	-7.7%
2016	1,015,465	-1.1%
2017	1,010,955	-0.4%
2018	1,052,800	4.1%
2019	1,042,353	-1.0%
2020	1,046,910	0.4%
2021	1,046,341	-0.1%
2022	1,044,992	**-0.1%**
2023	1,043,077	**-0.2%**
2024	1,046,600	**0.3%**
2025	1,043,853	**-0.3%**
2026	1,044,659	**0.1%**
2027	1,046,626	**0.2%**
2028	1,053,163	**0.6%**
2029	1,052,296	**-0.1%**
2030	1,055,093	**0.2%**
2031	1,057,715	**0.2%**
2032	1,064,445	**0.6%**
2033	1,065,005	**0.0%**
2034	1,069,938	**0.4%**
2035	1,075,484	**0.4%**
2036	1,085,565	**0.8%**

Model Statistics	Magnitude
Adjusted R^2	80.8%
AIC	1631
Durban-Watson	1.9
MAPE	6.28
In-Sample RMSE	2.0



Model Discussion

The graph above shows the final residential energy sales outlook, which combines the econometric forecast (i.e. the product of the use-per-customer per day model and the customer count model) and the projected impacts of electric vehicle and distributed solar adoption.

The AFR 2022 residential per-customer use model did not use an employment or demographic indicator variable as these variables rarely correlate well with per-customer usage and often are not intuitive or explainable. Instead, the Company uses weather and seasonal binary variables to indicate month-to-month variation in sales, a time-trend to indicate long-term underlying growth, and an Energy Efficiency variable to explain recent changes (since 2007) in the underlying trend of per-customer usage growth.

The "EE_Res" variable represents the cumulative effects of all past conservation measures on each year's sales, and the annual energy savings value is leveraged for all 12 monthly observations of a given year. The variable's construction and the Company's hypothesis regarding its effectiveness in modeling usage is documented in Section II.B.3.

The AFR 2022 model uses simple monthly HDD and CDD (per-day) specifications. The monthly total HDD and CDD values are normalized for the number of days in a month by dividing the monthly HDD or CDD count by the number of days in the month – this results in the "per-day" series HDDpd and CDDpd. For a more detailed description of this process see Section II.C.1.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a quality goodness-of-fit, and the AIC indicates a highly parsimonious model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant. In-sample error metrics are similar but have degraded a bit, likely due to the effects of Covid19: MAPE is 6.2% vs 5.6% in the 2021 model, and RMSE is 2 vs. 1.8 in the 2021 model.

Commercial Energy Use - Expected Scenario

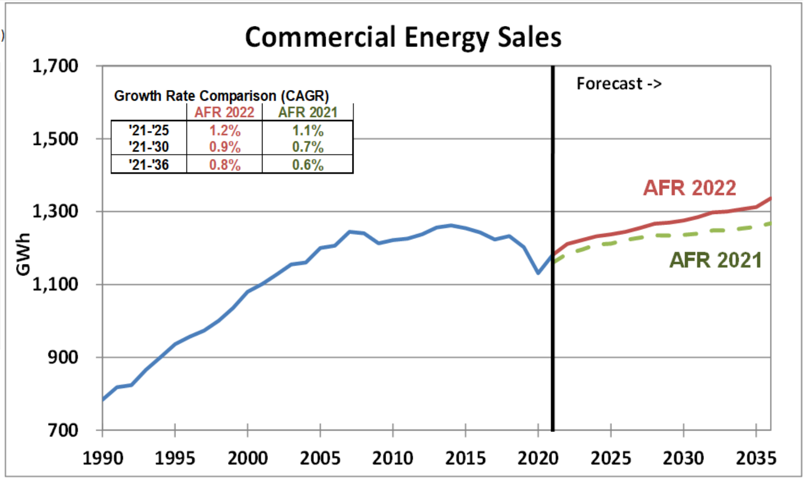
Estimation Start/End:	1/1990 - 12/2021
Unit Modeled/Forecast:	Monthly Per-Customer, Per-Day Use (kWh)

	Model Specifications		
Variable	Coefficient	P-Value	HAC-P-Value
CONST	47.35	0.00%	0.00%
Jan	(7.56)	0.01%	0.05%
Apr	(12.37)	0.00%	0.00%
May	(9.16)	0.00%	0.00%
Aug	11.07	0.00%	0.00%
Sep	7.56	0.02%	0.01%
Oct	(10.58)	0.00%	0.00%
Nov	(11.85)	0.00%	0.00%
Bi_2007_2036	3.08	3.50%	0.07%
EE_Com	(0.00)	0.00%	0.00%
Dul_HDDpd	0.4780	0.00%	0.00%
Dul_CDDpd	4.00	0.00%	0.00%
EmpltoPop_13	240.54	0.00%	0.00%

Commercial Energy Sales

	MWh	Y/Y Growth
2011	1,226,174	
2012	1,237,386	0.9%
2013	1,256,540	1.5%
2014	1,262,464	0.5%
2015	1,254,681	-0.6%
2016	1,243,045	-0.9%
2017	1,223,786	-1.5%
2018	1,233,117	0.8%
2019	1,202,403	-2.5%
2020	1,131,101	-5.9%
2021	1,181,246	4.4%
2022	1,214,991	**2.6%**
2023	1,232,760	**0.8%**
2024	1,233,344	**0.9%**
2025	1,237,668	**0.4%**
2026	1,244,434	**0.6%**
2027	1,255,222	**0.9%**
2028	1,266,480	**0.9%**
2029	1,269,252	**0.2%**
2030	1,275,024	**0.5%**
2031	1,284,253	**0.7%**
2032	1,297,015	**1.0%**
2033	1,299,603	**0.2%**
2034	1,305,493	**0.5%**
2035	1,311,661	**0.5%**
2036	1,323,294	**1.8%**

Model Statistics	Magnitude
Adjusted R^2	65.6%
AIC	2789
Durban-Watson	2.7
MAPE	4.57
In-Sample RMSE	9



Model Discussion

The AFR 2022 forecast of commercial energy use is higher than AFR 2021 due to a faster than anticipated rebound from the COVID-19-induced recession. Customer growth and use-per-customer are higher than estimated in AFR 2021, and - as a result - the commercial energy use forecast grows at a 0.8% per year (average) pace, compared to the AFR 2021 forecast (0.6%).

The graph above shows the final commercial energy sales outlook, which combines the econometric forecasts of use-per-customer per day and customer count, along with arithmetic adjustments for: 1) the planned installation of new generation at a specific customer's facility, and 2) the projected impacts of distributed solar adoption.

The key driver of this year's commercial energy use model was the 13-County Employment-to-Population ratio. COVID-19 resulted in a substantial loss of energy sales without any corresponding decrease in customer counts, which is unprecedented and difficult to model with the typical economic indicators. The Employment-to-Population ratio indicates the rate of employment utilization, and both correlates and explains commercial property/account energy utilization during the initial economic contraction and recovery from COVID-19.

"Bi_2007_2036" is a binary variable starting in 2007 that accounts for a step-change, or "systematic shift," in energy use for this class around the time of the 2007 Energy Act. Sales to this class have remained essentially flat since this time (aside from the COVID-19 recession of 2020).

The AFR 2022 model uses an Energy Efficiency variable as a predictor of commercial per-customer sales: the "EE_Com" variable represents the cumulative effects of all past conservation measures on each year's sales, and the annual energy savings value is leveraged for all 12 monthly observations of a given year. The variable's construction and the Company's hypothesis regarding its effectiveness in modeling usage is documented in Section II.B.3.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared of 65% indicates there's just a moderate traditional "goodness-of-fit", but this was the case in last year's model as well (Adjusted R-Squared was only 63%) and the Company does not consider the R-Squared an indicator of predictive quality. Minnesota Power leverages other objective metrics for determining model selection such as Mean Absolute Percent Error and Root Mean Square Error.

The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant. In-sample error metrics are similar: MAPE is 4.7% vs. 4.5% in the 2021 model, and RMSE is 9 vs. 9 in the 2021 model.

Mining and Metals Energy Use - Expected Scenario

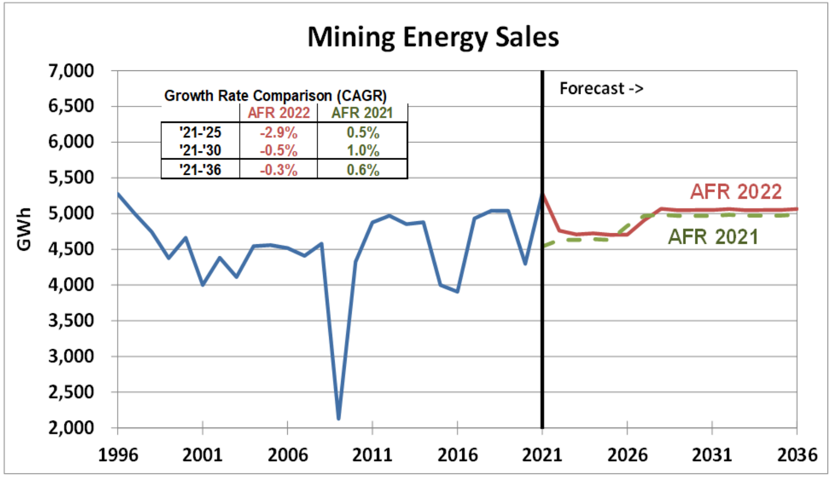
Estimation Start/End:	1/1996 - 12/2021
Unit Modeled/Forecast:	Monthly Per-Day Use (MWh)

	Model Specifications		
Variable	Coefficient	P-Value	HAC-P-Value
CONST	4,434.72	0.00%	0.00%
Trend_Mine1	(30.07)	0.00%	0.00%
Bi_Mine2	(305.13)	6.00%	4.62%
Bi_Mine3	(2,220.10)	0.00%	0.00%
Bi_Mine4	(1,365.53)	0.00%	0.00%
Bi_Mine5	(848.37)	0.07%	0.47%
Bi_Mine6	176.42	4.35%	6.71%
MN_Iron_IPI	79.56	0.00%	0.00%

Mining and Metals Energy Sales

	MWh	Y/Y Growth
2011	4,874,331	
2012	4,968,517	1.9%
2013	4,851,094	-2.4%
2014	4,879,520	0.6%
2015	4,000,557	-18.0%
2016	3,906,570	-2.3%
2017	4,930,188	26.2%
2018	5,039,138	2.2%
2019	5,038,704	0.0%
2020	4,295,593	-14.7%
2021	5,280,743	22.9%
2022	4,761,677	**-9.8%**
2023	4,707,391	**-1.1%**
2024	4,723,267	**0.3%**
2025	4,701,747	**-0.5%**
2026	4,705,387	**0.1%**
2027	4,905,945	**4.3%**
2028	5,065,665	**3.3%**
2029	5,047,148	**-0.4%**
2030	5,049,375	**0.0%**
2031	5,049,171	**0.0%**
2032	5,065,260	**0.3%**
2033	5,046,332	**-0.4%**
2034	5,048,561	**0.0%**
2035	5,048,361	**0.0%**
2036	5,064,455	**0.3%**

Model Statistics	Magnitude
Adjusted R^2	88.7%
AIC	4908
Durban-Watson	1.3
MAPE	4.84
In-Sample RMSE	622



Model Discussion

The AFR 2022 outlook for mining and metals energy use is similar to the AFR 2021 projection, except for a higher level of sales long-term due to increased customer operations (post-regression adjustments). The graph and table show the total sales forecast for this class, which combines the output of the econometric forecast with load additions.

The key economic driver of this year's mining energy use model was the Minnesota (MN) Iron IPI, which measures the real production output nationwide in the industry and is scaled to MN-only production – the process of scaling the national Iron IPI to a MN-only IPI is described in Section II.C.1.

This year's model incorporates several binary variables to control for known or suspected definitional changes in the historical mining energy sales series. These variables have been added with the goal of avoiding bias in the IPI's coefficient for these past definitional changes in the mining and metals sales series.

"Trend_Mine1" is a trend variable that denotes the timeframe from 1996-2001, when a large mining customer ended operations. The variable accounts for a possible change in relationship between Minnesota Power mining customer energy and the MN IPI, and allows for a more exact estimation of the relationship during the current paradigm.

The "Bi_Mine2" binary variable denotes and normalizes for some of the observable seasonality in mining operations.

The "Bi_Mine3" binary variable denotes the recession period from early 2009 to early 2010, when significant mining load was idled. This variable accounts for a possible change in the relationship between mining customer usage and the MN IPI.

The "Bi_Mine4" binary variable denotes a timeframe from May-2015 to February-2017, when significant mining load was idled. This variable accounts for a possible change in the relationship between mining customer usage and the MN IPI.

The "Bi_Mine5" binary variable denotes months between April-2020 and November-2020, when significant mining load was idled. This variable accounts for a possible change in the relationship between mining customer usage and the MN IPI.

The "Bi_Mine6" binary variable denotes operations of four smaller metals customers in the January-2010 to September-2016 timeframe. These customers' are backed out of the historical series prior to regression modeling, but their historical production contributed to national iron IPI. This binary variable ("Bi_Mine6") explains the temporary distortion in the energy-sales-to-National-IPI relationship.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's a quality goodness-of-fit, and the AIC indicates a highly parsimonious model. The P-values suggests all variables' coefficients' are significant. In-sample error metrics are very similar: the MAPE is the same as the 2021 model at 4.8%, and RMSE is nearly identical at 622 vs. 621 in the 2021 model.

Paper and Wood Products Energy Use - Expected Scenario

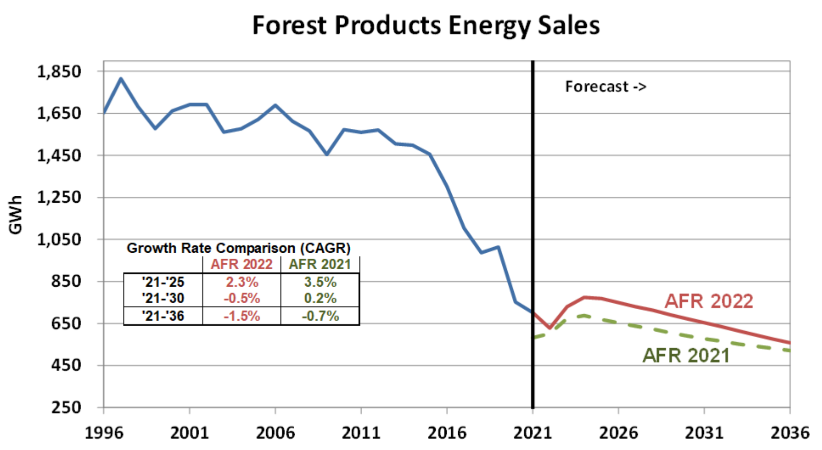
Estimation Start/End:	1/1996 - 12/2021
Unit Modeled/Forecast:	Monthly Per-Day Use (MWh)

	Model Specifications		
Variable	Coefficient	P-Value	HAC-P-Value
CONST	3,076.31	<.0001	<.0001
Bi_Paper1	(317.40)	0.40%	<.0001
Bi_Paper2	(559.95)	<.0001	<.0001
Bi_Paper3	(599.50)	<.0001	0.01%
Paper_IPI	9.86	<.0001	0.40%

Forest Products Energy Sales

	MWh	Y/Y Growth
2011	1,559,519	
2012	1,570,852	0.7%
2013	1,505,113	-4.2%
2014	1,498,810	-0.4%
2015	1,456,091	-2.9%
2016	1,302,920	-10.5%
2017	1,104,160	-15.3%
2018	987,208	-10.6%
2019	1,013,971	2.7%
2020	752,072	-25.8%
2021	701,549	-6.7%
2022	627,426	**-10.6%**
2023	729,476	**16.3%**
2024	774,180	**-2.4%**
2025	768,834	**-3.0%**
2026	749,692	**-2.8%**
2027	730,268	**-2.9%**
2028	713,054	**-2.6%**
2029	692,040	**-3.3%**
2030	672,723	**-3.1%**
2031	653,404	**-3.2%**
2032	635,556	**-3.1%**
2033	614,767	**-3.7%**
2034	595,449	**-3.6%**
2035	576,129	**-3.7%**
2036	558,069	**-3.6%**

Model Statistics	Magnitude
Adjusted R^2	72.7%
AIC	4622
Durban-Watson	0.3
MAPE	9.11
In-Sample RMSE	392



Growth Rate Comparison (CAGR)

	AFR 2022	AFR 2021
'21-'25	2.3%	3.5%
'21-'30	-0.5%	0.2%
'21-'36	-1.5%	-0.7%

Model Discussion

The AFR 2022 outlook for paper and wood products energy requirements is a bit higher than the AFR 2021 projection by 2036 – about 36,000 MWh (or 7.0%) higher due to a specific new customer's load. The graph and table show the total sales forecast for this class, which combines the output of the econometric forecast with load additions.

The AFR 2022 model was driven by the Industrial Production Index (IPI) for Paper, which measures the real production output nationwide in the industry, and indicates an underlying secular decline of the North American Paper industry (and demand for paper products).

The three binary variables ("Bi_Paper1," "Bi_Paper2," and "Bi_Paper3") denote specific decreases in sales to paper customers due to transition of customer generation assets or closure of paper production capacity. Binary variables are used as this is not a situation in which pre-regression adjustments to the historical series would be appropriate. These variables terminate at the beginning of the forecast timeframe, producing an econometric forecast that's at a pre-change-in-operations level. Post-regression load adjustments are then applied to reduce the outlook in the amount of the operational changes likely demands.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's reasonable goodness-of-fit, and In-sample error metrics are a bit different: MAPE increased to 9.1% vs. 6.7% in the 2021 model, and RMSE increased to 392 vs. 296 in the 2021 model.

The AIC indicates a highly parsimonious model. HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' (except the intercept) are significant.

Other Industrial Energy Use - Expected Scenario

Estimation Start/End:

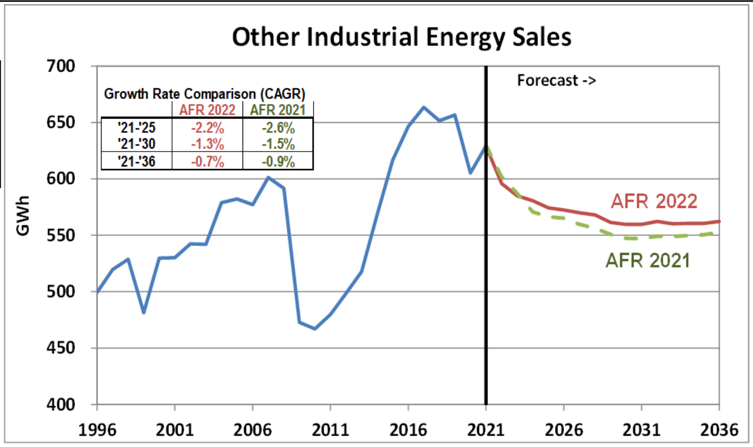
Unit Modeled/Forecast: Monthly Per-Day Use (MWh)

	Model Specifications			
Variable	Coefficient	P-Value	HAC-P-Value	VIF

Other Industrial Energy Sales

	MWh	Y/Y Growth
2011	479,799	
2012	498,474	3.9%
2013	517,786	3.9%
2014	568,206	9.7%
2015	616,625	8.5%
2016	646,339	4.8%
2017	663,444	2.6%
2018	651,546	-1.8%
2019	656,590	0.8%
2020	605,277	-7.8%
2021	629,017	3.9%
2022	595,900	**-5.3%**
2023	585,020	**-1.8%**
2024	580,563	**-0.8%**
2025	574,380	**-1.1%**
2026	572,459	**-0.3%**
2027	570,002	**-0.4%**
2028	567,987	**-0.4%**
2029	561,360	**-1.2%**
2030	559,615	**-0.3%**
2031	559,572	**0.0%**
2032	562,218	**0.5%**
2033	560,156	**-0.4%**
2034	560,478	**0.1%**
2035	560,501	**0.0%**
2036	562,309	**0.3%**

Model Statistics	Magnitude



Model Discussion

Minnesota Power has broken out Other Industrial into four sectors: 1) Pipelines, 2) Foundries, 3) Food Products, and 4) Remaining.

Due to several Other Industrial sub-sectors containing just two or three customers, these sector-level forecasts could imply trade secret information. Minnesota Power will only show the aggregate of all sectors ("Other Industrial") in the graph above and table to the left. The sector-specific models of projected energy and the model discussions are discussed on the following pages, and are marked "TRADE SECRET" due to the limited number of customers in each sector.

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TRADE SECRET DATA ENDS]

Public Authorities Energy Use - Expected Scenario

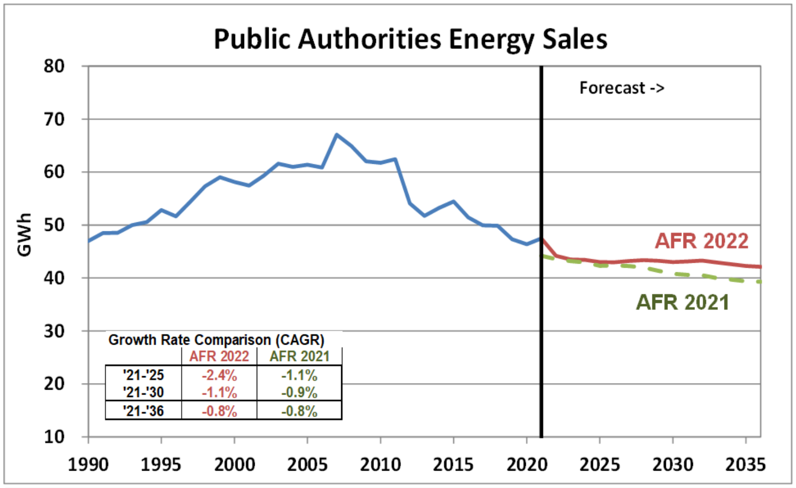
Estimation Start/End:	1/1990 - 12/2021
Unit Modeled/Forecast:	Monthly Per-Day Use (MWh)

	Model Specifications		
Variable	Coefficient	P-Value	HAC-P-Value
CONST	(1,301.97)	0.00%	0.00%
Bi_2021_2036	21.74	0.14%	0.09%
EE_Com	(0.00)	0.00%	0.00%
Dul_HDDpd	0.16	1.80%	1.71%
Dul_CDDpd	4.18	0.00%	0.01%
MSA_Pop	5.27	0.00%	0.00%

Public Auth. Energy Sales

	MWh	**Y/Y Growth**
2011	62,458	
2012	54,074	-13.4%
2013	51,736	-4.3%
2014	53,237	2.9%
2015	54,471	2.3%
2016	51,455	-5.5%
2017	49,945	-2.9%
2018	49,884	-0.1%
2019	47,302	-5.2%
2020	46,375	-2.0%
2021	47,497	2.4%
2022	44,193	**-7.0%**
2023	43,503	**-1.6%**
2024	43,400	**-0.2%**
2025	43,011	**-0.9%**
2026	42,973	**-0.1%**
2027	43,228	**0.6%**
2028	43,391	**0.4%**
2029	43,241	**-0.3%**
2030	42,998	**-0.6%**
2031	43,143	**0.3%**
2032	43,287	**0.3%**
2033	42,923	**-0.8%**
2034	42,616	**-0.7%**
2035	42,264	**-0.8%**
2036	42,108	**-0.4%**

Model Statistics	Magnitude
Adjusted R^2	37.1%
AIC	3401
Durban-Watson	2.1
MAPE	10.73
In-Sample RMSE	20



Growth Rate Comparison (CAGR)

	AFR 2022	AFR 2021
'21-'25	-2.4%	-1.1%
'21-'30	-1.1%	-0.9%
'21-'36	-0.8%	-0.8%

Model Discussion

The key economic driver of this year's Public Authorities energy use model was Duluth MSA Population. This variable indicates the underlying growth trend, which impacts government entities' operations (affecting energy use).

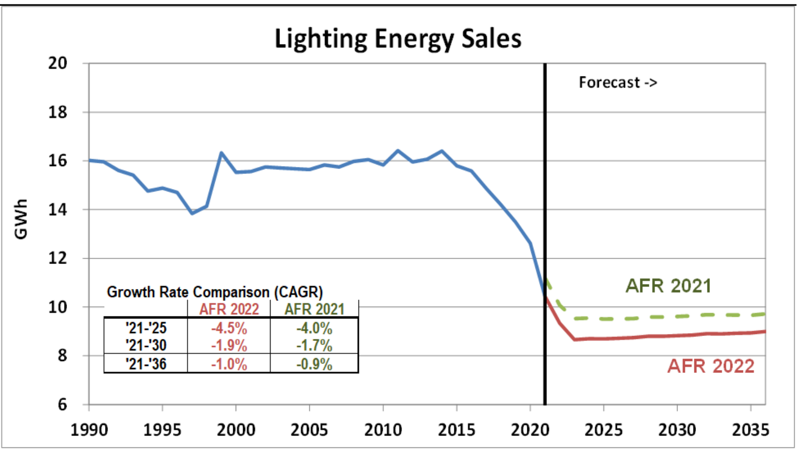
The AFR 2022 model uses an Energy Efficiency variable as a predictor of public authorities' energy sales: the "EE_Com" variable represents the cumulative effects of all past conservation measures on each year's sales, and the annual energy savings value is leveraged for all 12 monthly observations of a given year. The commercial-sector energy efficiency variable was used for the public authorities model since: 1) both customer groups are served by the same CIP program, and 2) the overall trend of conservation in public authorities is likely very similar to commercial customers. The variable's construction and the Company's hypothesis regarding its effectiveness in modeling usage is documented in Section II.B.3.

This year's model is similar to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's moderate goodness-of-fit, and the AIC indicates a highly parsimonious model. In-sample error metrics are similar to last year's: MAPE is 10.7% vs. 10.2% in the 2021 model, and RMSE is 20.1 vs. 19.6 in the 2020 model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant.

Street Lighting Energy Use - Expected Scenario

Estimation Start/End:	1/1990 - 12/2021
Unit Modeled/Forecast:	Monthly Per-Day Use (MWh)

	Model Specifications		
Variable	Coefficient	P-Value	HAC-P-Value
CONST	50.72	0.00%	0.00%
T	(0.01)	7.26%	7.76%
Jan	2.80	0.50%	0.12%
Feb	(2.10)	3.48%	0.44%
Mar	(9.49)	0.00%	0.00%
Apr	(14.31)	0.00%	0.00%
May	(20.29)	0.00%	0.00%
Jun	(23.53)	0.00%	0.00%
Jul	(23.03)	0.00%	0.00%
Aug	(19.43)	0.00%	0.00%
Sep	(11.80)	0.00%	0.00%
Oct	(8.46)	0.00%	0.00%
Nov	(2.93)	0.32%	0.00%
Bi_Light_1	(2.46)	0.32%	2.09%
Bi_Light_2	90.12	0.00%	0.00%
Trend_Light_2	(0.27)	0.00%	0.00%
NonWPI_StLou	0.002	4.66%	3.22%



Lighting Energy Sales

	MWh	Y/Y Growth
2011	16,420	
2012	15,954	-2.8%
2013	16,066	0.7%
2014	16,400	2.1%
2015	15,801	-3.7%
2016	15,588	-1.4%
2017	14,873	-4.6%
2018	14,206	-4.5%
2019	13,482	-5.1%
2020	12,617	-6.4%
2021	10,445	-17.2%
2022	9,341	**-10.6%**
2023	8,663	**-7.3%**
2024	8,706	**0.5%**
2025	8,695	**-0.1%**
2026	8,719	**0.3%**
2027	8,741	**0.3%**
2028	8,803	**0.7%**
2029	8,800	**0.0%**
2030	8,827	**0.3%**
2031	8,850	**0.3%**
2032	8,906	**0.6%**
2033	8,902	**0.0%**
2034	8,921	**0.2%**
2035	8,941	**0.2%**
2036	9,001	**0.7%**

Model Statistics	Magnitude
Adjusted R^2	85.5%
AIC	2163
Durban-Watson	1.7
MAPE	5.15
In-Sample RMSE	4

Model Discussion

The AFR 2022 lighting per-day use model utilized St. Louis County Non-Wage Personal Income as a key economic/demographic indicator.

"Bi_Light1" is a binary variable denoting the 1990-1999 timeframe and effectively shifts the level of the estimate to account for changes to the Company's accounting practices, which affected historical energy use data. The corrective binary shifts the forecast to avoid improbably changes in energy use, but does not impact the forecast trajectory; this is determined by the economic variables.

"Bi_Light2" and "Trend_Light2" are binary and trend variables denoting the 2017-2036 timeframe and effectively creates a new forecast trajectory influenced by levels starting in 2017 (this level is then held constant in the forecast timeframe after January-2023). This binary and trend combination shifts the forecast to account for Minnesota Power's LED lighting program's impact on energy use, and unlike "Bi_Light1," it does impact the forecast trajectory; in addition to the economic variables.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's high goodness-of-fit, and the AIC indicates a highly parsimonious model. In-sample error metrics are similar to last year's: MAPE is 5.1% vs. 4.9% in the 2021 model, and RMSE is 4.0 vs. 4.0 in the 2021 model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant.

Resale Energy Use - Expected Scenario

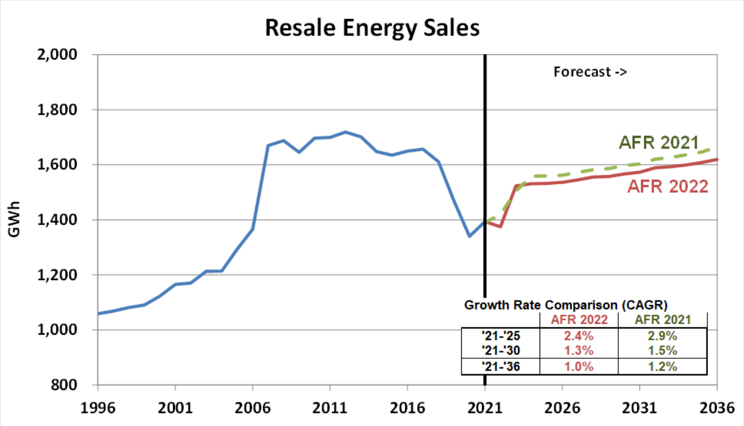
Estimation Start/End:	
Unit Modeled/Forecast:	Monthly Per-Day Use (MWh)

	Model Specifications			
Variable	Coefficient	P-Value	HAC-P-Value	VIF

Resale Energy Sales

	MWh	Y/Y Growth
2008	1,587,318	
2012	1,718,819	8.3%
2010	1,585,993	3.3%
2014	1,647,763	3.9%
2015	1,634,786	-0.8%
2016	1,649,405	0.9%
2017	1,656,865	0.5%
2018	1,610,792	-2.8%
2019	1,468,108	-8.9%
2020	1,340,290	-8.7%
2021	1,393,315	4.0%
2022	1,374,718	**-1.3%**
2023	1,523,465	**11.9%**
2024	1,530,812	**1.0%**
2025	1,532,449	**0.1%**
2026	1,536,000	**2.2%**
2027	1,545,146	**0.6%**
2028	1,555,451	**0.4%**
2029	1,557,530	**0.1%**
2030	1,566,535	**0.6%**
2031	1,572,971	**0.5%**
2032	1,588,843	**1.0%**
2033	1,592,692	**0.2%**
2034	1,599,559	**0.4%**
2035	1,608,467	**0.6%**
2036	1,619,294	**0.7%**

Model Statistics	Magnitude



Model Discussion

AFR 2022 is continuing the practice of forecasting each resale customer separately, but unlike in previous years, Minnesota Power will not be providing graphs or tables that include forecast values for individual resale customers (similar to the approach mentioned above for Other Industrial).

Due to the trade secret nature of individual resale customers' forecasts, Minnesota Power will only be showing the aggregate forecast summary for total Resale energy sales in the graph above and table to the left, and withhold this information on each customers' respective page.

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TRADE SECRET DATA ENDS]

System Peak Demand - Expected Scenario

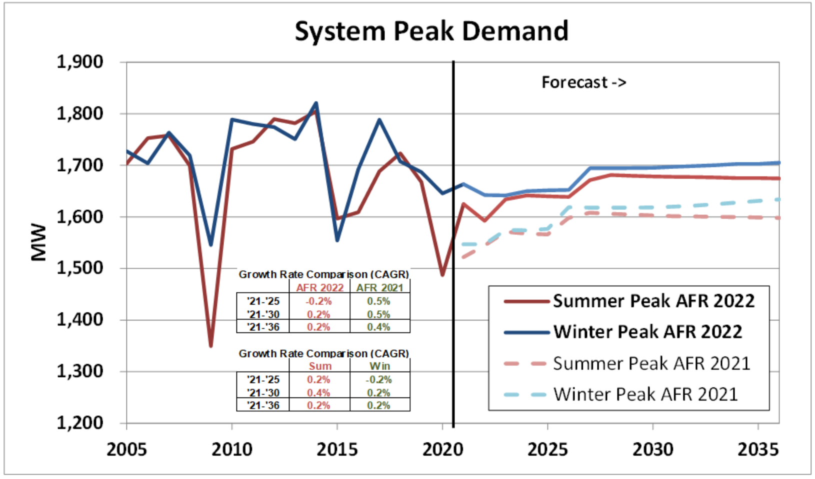
Estimation Start/End:	6/1999 - 12/2021
Unit Modeled/Forecast:	Monthly Peak Demand

	Model Specifications		
Variable	Coefficient	P-Value	HAC-P-Value
CONST	378.52	0.00%	0.00%
WN_MWhpd	0.04	0.00%	0.00%
S	36.22	0.00%	0.12%
W	18.59	3.96%	0.49%
Bi_1999_2001	(26.74)	0.05%	0.04%
Bi_2008	108.57	0.00%	0.00%
WC_THI	(1.25)	0.00%	0.00%
WC_THI_3	0.0002	0.00%	4.05%
Jan_WN_MWhpd	(0.001)	0.94%	0.01%
Feb_WN_MWhpd	(0.001)	0.65%	0.01%
Mar_WN_MWhpd	(0.001)	0.17%	0.31%

System Peak Demand

	Summer (MW)	Y/Y Growth		Winter (MW)	Y/Y Growth
2011	1,746		2011	1,780	
2012	1,790	2.5%	2012	1,774	-0.3%
2013	1,782	-0.5%	2013	1,751	-1.3%
2014	1,805	1.3%	2014	1,821	4.0%
2015	1,597	-11.5%	2015	1,554	-14.6%
2016	1,609	0.8%	2016	1,692	8.9%
2017	1,688	4.9%	2017	1,789	5.7%
2018	1,723	2.1%	2018	1,707	-4.5%
2019	1,668	-3.2%	2019	1,687	-1.2%
2020	1,487	-10.8%	2020	1,646	-2.4%
2021	1,625	9.3%	2021	1,663	1.1%
2022	1,592	**-2.0%**	2022	1,642	**-1.3%**
2023	1,634	**2.6%**	2023	1,641	**-0.1%**
2024	1,641	**0.4%**	2024	1,650	**0.5%**
2025	1,640	**-0.1%**	2025	1,651	**0.1%**
2026	1,639	**-0.1%**	2026	1,652	**0.1%**
2027	1,671	**2.0%**	2027	1,694	**2.5%**
2028	1,681	**0.6%**	2028	1,694	**0.0%**
2029	1,680	**-0.1%**	2029	1,695	**0.0%**
2030	1,679	**-0.1%**	2030	1,695	**0.0%**
2031	1,678	**0.0%**	2031	1,697	**0.1%**
2032	1,677	**0.0%**	2032	1,699	**0.1%**
2033	1,677	**-0.1%**	2033	1,700	**0.1%**
2034	1,675	**-0.1%**	2034	1,703	**0.1%**
2035	1,674	**-0.1%**	2035	1,705	**0.1%**
2036	1,673	**-0.1%**	2036	1,709	**0.3%**

Model Statistics	Magnitude
Adjusted R^2	89.8%
AIC	2685
Durban-Watson	1.6
MAPE	1.88
In-Sample RMSE	34



Model Discussion

The long-run outlook for Minnesota Power's system peak is higher than the 2021 outlook primarily due to a projected increase in industrial energy consumption relative to AFR 2021.

Temperature variables play a critical role in peak demand modeling, and both the definition and structure of these variables are important for interpreting the results. 2022 AFR used a third-degree polynomial specification on a Wind-Chill & Temperature Humidity Index. Peak demand is modeled as a function of the weather observations specific to the hour in which the peak occurred.

The 2022 AFR peak demand model utilized two binaries to indicate the month of the system's historical summer and winter peaks, and assumed this peak in July/January (respectively) throughout the forecast timeframe. Summer peaks typically occur in either July or August, historical winter peaks have occurred in November, December, February, but are most likely in January. This broad distribution of peak occurrence dilutes the model's measured seasonality, and as a result, the peak forecast will understate both the summer and winter peak demand figures. The utilization of these peak binaries focuses the seasonal peaks – which may have occurred in August or July, or December or January - into the months of July and January. This ensures seasonal peaks are not under forecast as a result of historical diversity in the timing of those seasonal peaks.

The model also includes two binaries ("Bi_1999_2001" and "Bi_2008") denoting periods of economic downturn for Minnesota Power's large industrial customers, resulting in abnormally low usage. During (or immediately following) these periods the normal relationship of Peak-to-Energy was affected by the idling of large, high load factor customers. These binaries effectively remove these downturn periods from consideration in the regression model and allow for more accurate estimation of model coefficients under more normal economic conditions.

There is no energy efficiency variable in the peak demand model and no explicit assumption for peak demand savings. Conservation impacts are accounted for by leveraging the energy sales forecast, which includes the effects of conservations, as the key input to the peak demand regression model.

This year's model is comparable to last year's in terms of statistical quality. The Adjusted R-Squared indicates there's high goodness-of-fit, and the AIC indicates a highly parsimonious model. In-sample error metrics are very similar to the 2021 model: MAPE is 1.9% vs. 1.9% in the 2021 model, and RMSE is 34 vs. 34 in the 2021 model. The HAC-Adjusted P-values ("HAC-P-Value") suggests all variables' coefficients' are significant.

F. Confidence in Forecast & Historical Accuracy

Minnesota Power has a strong record of accurate forecasting and consistent improvements in forecast accuracy over time. Excluding the mining downturn years (2009/2010 and 2015/2016), as well as the 2020 COVID-19 recession (including 2021), each successive AFR has reduced its current-year energy sales forecast error, on average, by about 0.05 percent over the prior year.

Tables 7-9 show Minnesota Power's past AFR forecast accuracy for aggregate energy use, Summer Peak, and Winter Peak demand. The bottom values in each column (**Bold**) represent the forecast accuracy in the current year, or the year it was produced. For example, the lower right value of -15.7 percent is the difference between the forecast produced in 2020 (AFR 2020) and the 2020 year-end actual. Similarly, the cell just above the current year accuracy (***Bold, Italic***) represents the accuracy of the forecast in the year immediately after its formulation. For example, AFR 2015 (formulated in 2015) forecast of 2016 was 5.9 percent (581 GWh) above the actual (due to effects of Mining downturn).

Figure 18: AFR Energy Sales Forecast Accuracy

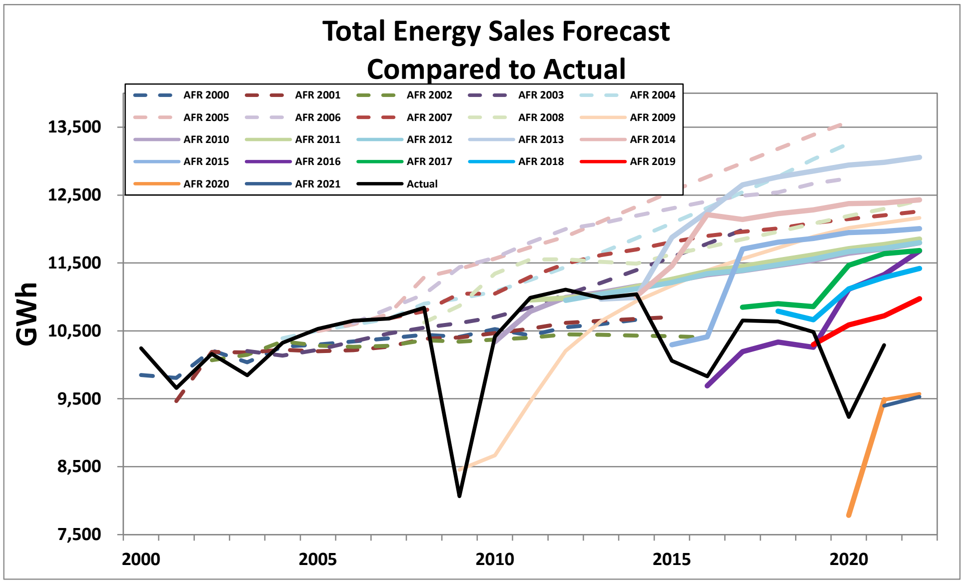


Table 7: AFR Energy Sales Forecast Accuracy

Total Energy Sales Forecast Error

Forecast	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Average Error of AFR	Avg. Error Year-Ahead
AFR 2000	**-3.9%**	**1.5%**	0.5%	1.9%	-0.6%	**-2.2%**	-2.9%	-2.7%	-3.7%	29.1%	1.0%	-5.1%	-5.0%	-3.5%	-3.4%								0.1%	1.5%
AFR 2001		**-2.0%**	***0.3%***	3.4%	-1.0%	-3.1%	**-4.1%**	-3.9%	-4.2%	29.0%	0.5%	-4.2%	-4.4%	-3.1%	-3.3%	6.4%							0.4%	0.3%
AFR 2002			**-0.9%**	***3.1%***	0.2%	-2.4%	-3.6%	**-3.8%**	-4.4%	28.2%	-0.4%	-5.4%	-5.9%	-5.0%	-5.5%	3.6%	5.8%						0.2%	3.1%
AFR 2003				**3.6%**	***-1.8%***	-2.9%	-2.9%	-2.1%	**-2.7%**	31.6%	2.8%	-1.3%	-0.6%	2.0%	3.2%	15.2%	19.8%	12.5%					5.1%	1.8%
AFR 2004					**0.6%**	***-0.3%***	-0.5%	0.0%	0.6%	**36.1%**	6.4%	2.4%	3.0%	6.0%	7.5%	20.1%	25.2%	17.7%	20.0%				9.7%	0.3%
AFR 2005						**-0.3%**	***-0.5%***	0.6%	4.1%	41.5%	**11.0%**	6.8%	7.0%	10.2%	11.7%	24.8%	29.9%	21.8%	23.9%	27.7%			14.7%	0.5%
AFR 2006							**-0.3%**	***1.4%***	1.8%	41.8%	11.1%	**7.4%**	8.0%	10.0%	10.5%	22.3%	26.2%	17.2%	17.9%	20.9%	38.1%		15.6%	1.4%
AFR 2007								**0.0%**	***-0.5%***	37.0%	6.0%	2.8%	**3.4%**	5.7%	6.0%	17.4%	21.0%	12.3%	12.9%	15.3%	31.6%	18.6%	12.6%	0.5%
AFR 2008									**-2.0%**	***34.8%***	8.9%	5.1%	4.0%	**4.8%**	4.1%	15.6%	19.3%	11.2%	12.4%	15.2%	32.1%	19.5%	13.2%	34.8%
AFR 2009										**4.8%**	***-16.8%***	-13.9%	-8.1%	-3.1%	**-0.9%**	11.0%	15.9%	8.5%	10.2%	13.4%	30.2%	17.5%	5.3%	16.8%
AFR 2010											**-0.8%**	***-1.8%***	-1.0%	0.7%	1.1%	**11.6%**	15.2%	6.9%	7.7%	10.1%	26.1%	13.8%	7.5%	1.8%
AFR 2011												**-0.3%**	***-1.1%***	0.5%	1.0%	11.9%	**15.7%**	7.5%	8.4%	10.8%	26.9%	14.4%	8.7%	1.1%
AFR 2012													**-1.4%**	***0.5%***	0.7%	11.5%	15.4%	**6.9%**	7.8%	10.2%	26.4%	13.9%	9.2%	0.5%
AFR 2013														**-0.2%**	***-0.4%***	18.1%	24.6%	18.7%	**20.0%**	22.6%	40.2%	26.2%	18.9%	0.4%
AFR 2014															**-0.3%**	***13.9%***	24.2%	13.9%	14.9%	**17.2%**	34.0%	20.3%	17.3%	13.9%
AFR 2015																**2.4%**	***5.9%***	9.9%	11.0%	13.1%	**29.4%**	16.3%	12.6%	5.9%
AFR 2016																	**-1.4%**	***-4.3%***	-2.9%	-2.2%	20.4%	**10.1%**	3.3%	4.3%
AFR 2017																		**1.8%**	***2.5%***	3.6%	24.2%	13.1%	9.0%	2.5%
AFR 2018																			**1.4%**	***1.7%***	20.4%	9.7%	8.3%	1.7%
AFR 2019																				**-1.8%**	***14.7%***	4.2%	5.7%	14.7%
AFR 2020																					**-15.7%**	***-7.8%***	-11.7%	7.8%
AFR 2021																						**-8.7%**	-8.7%	

🟥 ***N.n%***	= *Year-Ahead Foreast*	Avg Year-Ahead Error =	2.1%
		Avg Year-Ahead Error (No Downturns) =	-0.8%
🟩 **N.n%**	= Current Year Forecast	Avg Current Year Error =	-1.1%
🟦 **N.n%**	= 5 Year-Ahead Forecast	Avg 5 Year Error =	9.4%
		Avg 5 Year Error (No Downturns) =	3.9%

Figure 19: AFR Summer Peak Demand Forecast Accuracy

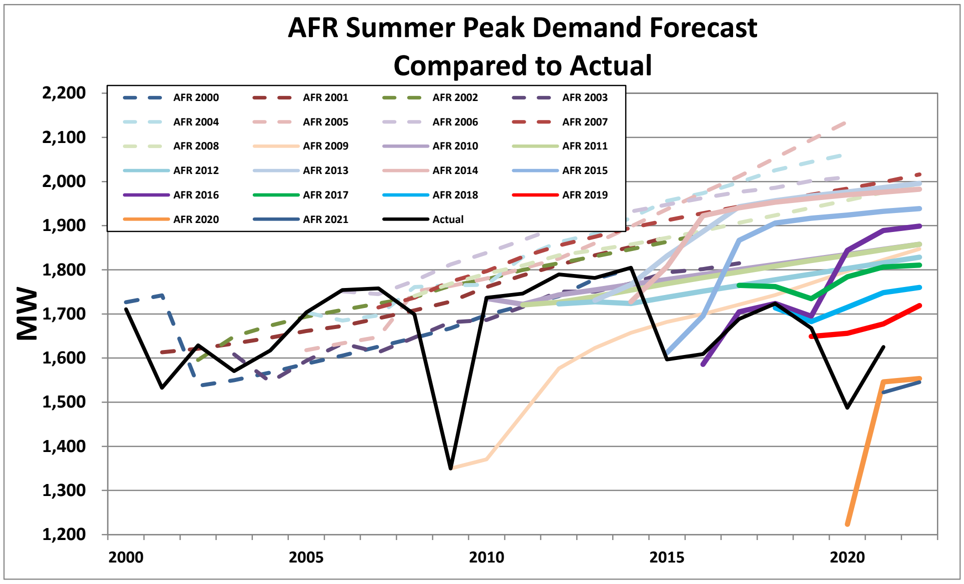


Table 8: AFR Summer Peak Demand Forecast Accuracy

Summer System Peak Error

Forecast	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	**Average Error of AFR**	**Avg. Error Year-Ahead**
AFR 2000	**0.9%**	***13.7%***	-5.6%	-1.3%	-3.1%	**-6.8%**	-8.5%	-7.5%	-3.1%	23.6%	-2.2%	-1.6%	-2.8%	-0.2%	-0.1%								-0.3%	13.7%
AFR 2001		**5.2%**	***-0.5%***	4.0%	1.8%	-2.5%	**-4.6%**	-3.8%	0.5%	28.0%	1.4%	2.4%	1.2%	2.9%	2.6%	17.4%							3.7%	0.5%
AFR 2002			**-2.0%**	***5.0%***	3.5%	-0.6%	-2.6%	**-1.9%**	2.3%	30.7%	2.4%	3.1%	1.4%	2.7%	2.3%	16.7%	16.9%						5.3%	5.0%
AFR 2003				**2.4%**	***-4.4%***	-6.4%	-6.9%	-8.2%	**-3.1%**	24.6%	-2.9%	-1.7%	-2.2%	-1.7%	-2.0%	12.4%	12.0%	7.5%					1.3%	4.4%
AFR 2004					**0.0%**	***0.0%***	-3.9%	-3.5%	3.7%	**30.8%**	1.7%	4.8%	4.1%	5.6%	6.3%	22.5%	22.7%	18.4%	17.5%				8.7%	0.0%
AFR 2005						**-5.0%**	***-6.9%***	-6.3%	3.1%	30.7%	**2.5%**	3.3%	2.0%	4.4%	5.2%	21.3%	22.8%	19.2%	19.1%	25.6%			9.4%	6.9%
AFR 2006							**-0.2%**	***-0.7%***	4.5%	34.3%	5.9%	**7.0%**	6.0%	7.5%	7.0%	22.0%	22.0%	17.1%	15.2%	20.0%	35.2%		13.5%	0.7%
AFR 2007								**-2.4%**	***2.2%***	31.4%	3.5%	4.8%	**3.6%**	5.2%	5.0%	19.8%	19.8%	15.1%	13.4%	18.1%	33.4%	23.0%	13.1%	2.2%
AFR 2008									**2.5%**	***31.0%***	3.2%	3.7%	2.4%	**3.6%**	2.9%	17.3%	17.4%	12.9%	11.6%	16.3%	31.6%	21.6%	12.7%	31.0%
AFR 2009										**0.0%**	***-21.1%***	-15.6%	-11.9%	-8.9%	**-8.2%**	5.3%	5.7%	2.0%	1.1%	6.1%	20.9%	12.2%	-1.0%	21.1%
AFR 2010											**-0.1%**	***-1.4%***	-2.6%	-1.5%	-2.1%	**11.3%**	11.2%	6.7%	5.1%	9.3%	23.4%	13.6%	6.1%	1.4%
AFR 2011												**-1.5%**	***-3.5%***	-2.4%	-2.8%	10.8%	**10.8%**	6.3%	4.9%	9.2%	23.3%	13.6%	6.2%	3.5%
AFR 2012													**-3.7%**	***-3.0%***	-4.5%	8.8%	8.9%	**4.5%**	3.1%	7.3%	21.2%	11.7%	5.4%	3.0%
AFR 2013														**-2.8%**	***-2.1%***	14.7%	17.3%	15.1%	**13.5%**	18.0%	32.9%	22.2%	14.3%	2.1%
AFR 2014															**-4.3%**	***13.2%***	19.5%	14.9%	13.3%	**17.6%**	32.5%	21.6%	16.1%	13.2%
AFR 2015																**1.0%**	***5.4%***	10.6%	10.6%	14.9%	**29.4%**	18.9%	13.0%	5.4%
AFR 2016																	**-1.4%**	***1.0%***	0.0%	1.6%	24.0%	**16.2%**	6.9%	1.0%
AFR 2017																		**4.5%**	***2.2%***	4.0%	20.0%	11.1%	8.4%	2.2%
AFR 2018																			**-0.6%**	***0.9%***	15.4%	7.6%	5.8%	0.9%
AFR 2019																				**-1.1%**	***11.4%***	3.2%	4.5%	11.4%
AFR 2020																					**-17.7%**	***-4.9%***	-11.3%	4.9%
AFR 2021																						**-6.3%**	-6.3%	

N.n% 🟥	= *Year-Ahead Foreast*	Avg Year-Ahead Error =	1.8%
		Avg Year-Ahead Error (No Downturns) =	-1.7%
N.n% 🟩	= Current Year Forecast	Avg Current Year Error =	-1.5%
N.n% 🟦	= 5 Year-Ahead Forecast	Avg 5 Year Error =	7.4%
		Avg 5 Year Error (No Downturns) =	3.0%

Figure 20: AFR Winter Peak Demand Forecast Accuracy

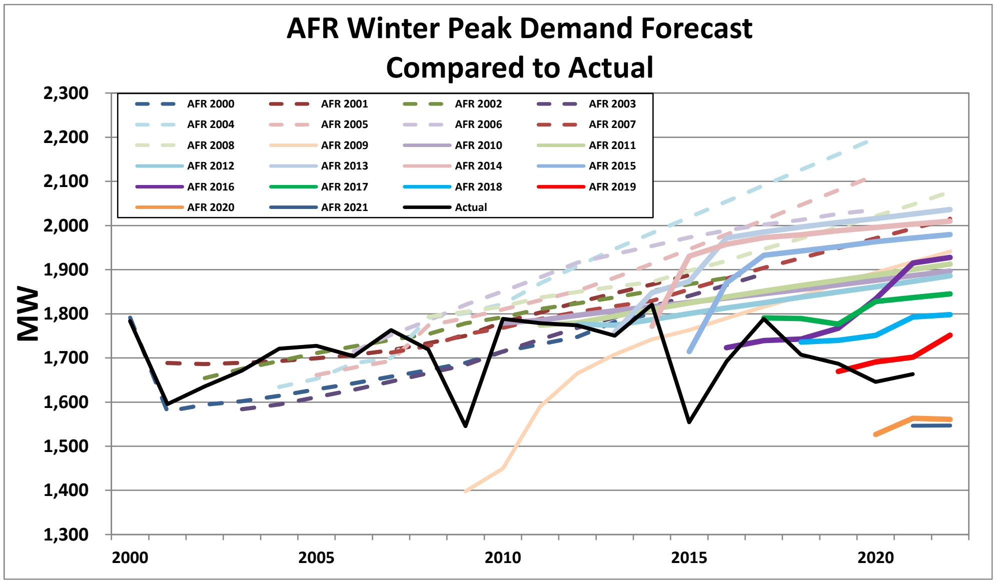


Table 9: AFR Winter Peak Demand Forecast Accuracy

Winter System Peak Error

Forecast	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	**Average Error of AFR**	**Avg. Error Year-Ahead**
AFR 2000	**0.4%**	**-1.0%**	-2.6%	-4.1%	-6.2%	**-5.7%**	-3.6%	-6.0%	-2.7%	9.3%	-4.1%	-2.7%	-1.5%	1.8%	-1.1%								-2.0%	1.0%
AFR 2001		**5.8%**	***3.1%***	1.1%	-1.6%	-1.6%	**0.2%**	-2.6%	0.8%	13.3%	-0.4%	1.4%	2.9%	5.5%	2.5%	21.4%							3.4%	3.1%
AFR 2002			**1.1%**	***0.2%***	-1.6%	-0.9%	1.3%	**-1.3%**	2.0%	15.1%	0.2%	1.8%	2.8%	4.9%	1.7%	20.1%	11.2%						3.9%	0.2%
AFR 2003				**-5.2%**	***-7.4%***	-6.7%	-4.4%	-6.6%	**-3.1%**	9.0%	-4.1%	-2.1%	-0.3%	2.4%	-0.2%	18.4%	10.2%	5.7%					0.4%	7.4%
AFR 2004					**-5.0%**	***-4.3%***	-0.9%	-3.6%	4.2%	**16.6%**	1.9%	5.1%	7.6%	11.2%	8.9%	29.9%	21.4%	16.9%	24.5%				8.9%	4.3%
AFR 2005						**-3.8%**	***-1.5%***	-3.9%	3.2%	15.8%	**1.2%**	2.9%	4.4%	7.5%	5.1%	25.2%	17.0%	12.5%	19.9%	23.3%			8.6%	1.5%
AFR 2006							**0.7%**	***-0.6%***	3.8%	17.8%	3.5%	**5.8%**	8.0%	10.5%	7.3%	27.0%	17.5%	11.9%	17.9%	20.1%	23.7%		11.7%	0.6%
AFR 2007								**-2.9%**	***0.5%***	13.5%	-1.1%	0.5%	**1.7%**	3.8%	0.5%	19.4%	11.1%	6.5%	12.8%	15.5%	19.8%	19.8%	8.1%	0.5%
AFR 2008									**4.3%**	***16.8%***	1.6%	3.2%	4.2%	**6.3%**	2.8%	22.1%	13.5%	8.8%	15.4%	18.3%	22.8%	23.1%	11.7%	16.8%
AFR 2009										**-9.6%**	***-18.9%***	-10.6%	-6.2%	-2.4%	**-4.3%**	13.4%	5.8%	1.5%	7.8%	10.8%	15.1%	15.3%	1.4%	18.9%
AFR 2010											**-0.5%**	***0.4%***	1.3%	3.2%	-0.2%	**17.5%**	8.5%	3.2%	8.7%	10.6%	14.0%	13.4%	6.7%	0.4%
AFR 2011												**-0.3%**	***0.3%***	2.5%	-0.6%	17.4%	**8.6%**	3.5%	9.2%	11.2%	14.7%	14.3%	7.4%	0.3%
AFR 2012													**0.1%**	***1.3%***	-1.9%	15.8%	7.1%	**2.0%**	7.6%	9.6%	13.1%	12.6%	6.8%	1.3%
AFR 2013														**0.4%**	***1.5%***	20.5%	16.5%	11.0%	**16.9%**	19.0%	22.5%	21.8%	14.5%	1.5%
AFR 2014															**-2.7%**	***24.2%***	15.7%	10.3%	15.9%	**17.9%**	21.3%	20.4%	15.4%	24.2%
AFR 2015																**10.3%**	***10.5%***	8.1%	13.8%	15.8%	**19.3%**	18.6%	13.7%	10.5%
AFR 2016																	**1.8%**	***-2.8%***	2.1%	4.8%	11.4%	**15.1%**	5.4%	2.8%
AFR 2017																		**0.1%**	***4.8%***	5.3%	11.1%	10.4%	6.4%	4.8%
AFR 2018																			**1.7%**	***3.2%***	6.4%	7.8%	4.8%	3.2%
AFR 2019																				**-1.0%**	***2.8%***	2.3%	1.4%	2.8%
AFR 2020																					**-7.2%**	***-6.0%***	-6.6%	6.0%
AFR 2021																						**-7.0%**	-7.0%	

N.n%	= *Year-Ahead Foreast*	Avg Year-Ahead Error =	1.3%
		Avg Year-Ahead Error (No Downturns) =	-0.6%
N.n%	= Current Year Forecast	Avg Current Year Error =	-0.8%
N.n%	= 5 Year-Ahead Forecast	Avg 5 Year Error =	6.8%
		Avg 5 Year Error (No Downturns) =	3.6%

III. AFR 2022 SCENARIO FORECAST DESCRIPTIONS

A. Expected Forecast Scenario Description

The AFR 2022 Expected scenario includes changes in customer operations that are not certain, but have a high likelihood of occurring. This high likelihood is characterized by formal communication from the customer, plus one or more of the following:

- An Electric Service Agreement is either executed or is in negotiation;
- The change in operation is supported by customer actions, such as construction or investment that will result in additional power requirements; and/or
- A timeframe for the operation and resulting power.

The Expected scenario assumes additional load from several new and existing customers. Most notably, this scenario accounts for a new industrial facility on the Iron Range; the facility is expected to reach full demand in 2024. Additionally, this scenario assumes the start-up of a new industrial facility in Duluth; the facility is expected to reach full demand in early 2023.

The scenario assumes a moderate, or “expected,” rate of national economic growth as the basis for the regional economic model.[50]

The Expected scenario results in compound annual energy sales and Summer peak demand growth of 0 percent and 0.2 percent, respectively, from 2021 through 2036.

B. Other Adjustments to Econometric Forecast

Minnesota Power’s forecast scenario is the summation of the econometric model results and arithmetic adjustments for impacts which cannot be accurately modeled. These exogenous impacts are documented as separate seasonal peak and energy adjustments in the Expected scenario tables. These adjustments fall into the following categories:

1. **Net Load/Energy Added**: are exogenous adjustments for load added due to Distributed Solar Generation, Electric Vehicle impacts, new customers or expansion by existing customers, and lost load due to closure or loss of contract. This adjustment includes all load added or lost on the system, regardless of how that load is met; “Net Load/Energy Added” accounts for any change in load at the system level. To preserve customer confidentiality, the seasonal demand and energy impacts are netted to a single value before being applied to the econometric values.

2. **Customer Generation:** is the demand on Minnesota Power system that is met by customer owned generation. Customer generation can fluctuate without clear economic causes so this component of Minnesota Power system peak is removed to more accurately model demand for an econometric forecast. The process for this adjustment can be outlined in 3 steps:
    - Remove Customer Generation from the historical peak series.
    - Econometrically project a less volatile “FERC load coincident w/Monthly Minnesota Power System peak (MW)” monthly peak series.
    - Arithmetically account for Customer Generation after forecasting.

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[50] All econometric models use the “expected” rate of national economic growth per IHS Global Insight’s January 2022 release.

This procedure has been a methodological staple of Minnesota Power forecasting for over a decade and increases the quality of the econometric processes and resulting forecasts.

The forecast assumption for customer generation is determined by averaging the historical customer generation coincident with the monthly peak over a twelve-year historical timeframe. The result is a set of 12 distinct monthly values for each month of the year. The MWh adjustment is determined similarly through averaging the most recent twelve-year historical timeframe, but excluding 2009 due to its irregularly low value. These adjustments are credits that increase the estimated peaks and system energy use projection by the estimated amount.

This Customer Generation adjustment to peak and energy forecasts also accounts for expected changes in the operation or ownership of generating assets that would affect deliveries to customers.

3. **Dual Fuel**: Minnesota Power has a robust Dual Fuel program for residential and commercial customers. The impacts of historical interruptions are assumed to be inherent in the forecast since curtailments affected historical monthly peak demand. Post-regression adjustments for dual fuel would produce an artificially low peak demand forecast. Minnesota Power will account for dual fuel interruption as a resource and not as an adjustment to the load forecast.

C. Expected Scenario Peak Demand and Energy Outlooks

Peak Forecast (MW)

	Econometric		+	Net Load Added		=	MP Delivered Load		+	Customer Gen.		=	MP System Peak			
	Sum	Win		Sum	Win		**Sum**	**Win**		Sum	Win		**Sum**	**Win**	*Annual*	
2000							1,469	1,503		242	281		1,711	1,784	*1,784*	2000
2001							1,383	1,421		150	175		1,533	1,595	*1,595*	2001
2002							1,464	1,456		165	180		1,629	1,636	*1,636*	2002
2003							1,408	1,496		163	175		1,570	1,671	*1,671*	2003
2004							1,449	1,533		168	189		1,617	1,721	*1,721*	2004
2005							1,535	1,555		169	172		1,703	1,727	*1,727*	**2005**
2006							1,584	1,534		169	170		1,753	1,704	*1,753*	2006
2007							1,582	1,584		176	179		1,758	1,763	*1,763*	2007
2008							1,552	1,575		147	145		1,699	1,719	*1,719*	2008
2009							1,200	1,369		150	176		1,350	1,545	*1,545*	2009
2010							1,591	1,599		140	190		1,732	1,789	*1,789*	**2010**
2011							1,573	1,630		173	150		1,746	1,780	*1,780*	2011
2012							1,603	1,605		187	169		1,790	1,774	*1,790*	2012
2013							1,645	1,589		136	162		1,782	1,751	*1,782*	2013
2014							1,620	1,637		184	184		1,805	1,821	*1,821*	2014
2015							1,442	1,461		155	94		1,597	1,554	*1,597*	**2015**
2016							1,453	1,520		156	173		1,609	1,692	*1,692*	2016
2017							1,538	1,594		150	195		1,688	1,789	*1,789*	2017
2018							1,585	1,557		139	150		1,723	1,707	*1,723*	2018
2019							1,560	1,588		108	99		1,668	1,687	*1,687*	2019
2020							1,410	1,548		78	97		1,487	1,646	*1,646*	**2020**
2021							1,553	1,556		114	114		1,625	1,663	*1,663*	2021
2022	1,393	1,396		85	126		**1,479**	**1,523**		114	120		**1,592**	**1,642**	**1,642**	2022
2023	1,391	1,395		123	127		**1,514**	**1,522**		120	120		**1,634**	**1,641**	**1,641**	2023
2024	1,390	1,394		132	136		**1,522**	**1,530**		120	120		**1,641**	**1,650**	**1,650**	2024
2025	1,389	1,393		131	139		**1,520**	**1,532**		120	120		**1,640**	**1,651**	**1,651**	**2025**
2026	1,388	1,393		131	139		**1,519**	**1,533**		120	120		**1,639**	**1,652**	**1,652**	2026
2027	1,388	1,393		164	182		**1,552**	**1,575**		120	120		**1,671**	**1,694**	**1,694**	2027
2028	1,387	1,392		174	182		**1,562**	**1,575**		120	120		**1,681**	**1,694**	**1,694**	2028
2029	1,386	1,392		173	183		**1,560**	**1,575**		120	120		**1,680**	**1,695**	**1,695**	2029
2030	1,386	1,392		173	184		**1,559**	**1,575**		120	120		**1,679**	**1,695**	**1,695**	**2030**
2031	1,386	1,393		172	185		**1,558**	**1,577**		120	120		**1,678**	**1,697**	**1,697**	2031
2032	1,387	1,393		171	186		**1,558**	**1,579**		120	120		**1,677**	**1,699**	**1,699**	2032
2033	1,387	1,392		170	188		**1,557**	**1,581**		120	120		**1,677**	**1,700**	**1,700**	2033
2034	1,387	1,392		169	190		**1,556**	**1,583**		120	120		**1,675**	**1,703**	**1,703**	2034
2035	1,387	1,392		168	193		**1,555**	**1,585**		120	120		**1,674**	**1,705**	**1,705**	**2035**
2036	1,387	1,392		167	198		**1,554**	**1,590**		120	120		**1,673**	**1,709**	**1,709**	2036

Energy Sales Forecast (MWh)

	Econometric	+	Net Energy Added	=	MP Delivered Energy	-	Customer Gen.	=	System Energy Use	MP System		
										Peak	*Load Factor*	
2000					10,029,324							
2001					9,476,860							
2002					9,950,113		1,187,858		11,137,971	1,636	*0.78*	2002
2003					9,638,417		1,232,635		10,871,052	1,671	*0.74*	2003
2004					10,117,168		1,267,728		11,384,896	1,721	*0.76*	2004
2005					10,345,265		1,258,895		11,604,160	1,727	*0.77*	**2005**
2006					10,443,777		1,195,070		11,638,847	1,753	*0.76*	2006
2007					10,670,857		1,252,965		11,923,822	1,763	*0.77*	2007
2008					10,826,034		1,276,158		12,102,192	1,719	*0.80*	2008
2009					8,062,253		1,108,014		9,170,267	1,545	*0.68*	2009
2010					10,417,422		1,299,292		11,716,714	1,789	*0.75*	**2010**
2011					10,988,200		1,422,107		12,410,307	1,780	*0.80*	2011
2012					11,107,357		1,200,317		12,307,674	1,790	*0.79*	2012
2013					10,985,809		1,185,139		12,170,948	1,782	*0.78*	2013
2014					11,038,979		1,287,965		12,326,944	1,821	*0.77*	2014
2015					10,059,466		1,227,221		11,286,687	1,597	*0.81*	**2015**
2016					9,830,787		1,074,786		10,905,573	1,692	*0.74*	2016
2017					10,654,217		1,215,894		11,870,111	1,789	*0.76*	2017
2018					10,638,692		1,236,276		11,874,968	1,723	*0.79*	2018
2019					10,482,913		1,064,454		11,547,367	1,687	*0.78*	2019
2020					9,230,235		812,490		10,042,725	1,646	*0.70*	**2020**
2021					10,290,154		909,778		11,199,931	1,663	*0.77*	2021
2022	9,078,827		594,412		**9,673,239**		915,052		**10,588,291**	**1,642**	***0.74***	2022
2023	9,066,357		806,998		**9,873,355**		967,564		**10,840,919**	**1,641**	***0.75***	2023
2024	9,077,653		863,218		**9,940,872**		967,756		**10,908,628**	**1,650**	***0.75***	2024
2025	9,042,808		867,828		**9,910,637**		970,023		**10,880,660**	**1,651**	***0.75***	**2025**
2026	9,033,347		870,975		**9,904,322**		967,564		**10,871,885**	**1,652**	***0.75***	2026
2027	9,034,632		1,070,546		**10,105,178**		967,564		**11,072,742**	**1,694**	***0.75***	2027
2028	9,054,566		1,219,428		**10,273,994**		967,756		**11,241,750**	**1,694**	***0.76***	2028
2029	9,021,638		1,210,030		**10,231,667**		970,023		**11,201,690**	**1,695**	***0.75***	2029
2030	9,017,629		1,212,562		**10,230,191**		967,564		**11,197,755**	**1,695**	***0.75***	**2030**
2031	9,016,384		1,212,697		**10,229,080**		967,564		**11,196,644**	**1,697**	***0.75***	2031
2032	9,046,086		1,219,444		**10,265,530**		967,756		**11,233,286**	**1,699**	***0.75***	2032
2033	9,018,354		1,212,026		**10,230,380**		970,023		**11,200,403**	**1,700**	***0.75***	2033
2034	9,013,807		1,217,210		**10,231,017**		967,564		**11,198,581**	**1,703**	***0.75***	2034
2035	9,011,634		1,220,174		**10,231,808**		967,564		**11,199,372**	**1,705**	***0.75***	**2035**
2036	9,034,295		1,229,801		**10,264,096**		967,756		**11,231,851**	**1,709**	***0.75***	2036

Customer Count Forecast by Class

Year	Residential	Commercial	Industrial	Street Lighting	Public Authorities	Resale	Total
2005	116,072	20,040	460	490	233	18	137,313
2006	117,596	20,419	451	509	237	18	139,229
2007	118,870	20,630	435	548	241	18	140,742
2008	119,300	20,969	431	585	246	18	141,549
2009	121,217	21,287	429	618	262	18	143,831
2010	121,235	21,491	424	2,209	278	18	145,655
2011	121,251	21,603	421	5,335	281	18	148,909
2012	120,697	21,614	411	6,414	275	18	149,429
2013	121,314	21,915	402	655	287	18	144,591
2014	121,601	22,096	394	660	282	17	145,050
2015	121,515	22,170	394	673	281	17	145,050
2016	121,836	22,420	396	689	281	17	145,639
2017	122,295	22,695	390	695	278	17	146,370
2018	122,557	22,834	380	693	277	17	146,758
2019	122,926	23,059	379	701	275	17	147,356
2020	123,617	23,346	378	720	271	16	148,348
2021	124,691	23,580	375	746	267	16	149,676
2022	**124,899**	**23,732**	**366**	**753**	**269**	**16**	**150,035**
2023	**124,940**	**23,947**	**360**	**758**	**268**	**16**	**150,289**
2024	**125,212**	**24,168**	**355**	**764**	**267**	**16**	**150,782**
2025	**125,528**	**24,401**	**351**	**769**	**266**	**16**	**151,330**
2026	**125,851**	**24,621**	**346**	**775**	**266**	**16**	**151,875**
2027	**126,152**	**24,841**	**340**	**780**	**265**	**16**	**152,395**
2028	**126,431**	**25,062**	**335**	**786**	**264**	**16**	**152,894**
2029	**126,706**	**25,281**	**330**	**791**	**263**	**16**	**153,388**
2030	**126,979**	**25,505**	**325**	**797**	**262**	**16**	**153,884**
2031	**127,235**	**25,729**	**320**	**803**	**262**	**16**	**154,364**
2032	**127,478**	**25,955**	**315**	**808**	**261**	**16**	**154,832**
2033	**127,707**	**26,177**	**310**	**814**	**260**	**16**	**155,284**
2034	**127,919**	**26,399**	**305**	**819**	**259**	**16**	**155,717**
2035	**128,111**	**26,622**	**300**	**825**	**258**	**16**	**156,132**

Energy Sales Forecast (MWh) by Customer Class

Year	Residential	Commercial	Industrial	Street Lighting	Public Authorities	Resale	Total
2005	1,013,156	1,200,075	6,761,669	15,646	61,396	1,293,323	10,345,265
2006	1,011,699	1,206,607	6,782,975	15,831	60,882	1,365,783	10,443,777
2007	1,051,453	1,244,930	6,622,051	15,752	67,056	1,669,615	10,670,857
2008	1,079,837	1,240,324	6,737,333	15,983	64,912	1,687,645	10,826,034
2009	1,075,116	1,212,778	4,051,352	16,049	62,036	1,644,922	8,062,253
2010	1,057,476	1,221,754	6,364,080	15,833	61,768	1,696,511	10,417,422
2011	1,069,856	1,226,174	6,913,648	16,420	62,458	1,699,643	10,988,200
2012	1,043,281	1,237,386	7,037,843	15,954	54,074	1,718,819	11,107,357
2013	1,086,481	1,256,540	6,873,993	16,066	51,736	1,700,993	10,985,809
2014	1,112,579	1,262,464	6,946,536	16,400	53,237	1,647,763	11,038,979
2015	1,026,454	1,254,681	6,073,273	15,801	54,471	1,634,786	10,059,466
2016	1,015,465	1,243,045	5,855,829	15,588	51,455	1,649,405	9,830,787
2017	1,010,955	1,223,786	6,697,793	14,873	49,945	1,656,865	10,654,217
2018	1,052,800	1,233,117	6,677,892	14,206	49,884	1,610,792	10,638,692
2019	1,042,353	1,202,403	6,709,265	13,482	47,302	1,468,108	10,482,913
2020	1,046,910	1,131,101	5,652,942	12,617	46,375	1,340,290	9,230,235
2021	1,046,341	1,181,246	6,611,310	10,445	47,497	1,393,315	10,290,154
2022	**1,044,992**	**1,214,991**	**5,985,002**	**9,341**	**44,193**	**1,374,718**	**9,673,239**
2023	**1,043,077**	**1,232,760**	**6,021,887**	**8,663**	**43,503**	**1,523,465**	**9,873,355**
2024	**1,046,600**	**1,233,344**	**6,078,011**	**8,706**	**43,400**	**1,530,812**	**9,940,872**
2025	**1,043,853**	**1,237,668**	**6,044,961**	**8,695**	**43,011**	**1,532,449**	**9,910,637**
2026	**1,044,659**	**1,244,434**	**6,027,537**	**8,719**	**42,973**	**1,536,000**	**9,904,322**
2027	**1,046,626**	**1,255,222**	**6,206,215**	**8,741**	**43,228**	**1,545,146**	**10,105,178**
2028	**1,053,163**	**1,266,480**	**6,346,706**	**8,803**	**43,391**	**1,555,451**	**10,273,994**
2029	**1,052,296**	**1,269,252**	**6,300,548**	**8,800**	**43,241**	**1,557,530**	**10,231,667**
2030	**1,055,093**	**1,275,024**	**6,281,714**	**8,827**	**42,998**	**1,566,535**	**10,230,191**
2031	**1,057,715**	**1,284,253**	**6,262,147**	**8,850**	**43,143**	**1,572,971**	**10,229,080**
2032	**1,064,445**	**1,297,015**	**6,263,034**	**8,906**	**43,287**	**1,588,843**	**10,265,530**
2033	**1,065,005**	**1,299,603**	**6,221,255**	**8,902**	**42,923**	**1,592,692**	**10,230,380**
2034	**1,069,938**	**1,305,493**	**6,204,488**	**8,921**	**42,616**	**1,599,559**	**10,231,017**
2035	**1,075,484**	**1,311,661**	**6,184,991**	**8,941**	**42,264**	**1,608,467**	**10,231,808**
2036	**1,085,565**	**1,323,294**	**6,184,834**	**9,001**	**42,108**	**1,619,294**	**10,264,096**

IV. OTHER INFORMATION

A. Subject of Assumption

Section 7610.0320, Subpart 4, lists specific assumptions to be discussed. The following list contains the discussion of each assumption and Minnesota Power's response.

- Assumptions made regarding the availability of alternative sources of energy.
    - *Minnesota Power makes no assumptions regarding the availability of alternative sources of energy*.
- Assumptions made regarding expected conversion from other fuels to electricity or vice versa.
    - *Minnesota Power makes no assumptions regarding the expected conversion from one fuel source to another*.
- Assumptions made regarding future prices of electricity for customers and the effect that such prices would have on system demand.
    - *See Section II.C.*
- Assumptions made in arriving at the data requested (historical reporting).
    - *Minnesota Power makes no such assumptions*.
- Assumptions made regarding the effect of existing energy conservations programs under Federal or State legislation on long-term electricity demand
    - *See Demand Side Management above*.
- Assumptions made regarding the projected effect of new conservations programs the utility deems likely to occur through Federal or State legislation.
    - *See Section II.B.*
- Assumptions made regarding current and future saturation levels of appliances and electric space heating.
    - *Minnesota Power makes no assumptions regarding current and future saturation levels of appliances and electric space heating*.

B. Coordination of Forecasts with Other Systems

Minnesota Power is a member of the Midwest Reliability Organization (MRO), Midcontinent Independent System Operator (MISO), Edison Electric Institute (EEI), Upper Midwest Utility Forecasters (UMUF), and other trade associations. While each member of these groups independently determines its power requirements, periodic meetings are held to share information and discuss forecasting techniques and methodologies.

C. Compliance with 7610.0320 Forecast Documentation

Statute or Rule	***Requirement***	***Reference Section***
7610.0320, Subp. 1(A)	The overall methodological framework that is used.	Section II.A
7610.0320, Subp. 1(B)	The specific analytical techniques that are used, their purpose, and the components of the forecast to which they have been applied.	Sections II.B, II.E
7610.0320, Subp. 1(C)	The manner in which these specific techniques are related in producing the forecast.	Section II.B
7610.0320, Subp. 1(D)	The purpose of the technique, typical computations specifying variables and data, and the results of appropriate statistical tests.	Section II.E
7610.0320, Subp. 1(E)	Forecast confidence levels or ranges of accuracy for annual peak demand and annual electrical consumption.	Section II.F
7610.0320, Subp. 1(F)	A brief analysis of the methodology used, including its strengths and weaknesses, its suitability to the system, cost considerations, data requirements, past accuracy, and any other factors considered significant to the utility.	Sections II.B, II.F
7610.0320, Subp. 2(A)	A complete list of data sets used in making the forecast, including a brief description of each data set and an explanation of how each was obtained, or a citation to the source.	Sections II.C

7610.0320, Subp. 2(B)	A clear identification of any adjustments made to the raw data to adapt them for use in forecasts, including the nature of the adjustment, the reason for the adjustment, and the magnitude of the adjustment.	Section II.C
7610.0320, Subp. 3	Discussion of essential assumptions.	Sections II.D, II.E
7610.0320, Subp. 4	Subject of assumption.	Section IV
7610.0320, Subp. 5(A)	Description of the extent to which the utility coordinates its load forecasts with those of other systems.	Section IV
7610.0320, Subp. 5(B)	Description of the manner in which such forecasts are coordinated.	Section IV

Appendix O

Summaries of 2021 Conservation Improvement Program and Integrated Resource Plan Filings

APPENDIX O

APPLICANT'S DEMAND-SIDE MANAGEMENT AND CONSERVATION

Pursuant to Minn. R. 7849.0290, a Certificate of Need application must provide information related to an applicant's energy conservation and efficiency programs and a quantification of the impact of these conservation and efficiency programs on forecast data. Minnesota Power requested and was granted an exemption from this rule requirement by the Minnesota Public Utilities Commission. In lieu of the information required by Minn. R. 7849.0290, Minnesota Power agreed to provide a summary of the conservation and demand-side management information that was provided as part of Minnesota Power's Integrated Resource Plan and Conservation and Improvement Plan ("CIP") filings.

Minnesota Power filed its 2022 CIP Consolidated Filing with the Commission on April 3, 2023 in Docket No. E015/M-23-135. A copy of the "Summary" section and the "2022 CIP Status Report" section of this filing is provided in this appendix.

Minnesota Power filed its 2021 Integrated Resource Plan ("2021 IRP") with the Commission on February 1, 2021 in Docket No. E015/RP-21-33. Appendix B of the 2021 IRP filing contained information regarding Minnesota Power's planning and strategies for demand-side management, Energy Efficiency, and CIP. A copy of Appendix B of the 2021 IRP filing is provided in this appendix.

Additional information regarding Minnesota Power's conservation and demand-side management programs can be found on Minnesota Power's website at:
https://www.mnpower.com/ProgramsRebates/PO1 .

2022 Consolidated Filing

Conservation Improvement Program

TOOLS AND RESOURCES

INFORMED CHOICES

RIGHT FIT OPTIONS

minnesota power

AN ALLETE COMPANY

April 3, 2023

Docket No. E-015/M-23-135 | E-015/CIP-20-476.02

minnesota power
AN ALLETE COMPANY

30 West Superior Street
Duluth, MN 55802-2093
www.mnpower.com

April 3, 2023

Mr. Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101-2147

Deputy Commissioner Michelle Gransee
Minnesota Department of Commerce
85 Seventh Place East, Suite 500
St. Paul, MN 55101-2198

Re: **2022 Conservation Improvement Program Consolidated Filing**
Docket Nos. E015/M-23-135, E015/CIP-20-476.02

Dear Mr. Seuffert and Ms. Gransee:

Attached please find via eFiling Minnesota Power's 2022 Conservation Improvement Program ("CIP") Consolidated Filing. This submittal includes a CIP Tracker Activity Report, a Financial Incentives Report, a Proposed Conservation Program Adjustment Factor, 2022 CIP Project Evaluations and a compliance with Department of Commerce ("DOC") orders section. Minnesota Power is filing this information pursuant to Minn. Stat. §§ 216B.241, 216B.16, subd, 6c, 216B.2401, and 216B.2411 and in compliance with Minnesota Public Utilities Commission ("MPUC") and DOC rules and orders relating to annual filings associated with Company-sponsored conservation program activities, including Minn. Rule 7690.0550.

Minnesota Power requests that the MPUC review the filed material and approve Minnesota Power's 2022 CIP Tracker Activity, Financial Incentives, proposed Conservation Program Adjustment ("CPA") factor, and a variance of Minn. Rules 7820.3500 and 7825.2600 to permit Minnesota Power to continue to combine the CPA factor with the Fuel Clause Adjustment on customer bills and/or combine the CPA factor with other currently applicable cost recovery riders on bills as the Minnesota Policy Adjustment when final rates in the Company's latest rate case are effective. Further, Minnesota Power requests that the DOC review and approve the evaluations of the various CIP projects included herein and the compliance with prior DOC orders. Minnesota Power has electronically filed this document and copies of this Cover Letter along with the Summary of Filing have been served on the parties on the attached service list.

If you have any questions regarding this filing, please contact me at (218) 355-3602 or avang@mnpower.com.

Sincerely,

Analeisha Vang
Senior Public Policy Advisor

AMV:th
Attach.

Summary

Minnesota Power
2022 Conservation Improvement Program (“CIP”) Consolidated Filing

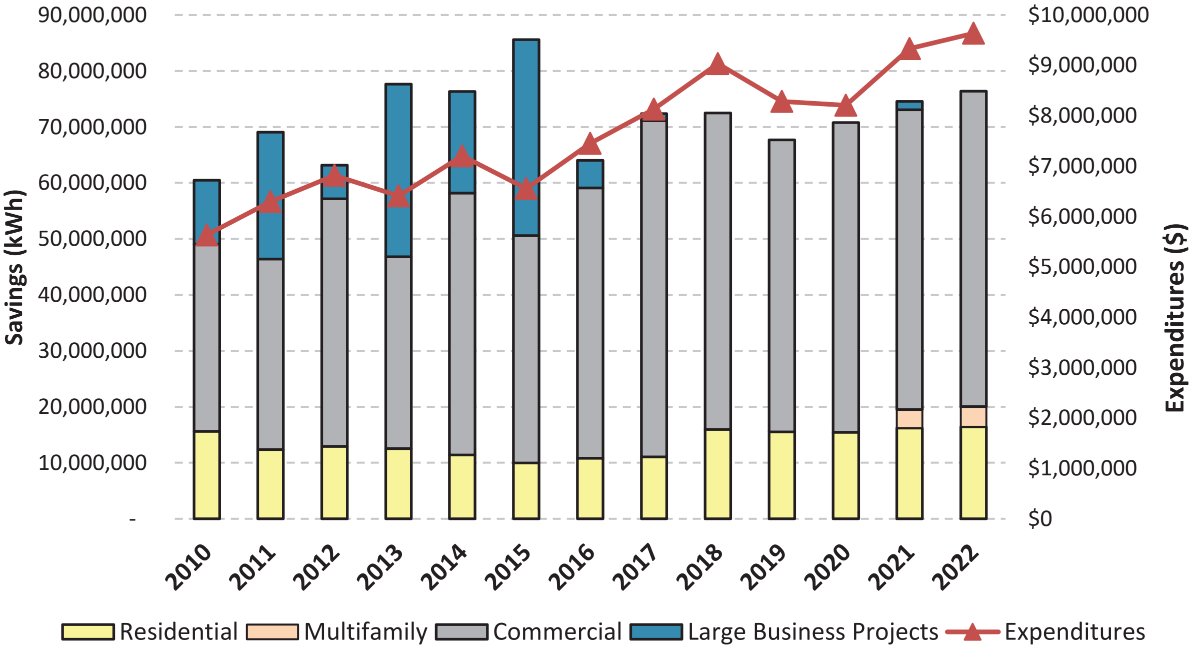
EXECUTIVE SUMMARY

Minnesota Power (or, “the Company”) is pleased to report its 2022 energy conservation program results:

- Minnesota Power achieved energy savings of **2.9%** of gross annual retail energy sales,[1] well above the 1.5% energy-savings goal set in the 2021-2023 Triennial Order, and the 1.75% goal in the 2021 Energy Conservation and Optimization Act.[2]
- The Company achieved energy savings totaling **76,400,068 kilowatt hours (“kWh”)**, which is **115%** of the approved energy-savings goal for the year. The Company also achieved demand savings of **8,195 kilowatts (“kW”)**, which is **82%** of the approved demand-savings goal. The proposed energy-savings target for 2022 was well above the state 1.5% energy-savings goal for CIP.
- Expenditures totaled **$9,635,730**, which was **90%** of the approved budget for 2022.

The figure below illustrates historical and recent kWh energy-savings achievements, along with CIP expenditures. While Minnesota Power continues to have a successful track record of exceeding the state energy savings goal, the cost of delivering on these goals continues to increase. The Company anticipates the trend of increasing costs will continue as inflation impacts the cost of both products and labor and more cost-effective measures reach market saturation. Cost-effectiveness is also being impacted by lower avoided costs. While Minnesota Power’s CIP portfolio continues to be cost-effective overall, higher cost programs – especially those serving income-qualified customers – are becoming increasingly less cost-effective.

Minnesota Power’s 2005–2022 CIP Achievements



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[1] In accordance with Minnesota Rules part 7690.1200, weather-normalized average retail energy sales were used to calculate the electric savings goal for Minnesota Power’s 2021–2023 Triennial Plan.

[2] While the Energy Conservation and Optimization Act (ECO Act) passed in 2021 with a higher savings goal, the energy savings goal for the 2022 Consolidated is based on the November 24, 2020 Order in Docket No. E015/[illegible]-20-476.

Minnesota Power's 2022 CIP Expenditures and Energy Savings

2022	*Expenditures*	*Energy Savings (kWh) at busbar*
Direct Savings Programs:		
Residential		
Energy Partners (Low Income)	$488,578	1,203,774
Home Efficiency (Residential)	$2,054,644	15,214,197
Multifamily		
Multifamily Direct Install	$156,743	351,955
Custom Multifamily Efficiency	$267,636	3,251,017
Commercial		
Prescriptive Business Efficiency	$59,247	1,013,699
Custom Business Efficiency (Business/Commercial/Industrial/Agricultural)	$4,474,126	55,365,426
Indirect Savings Programs:		
Customer Engagement	$640,290	
Energy Analysis	$700,495	
Research & Development	$148,909	
Evaluation & Program Development	$467,870	
Regulatory Charges	$177,191	
Total	**$9,635,730**	**76,400,068**

STATE OF MINNESOTA
BEFORE THE
MINNESOTA PUBLIC UTILITIES COMMISSION

In the Matter of Minnesota Power's
2022 Conservation Improvement Program
Consolidated Filing

Reporting on CIP Tracker Account Activity,
Financial Incentives Report, Proposed CPA
Factors and 2022 Project Evaluations

Docket No. E-015/M-23-135
E-015/CIP-20-476.02

SUMMARY OF FILING

Minnesota Power (or, "the Company") hereby files with the Minnesota Public Utilities Commission ("MPUC" or "Commission") and the Department of Commerce, Division of Energy Resources ("Department") its annual Conservation Improvement Program ("CIP") Consolidated Filing in compliance with Minn. Stat. § 216B.241. Minnesota Power requests approval of the following:

- Recovery of the 2022 CIP Tracker Account activity year-end balance of $1,321,045.
- A revised Conservation Program Adjustment ("CPA"), to be first implemented without proration on July 1, 2023, of $0.000306/kilowatt hour ("kWh").
- A variance of Minn. Rules 7820.3500 and 7825.2600 to permit the continued combination of the Conservation Program Adjustment with the Fuel and Purchased Power Clause Adjustment on customer bills, until final rates from Minnesota Power's latest rate case are implemented.[3]
- A variance of Minn. Rules 7820.3500 and 7825.2600 to permit the combination of the Conservation Program Adjustment with other currently applicable cost recovery riders (Rider for Transmission Cost Recovery, Rider for Renewable Resources, and Rider for Solar Energy Adjustment), on bills as the Minnesota Policy Adjustment when final rates are effective as detailed in the February 28, 2023 Order in Minnesota Power's latest rate case.[4]

Minnesota Power submits its Conservation Improvement Program Consolidated Filing via eFiling with the Department of Commerce, Division of Energy Resources to comply with annual CIP project evaluation filing requirements.

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[3] *Minnesota Power's 2021 Authority to Increase Rates for Electric Utility Service in Minnesota*, Docket No. E015/GR-21-335.

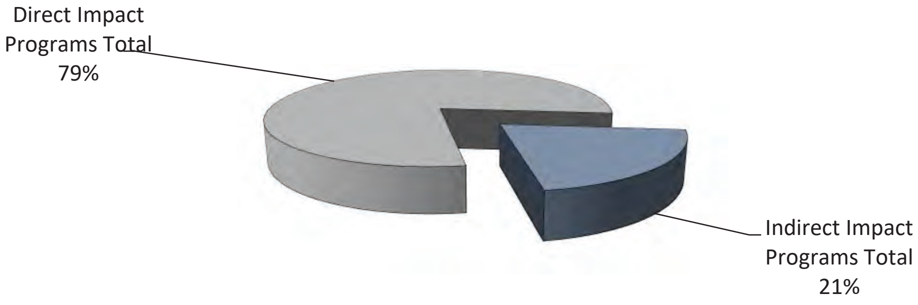
[4] From the docket above, see the February 28, 2023 Order at Order Point 43 and the September 1, 2022 ALJ's Findings of Fact, Conclusions of Law, and Recommendations at pp. 129-31.

Status Report

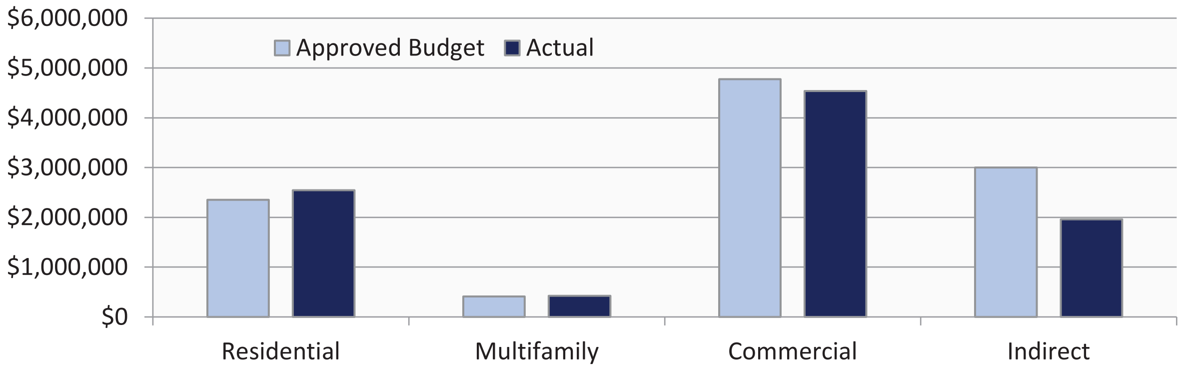
2022 CIP Status Report

Minnesota Power's energy conservation strategy provides a wide variety of program offerings to best serve its diverse customer mix. Each customer is unique in both their motivations for pursuing energy efficiency opportunities and their ability to engage in different offerings. With this knowledge, Minnesota Power provides a combination of traditional programs and innovative delivery strategies designed to address the needs and barriers of each customer segment including residential, multifamily and business. Minnesota Power's CIP portfolio includes a combination of "direct savings" and "indirect savings" programs that complement each other and provide for a balanced and meaningful customer experience.

2022 Program Spending By Direct and Indirect Savings Programs

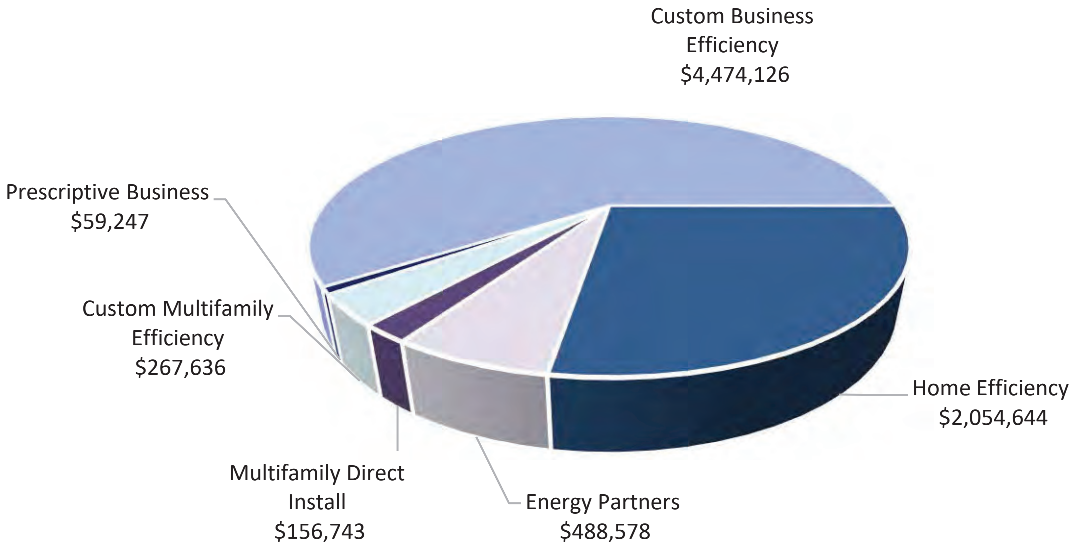


2022 Approved Budgets & Actual Spending Per Segment

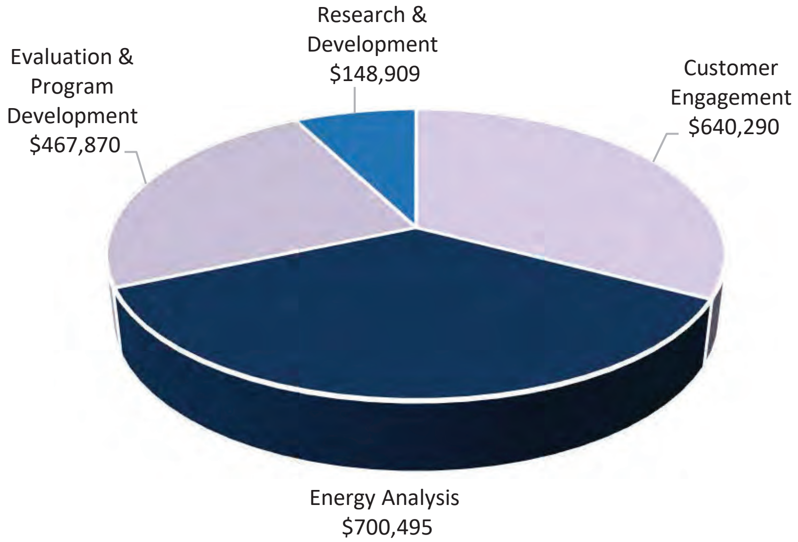


Investing in a range of programs is essential to keep Minnesota Power's program portfolio strong well into the future. Minnesota Power added three new programs to its CIP portfolio in the 2021-2023 Triennial Plan to better serve all customer segments. See the figures below for a breakdown of spending by program.

2022 Direct Savings Program Spending Breakdown

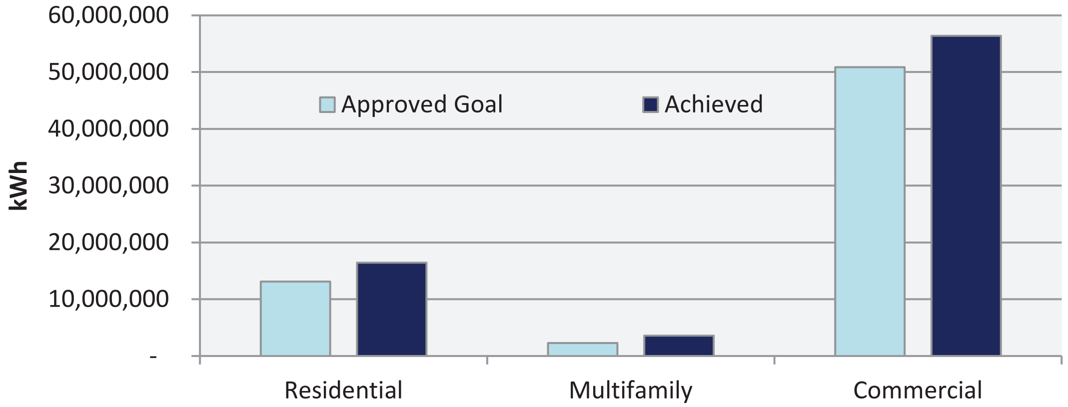


2022 Indirect Savings Program Spending Breakdown



Minnesota Power met or exceeded the energy savings goal in each segment of its CIP portfolio, as shown in the chart below. Two programs within those segments, Multifamily Direct Installation and Energy Partners, did not achieve the approved energy savings goal for various reasons as described in detail in the specific program descriptions. Minnesota Power continues to work with customers, stakeholders and delivery partners to identify opportunities to refine these offerings going forward.

2022 Approved Savings Goals & Achievements per Segment



For further context regarding Minnesota Power's energy conservation programs and the impact they have on customers, see the Successes section of this filing. These case studies highlight people, businesses and communities taking ownership of their energy usage and demonstrate how Minnesota Power connects with customers through conservation.

Looking Forward

There are many factors influencing the energy efficiency environment in Minnesota, including rising delivery costs, evolving state and federal policy, and changes in cost effectiveness. Minnesota Power has worked closely with customers, contractors, stakeholders, and regulators to ensure that programs are flexible and responsive to the evolving industry and has taken steps to modify programs as needed. However, additional actions will be required to ensure Minnesota Power's CIP portfolio continues to meet customer needs and encourages equitable access to customer programs as the environment continues to evolve.

Program delivery costs have increased significantly in recent years. The combination of inflation, supply chain disruptions, and economic uncertainty have impacted customers' ability to make capital improvements to their homes and businesses. Additionally, attracting and retaining talent in northern Minnesota has continued to create challenges for customers, delivery partners, and the Company. Encouraging customers to make energy-efficient investments has required higher incentives, more costly equipment and more resources than have historically been required.

In addition, the Company anticipates that recent federal and state policy changes will have a significant impact on Minnesota Power's CIP portfolio in the coming years. Initial guidance related to the ECO Act passed by the Minnesota legislature in 2021 was provided on March 15, 2022 as the result of a significant Department-led stakeholder working group.[17] This guidance will enable utilities to begin exploring new types of offerings including efficient fuel switching and load management activities. As utilities and stakeholders begin to utilize this guidance, further discussion and additional guidance will likely be needed. Meanwhile, the passage of the Inflation Reduction Act ("IRA") has introduced a significant amount of federal funding that will be available in the form of both rebates and tax credits on the purchase of energy efficient equipment and services. It will be critical for utilities and the Department of Commerce to coordinate on the design and implementation of these programs to ensure that customers are able to maximize the benefits of both CIP and IRA programs. While effective coordination and implementation of these funds could help address the rising costs of utility conservation programs, there is significant uncertainty around actual impacts.

Meanwhile, as the result of a robust series of Department-led working group efforts which included utilities, stakeholders, and industry experts, significant changes to the CIP/ECO evaluation framework and calculations have been proposed. Changes include the addition of a new primary screening test referred to as the Minnesota Cost Test ("MCT"), a test designed to reflect the State's energy policy goals and objectives, inclusion of new utility system and non-utility system impacts within the tests, and potential standardization of various existing impacts that historically have been utility specific. These changes, along with rising delivery costs and the new IRA programs described above, will make it difficult to predict the overall cost-effectiveness of CIP portfolios going forward. Flexibility to update and modify programs and portfolios will be more critical than ever going into the next Triennial.

Minnesota Power will continue to work with customers, stakeholders and regulators to ensure that programs are well-positioned to address challenges and opportunities associated with the rapidly evolving energy efficiency and optimization landscape into the future. Minnesota Power remains committed to providing sustainable, inclusive, and cost-effective energy-efficiency programs, with ongoing program development and increased efforts to raise program awareness and participation.

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[17] Docket No. E,G999/CIP-21-837

Exhibit 4
Page 1 of 1

Minnesota Power's 2022 CIP Expenditures & Achievements

2022	*Expenditures*				*Energy Savings (kWh @ Busbar)*				*Demand Savings (kW @ Busbar)*				*Participation*			
Direct Impact Programs	*Filed Budget*	*Approved Budget*	*Actual*	*Percent of Approved*	*Filed Goal*	*Approved Goal*	*Achieved*	*Percent to Goal*	*Filed Goal*	*Approved Goal*	*Achieved*	*Percent to Goal*	*Filed Goal*	*Approved Goal*	*Achieved*	*Percent to Goal*
Home Efficiency	$ 1,985,398	$ 1,985,398	$ 2,054,644	103%	11,847,171	11,847,171	15,214,197	128%	1,309	1,309	1,735.3	133%	225,559	225,559	309,430	137%
Energy Partners	$ 366,961	$ 366,961	$ 488,578	133%	1,246,050	1,246,050	1,203,774	97%	132	132	133.4	101%	14,126	14,126	12,735	90%
Multifamily Direct Install*	$ 247,228	$ 106,131	$ 156,743	148%	1,025,640	401,482	351,955	88%	112	43	39.9	92%	12,294	3,868	2,904	75%
Custom Multifamily Efficiency*	$ 140,588	$ 307,643	$ 267,636	87%	1,092,769	1,912,346	3,251,017	170%	184	350	628.4	179%	45	68	82	121%
Prescriptive Business Efficiency*	$ 123,323	$ 119,422	$ 59,247	50%	1,102,604	603,964	1,013,699	168%	123	88	173.4	198%	1,178	1,015	6,059	597%
Custom Business Efficiency	$ 4,651,797	$ 4,651,797	$ 4,474,126	96%	50,267,374	50,267,374	55,365,426	110%	8,101	8,101	5,484.9	68%	1,365	1,365	1,437	105%
Direct Impact Programs Total	**$ 7,515,295**	**$ 7,537,352**	**$ 7,500,974**	**100%**	**66,581,608**	**66,278,387**	**76,400,067.6**	**115%**	**9,962.1**	**10,023.0**	**8,195.2**	**82%**	**254,567**	**246,001**	**332,647**	**135%**
Indirect Impact Programs																
Customer Engagement	$ 864,900	$ 864,900	$ 640,290	74%									100,750	100,750	103,470	103%
Energy Analysis	$ 1,018,077	$ 1,018,077	$ 700,495	69%									6,145	6,145	5,771	94%
Evaluation & Program Development	$ 731,472	$ 731,472	$ 467,870	64%												
Research & Development	$ 384,600	$ 384,600	$ 148,909	39%												
Indirect Impact Programs Total	**$ 2,999,049**	**$ 2,999,049**	**$ 1,957,564**	**65%**	**-**	**-**	**-**						**106,895**	**106,895**	**109,241**	**102%**
Regulatory Charges	$ 200,000	$ 200,000	$ 177,191	89%												
Total	**$ 10,714,344**	**$ 10,736,401**	**$ 9,635,730**	**90%**	**66,581,608**	**66,278,387**	**76,400,068**	**115%**	**9,962.1**	**10,023.0**	**8,195.2**	**82%**	**361,462**	**352,896**	**441,888**	**125%**

*Approved budgets and goals for these programs reflect program modifications as filed and approved in Docket No. E015/CIP-20-476.

Appendix P

Phase Ia Cultural Resources Literature Search

Phase I Reconnaissance Survey

HVDC Modernization Project
St. Louis County, Minnesota

minnesota power
AN ALLETE COMPANY

An operating division of ALLETE, Inc.
30 W Superior Street
Duluth, Minnesota 55802

PREPARED BY
Merjent, Inc.
1 Main Street SE, Suite 300
Minneapolis, Minnesota 55414

Stephen Larsen, BA

Michael Madson, MS
Principal Investigator

December 2022

merjent

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APPENDIX A	PHASE 1 SITE FORM

ACRONYM LIST

APE	Area of Potential Effects
BCE	Before the Common Era
CE	Common Era

ACRONYM LIST

APE	Area of Potential Effects
BCE	Before the Common Era
CE	Common Era
CFR	Code of Federal Regulations
cmbd	centimeters below datum
DAC	Duluth Archaeology Center
MDNR	Minnesota Department of Natural Resources
GIS	Geographic Information System
GLO	General Land Office
GPS	Global Positioning System
GSV	Ground Surface Visibility
HVDC	Square Butte HVDC Transmission Line
kV	Kilovolt
LHVTL	Large high-voltage transmission line
Merjent	Merjent, Inc.
MnDOT	Minnesota Department of Transportation
MP	Minnesota Power
NRCS	U.S. Department of Agriculture, Natural Resources Conservation Service
NRHP	National Register of Historic Places
OSA	Minnesota Office of the State Archaeologist
Phase I	Phase I Reconnaissance Survey
Project	Upper Midwest Express Project
SHPO	Minnesota State Historic Preservation Office

EXECUTIVE SUMMARY

Minnesota Power intends to submit a combined application for a Certificate of Need and a Route Permit to modernize and upgrade its existing High-Voltage Direct-Current (HVDC) terminal near the Arrowhead Substation located in Hermantown Minnesota (the HVDC Modernization Project" or Project). The Project would require modernizing and upgrading both HVDC terminals for the 465-mile-long HVDC transmission line (HVDC Line) and interconnecting the upgraded HVDC terminals to the existing alternating-current (AC) transmission system. These HVDC terminals are currently located near the Arrowhead Substation in Hermantown, Minnesota and the Center Substation in Center, North Dakota. In order to modernize the HVDC terminals and implement the latest technology, new buildings and electrical infrastructure need to be constructed on a new site near the existing HVDC terminals. In Minnesota, to connect the new HVDC terminal to the existing AC system, the Project would require the construction of a new St Louis County 345 kilovolt (kV)/230 kV substation located less than one mile west of the current Arrowhead Substation. The new HVDC terminal would be connected to the St Louis County Substation by less than one mile of 345 kV large high-voltage transmission line (LHVTL) and the new St Louis County Substation would be connected to the existing Arrowhead Substation by two parallel 230 kV LHVTLs less than one mile in length. Additionally, a short portion of the existing ±250 kV HVDC Line in Minnesota will need to be reconfigured to terminate at the new HVDC terminal. The Project is currently scheduled to be in service in 2027. Minnesota Power is evaluating a 356.6 acre Project Study Area, which will be referred to as the Project Area in this report and associated figures.

Minnesota Power contracted with Merjent, Inc. (Merjent) to conduct a Phase I Reconnaissance Survey (Phase I) of the Project y Area. Merjent archaeologist Michael Madson served as Principal Investigator. Fieldwork was conducted between September 21 and September 22, 2022 by Merjent archaeological field lead, Stephen Larsen, and technicians Cristy Abbott, Paige Englert, and Matthew McKay.

The effort to identify archaeological deposits in the Project s Area was appropriate given existing environmental conditions and construction workspace requirements. Pedestrian survey was conducted on all tracts where access was granted. Of the 356.6 total acres in the Project Area, 126.55 acres were surveyed. Additionally, 21 shovel tests were excavated in various locations deemed high potential by Mr. Larsen.

During the survey, Merjent identified Site 21SL1274, which includes two historic depression features, one stone foundation feature, and an associated historic artifact scatter and is considered unevaluated for the National Register of Historic Places (NRHP).

Should Project construction plans impact Site 21SL1274 Merjent recommends site evaluation by means of Phase II Intensive Survey, to determine eligibility for listing on the NRHP. Until the site can be formally evaluated Merjent recommends the site be avoided by all construction activities with a 25-foot buffer around the site.

1.0 PROJECT DESCRIPTION

Merjent, Inc. (Merjent) was contracted by Minnesota Power to conduct a Phase I Reconnaissance Survey (Phase I) of 356.6 acres of land for the proposed Upper Midwest Express Project (Project). Of the 356.6 total acres in the Project Area, 126.55 acres were surveyed (See survey results in Section 4). The Project Area is located in Township 50 North, Range 15 West, Section 31, and Township 50 North, Range 16 West, Section 36 in St. Louis County, Minnesota (see Figure 1, Appendix A).

2.0 ENVIRONMENTAL BACKGROUND

The Project Area is located in St. Louis County, Minnesota within the North Shore Highlands Subsection of the Northern Superior Uplands section of the Laurentian Mixed Forest Province as defined by the Minnesota Department of Natural Resources (MNDNR) Ecological Classification System. This subsection is located adjacent to Lake Superior, and parallels the Highland Moraine associated with the lake, 20 to 25 miles inland. Lake Superior is the main feature in this region and moderates the climate throughout the year. Pre-settlement vegetation of this area was pine, fir, and aspen-birch forest, along with conifer bogs and swamps. The present land is still dominated by forest, therefore forest management and recreation, along with tourism are the primary uses (MNDNR, 2022).

2.1 TOPOGRAPHY

The landscape ranges from rugged lake-dotted terrain with thin glacial deposits over bedrock, to hummocky or undulating plains with deep glacial drift, to large, flat, poorly drained peatlands (MDNR, 2019a). Further, the Project area is in the Northern Superior Uplands Section (MDNR, 2019b), which predominantly coincides with the Canadian Shield and is characterized by glacially scoured bedrock terrain with thin and discontinuous deposits of coarse loamy till around numerous lakes. The section has high relief, reflecting the rugged topography of the underlying bedrock (MDNR, 2019b). Elevations in the Project Area vary from 384 to 457 meters above sea level. The topography observed in the Project area was rough and undulating with sporadic wetland bog area, and generally coincides with the description provided by the MDNR.

2.2 GEOLOGY

The area of the Project has thin glacial drift over the entire subsection and large areas of exposed bedrock near the surface. The underlying bedrock consists of Upper Precambrian basalt, rhyolite, gabbro, diabase, anorthosite, granite, sandstone, and shale. (Morey and Walton, 1976) Bedrock within the immediate Project Corridor is part of the Animikie Group. The Animikie Group a geologic group composed of sedimentary and metasedimentary rock and was deposited between 2,500 and 1,800 million years ago during the Paleoproterozoic era. This group of formations is geographically divided into the Gunflint, the Mesabi, the Vermillion, and the Cuyuna Ranges. The Mesabi Range is located largely in St. Louis County. The bedrock of the group in the immediate vicinity of the Project Corridor is composed of slate and greywacke (USGS 2022; MNDNR 2022).

2.3 SOILS

According to St. Louis County soil data, there are seven different soil series within the Project area (Natural Resources Conservation Service [NRCS], 2022). Basic descriptions of each soil type are provided in Table 2.2-1. These soil types typically occur on steep slopes, suggesting there is generally low potential for intact subsurface deposits across the survey area. Additionally, any gravel pits likely would have stripped away the intact, subsurface, cultural deposits, depending on their depth.

TABLE 2.3-1

NRCS Soil Types within the Project Area (NRCS, 2022)

Map Unit Symbol	Map Unit Name	Acres in Project Area	Percent of Project Area
1020A	Bowstring and Fluvaquents, loamy, 0 to 2 percent slopes, frequently flooded	25.2	7.1%
F117D	Rollins sandy loam, 8 to 18 percent slopes	7.3	2.1%
F121B	Aldenlake sandy loam, 2 to 8 percent slopes	60.7	17.0%
F134A	Giese muck, depressional, 0 to 1 percent slopes	0.1	0.0%
F135A	Hermantown-Canosia-Giese, depressional, complex, 0 to 3 percent slopes	1.9	0.5%
F136A	Hermantown silt loam, 1 to 3 percent slopes	0.3	0.1%
F137B	Normanna-Canosia-Hermantown complex, 0 to 8 percent slopes	45.7	12.8%
F141D	Ahmeek-Normanna-Cathro, depressional, complex, pitted, 0 to 25 percent slopes	0.3	0.1%
F142A	Canosia loam, 0 to 2 percent slopes	14.0	3.9%
F143B	Normanna-Aldenlake-Canosia complex, 0 to 8 percent slopes	6.4	1.8%
F144D	Aldenlake-Ahmeek complex, 8 to 18 percent slopes	91.1	25.5%
45F	Ahmeek-Aldenlake complex, 18 to 45 percent slopes	73.4	20.6%
F151A	Tacoosh mucky peat, dense substratum, 0 to 1 percent slopes	12.6	3.5%
F154A	Urban land-Hermantown-Canosia complex, 0 to 3 percent slopes	1.7	0.5%
GP	Pits, gravel-Udipsamments complex	15.8	4.4%

2.4 VEGETATION

The Project area is located in the Laurentian Mixed Forest physiographic province (MDNR, 2020). The Laurentian Mixed Forest Province traverses northern Minnesota, Wisconsin, Michigan, southern Ontario, and the less mountainous portions of New England. Near the Project area, the Province is characterized by broad areas of conifer forest, mixed hardwood and conifer forests, and conifer bogs and swamps (see Photo 2.4-1).

Photo 2.4-1. Typical vegetation and topography in Project area.

2.5 CULTURAL AND HISTORICAL OVERVIEW

Merjent archaeologists conducted an archival review of the Project's Area of Potential Effects (APE) and the surrounding area within a 1-mile radius, referred to as the Study Area (see Figures A1 to A4). The Project is within the Minnesota State Historic Preservation Office's (SHPO) Archaeological Sub-Regions 5e (Central Lakes Coniferous East), which contains parts of Aitkin, Carlton, Itasca, Lake, and St. Louis Counties (Gibbon et al., 2002). Additionally, the Project APE falls primarily within the Low Layer of the Mn-Model (Phase 4) Survey Implementation Model (Minnesota Department of Transportation [MnDOT], 2022).

Due to access restrictions at the time of the file search, archival information on file at the SHPO was limited to known or suspected archaeological site locations and previous surveys; therefore, a complete review of previous surveys was not possible due to Covid-19 restrictions. No previous surveys or archaeological sites were found within the Study Area. Merjent archaeologists also reviewed additional archival resources, including 19th century maps and field notes published by General Land Office (GLO), and historic aerial photographs. A railroad (XX-ROD-176) is located within the Project Study Area, but does not intersect the survey area.

Merjent reviewed 19th century GLO maps and notes on file with the Bureau of Land Management (2022). The GLO maps within the Study Area show an undulating landscape with intermittent wetland bog areas which is generally the same as it is today. The maps indicate no structures, roads, or other 19th century improvements within the Study Area.

Merjent reviewed aerial photographs taken between 1948 and 1972 on file with the OSA. The 1948 aerial photograph shows that much of the Study Area was once cleared of forest by logging and appeared to be grasslands at that point in time. Aerial photography from 1972 shows that some areas scattered across the Survey Area have become wooded since then. There is evidence throughout the Project Area that there has been disturbances caused by the construction of various public roads, railroad, residential and commercial structures, and above ground utilities like powerlines and electrical substations.

2.5.1 Pre-Contact Period (10,900 BCE-1650 CE)

The first inhabitants of Minnesota are known as Paleo-Indians (10,900 to 7,500 years Before the Common Era [BCE]). These people were highly nomadic hunter-gatherers, moving in small bands in search of food and other subsistence resources; however, in the Late Glacial and Early Holocene forests of Minnesota, Paleo-Indians likely relied more on gathering and the hunting of a variety of smaller animals. Paleo-Indian sites are small and relatively ephemeral and are commonly identified with the recovery of distinctive spear tips that occur across much of North America (Gibbon et al., 2002).

The Paleo-Indian peoples were followed by Archaic Tradition hunter-gatherers. At the end of the Ice Age around 10,000 years BCE, the climate became warmer and drier, which led to major changes in plant and animal communities. Spruce forests followed the retreating glacial ice northward and were replaced by a new landscape comprised of extensive lakes and rivers. Many large-game species became extinct. Archaic Tradition hunters-gatherers (7,500 to 500 BCE) adapted to this new environment, shifting their focus to smaller game such as deer and elk, the abundant fish and shellfish in the numerous lakes and rivers, and wild plants such as nuts and berries (Gibbon et al., 2002).

The Archaic peoples appear to have been less nomadic and lived in smaller household groups. Archaic sites are identified by large notched and stemmed projectile points. Immense sedimentation during the early part of the Archaic, corresponding with the Early and Middle Holocene periods, resulted in many Archaic Tradition sites being deeply buried under river valley deposits; therefore, these sites are not usually evident in surficial contexts (Gibbon et al., 2002).

The Woodland Tradition followed the Archaic Tradition. In Minnesota, the Woodland culture is separated into two periods, the earlier Initial Woodland period (ca. 500 BCE to 500 years into the Common Era [CE]), and the later Terminal Woodland period (500 to 1650 CE) (Gibbon et al., 2002).

The frequent surficial expression of Woodland site locations, coupled with burial mounds that frequently mark their place, has resulted in more frequent documentation and excavation of Woodland sites. Due to this higher frequency of identification, many Woodland sites have also been grouped into specific regional archaeological cultures (Gibbon et al., 2002; Gibbon, 2012).

The Initial Woodland period is primarily marked by the emergence of Pre-contact ceramic traditions and burial mounds. Regional archaeological cultures of the Initial Woodland period include Howard Lake, Malmo, Elk Lake, and Laurel (Gibbon et al., 2002; Gibbon, 2012).

The Terminal Woodland period has been defined throughout eastern and central Minnesota, the Red River Valley, and portions of the Dakotas (Gibbon, 2012). During this time period, populations began to increase, which in turn led to an increase in size and number of Pre-contact sites. Burial mounds became more prevalent and the cultural material artifacts began shifting to smaller, unnotched triangular projectile points and thinner ceramic vessels that were more globular in shape. Agriculture and wild rice harvests also increased (Gibbon, et al. 2002; Gibbon, 2012).

In the northern portion of the state, ceramic types and burial practices indicate specific regional archaeological cultures, including Kathio, Blackduck, and Psinomani. In the southern portion of the state, primarily comprised of deciduous forests and prairie, some cultures adopted the cultivation of maize and the construction of effigy burial mounds (Gibbon, et al. 2002; Gibbon, 2012).

Around approximately 1,000 CE, Mississippian populations from Cahokia, near St. Louis, Missouri, began to extend their influence northward into the Upper Mississippi River Valley and evidence suggests that there were attempts at colonization. Archaeologists tend to regard some southern Minnesota Terminal Woodland cultures as the northern expression of a “Mississippian” lifeway, distinguished by distinctive ceramic styles, larger and more diverse artifact assemblages, and evidence of maize production. In southern Minnesota, three Mississippian complexes have been identified: Silvernale, Oneota, and Plains Village (Gibbon et al., 2002). It was the Mississippian peoples in the south, and the Terminal Woodland peoples in the north, who had contact with the first Europeans to explore Minnesota in the mid-17th century (Gibbon et al., 2002; Gibbon, 2012).

2.5.2 Contact Period (1650-1837 CE)

The Contact Period includes American Indian and Euro-American contexts. The OSA subdivides the American Indian context into “Indeterminate” or “Eastern Dakota,” and the Euro-American context into “Indeterminate,” “French,” “British,” and “Initial US” (OSA, 2009). This section focusses on developing a context for those sites identified during the Project investigations. The remaining information provides a temporal framework as a context.

Euro-American fur traders and settlers encountered the Dakota (also known as Sioux) and Ojibwe (also known as Chippewa) Native American peoples when they moved into traditional lands in what is now Minnesota. Several other Native American tribes, including the Assiniboine moved west in the early 1600s, soon after the explorers and traders entered the region (Holmquist, 1981). The Dakota lived in village-centered societies in the southern portion of Minnesota while the Ojibwe were organized into independent migratory bands in the northern portion of Minnesota. (Gibbon, 2012:205). Traditionally, Ojibwe individuals lived in bands and were members of a clan (Roy, 2018).

The first written European accounts about the Ojibwe appeared in Jesuit diaries, published in collected form as the Jesuit Relations and Allied Documents 1610-1791 (Thwaites, 1898), described by Roy (2018). The documents are so detailed in their descriptions of Native Americans and their cultures, they are considered ethnographic accounts. Following the Jesuits, French explorers and trappers traveled portions of Minnesota in the 17th century and established a fur trading economy with local native populations, including the Dakota and Ojibwe. Early trading posts were established along the lower Mississippi River and the first French fort was established in 1700 near present day Mankato. The fur trade resulted in the Ojibwe becoming reliant on traded goods rather than the clothing, utensils, and weapons they had traditionally constructed (Roy, 2018).

In the early 18th century, the French began to move their fur trade north into Canada. Over the next 100 years, the Ojibwe and French established strong relationships and the French embraced Ojibwe culture, learned the language, and married into Ojibwe families. Territorial disputes, competition, and shifts in political alliances eventually led to the French and Indian War (1754-1763). The Ojibwe sided with the French against the British in the final Colonial War fought between 1689 and 1763, which culminated with the French and Indian War. At the end of the

French and Indian War, the 1763 Treaty of Paris resulted in the French ceding all land east of the Mississippi River in the New World to the British (Fond du Lac Band of Lake Superior Chippewa, 2018). The French had already ceded the land west of the Mississippi River to Spain with the 1762 Treaty of Fontainebleau, but the transfer was not publicly announced until 1764. The region was retroceded to France, under the terms of the 1800 Third Treaty of San Ildefonso and the 1801 Treaty of Aranjuez, then was transferred to the United States in 1803 by the Louisiana Purchase (World History Project, 2018). Although the United States purchased the land, the Dakota, Ojibwe, and several other Native American groups maintained sovereignty, resulting in numerous subsequent treaties with the United States.

After the Treaty of Paris in 1763, the British quickly set up fur trading posts throughout Minnesota. The British fur trading economy was centered at Grand Portage, where traders would bring their furs and leave with other valuable trade goods. Jonathon Carver explored the upper Mississippi River in the 1760s. After the Revolutionary War of 1776, competition between the United States and British companies intensified throughout Minnesota. In 1803, the Louisiana land purchase established United States lands extending from the Atlantic to the Rocky Mountains. The War of 1812 saw a demise in the British fur traders due to the United States denying business licenses to British traders.

Early British and United States citizens conducted the first fully documented land survey of Minnesota in the mid-18th and early 19th centuries. By 1806, Zebulon Pike had explored portions of the Mississippi River. Missionaries began to arrive in the early 19th century, primarily along the Minnesota River. The American Fur Company was founded by John Jacob Astor in 1811, after which numerous fur trading posts were quickly established throughout the state. At the confluence of the Minnesota and Mississippi River, Fort Snelling was constructed in 1819 to protect the new United States' investments in the area. Large-scale fur trade resulted in a major decline in the native beaver populations and by 1842, the fur trade in Minnesota came to an end when the American Fur Company came to its demise (Dobbs, 1989). After the passing of the fur trading industry, land was opened up to Euro-American settlers.

Farming (1820-1960)

Although land transactions undoubtedly occurred prior, the United States General Land Office ("GLO") records document the first transfer of title of public lands in the state in 1848, which was when the land opened for homestead entry (BLM 2002). Not quite 100 years later, in 1930, public domain was declared closed in Minnesota (BLM 2002).

In the multi-volume Minnesota Department of Transportation ("MNDOT") Minnesota farmstead context, Terrell (2006) divides Euro-American Farms in Minnesota (1820-1960) into eight development periods:

- Early Settlement (1820-1870)
- Development of a Wheat Monoculture (1860-1885)
- Diversification and the Rise of Dairying (1875-1900)
- Industrialization and Prosperity (1900-1920)
- Developing the Cutover (1900-1940)

- Development of Livestock Industries (1900-1940)
- Depression and the Interwar Period (1920-1940)
- World War II and the Postwar Period (1940-1960)

In 1866 with the advent of the railroad, Bonanza farming was begun by Oliver Dalrymple in Washington County. He purchased three large farms located about fifteen miles south of St. Paul between the St. Croix and Mississippi Rivers. In 1867, he cultivated 1,700 acres in wheat and 2,000 acres in 1869. Bonanza farming was characterized by growing solely wheat by mass production with specialized machinery and a large labor force (McCroskey 1990). About five years later, Dalrymple was hired to manage the Cass-Cheney Bonanza farm, which grew to 32,000 acres, in North Dakota (McCroskey 1990). Bonanza farms were characterized as large wheat growing empires emphasizing mass production with specialized machinery and an assembly line cast of laborers. Managed and operated by eastern industrial capitalists, these farms were important propaganda instruments designed to boost land sales and regenerate railroad building in the northern Plains. Bonanza farms effloresced following the financial Panic of 1873 and lasted until the early twentieth century, when smaller farms with diversified crops proved more profitable due to a steady drop in wheat prices and a single family constituted the labor force (McCroskey 1990).

The MNDOT has developed a context for farmsteads (Granger and Kelly 2005) that mirrors that of the MHS. Granger and Kelly (2005) place the Project in geographic area 8. Area 8 is the Northern Cutover Dairy, Potatoes, and Clover Seed and comprises the easternmost portion of the Project. Area 8 consisted of the whole of northeast Minnesota and dairying was the principal type of farming in 1940 (Granger and Kelly 2005). By 1939, there were approximately 30,000 farms that averaged 103 acres in size—the state average was 165 acres at that time (Engene and Pond 1940). About 20 percent of the farmhouses had electric lights, 4 percent had flush toilets, and 7 percent had running water (Davies 1947, in Granger and Kelly 2005).

For most of the twentieth century, five farm products generated most of the farm income in Minnesota: (1) livestock, (2) poultry, (3) dairy products, (4) oil crops, and (5) wheat. Important specialty crops during this period were vegetables, potatoes, sugar beets, and barley for malting; however, much of the crop yield was grown to feed livestock, and a strong livestock industry developed in the state. In addition, Minnesota was home to an array of processing industries that bought and used the commodities produced on Minnesota farms (Tweton 1989: 282).

3.0 FIELD METHODS

This section presents the Phase I methodology, research design, and NRHP evaluation criteria used during Project investigations.

3.1 PHASE I FIELD SURVEY METHODS

The general objective of a Phase I is to identify archaeological resources within the Project area that are at least 45 years of age. Archaeological resource types considered for this investigation included both precontact and postcontact period archaeological sites and earthworks that could provide information about human occupation. Such sites could be evident in artifacts or features on or below the current ground surface. The focus of this field investigation was to understand if any unknown resources could be positively identified in the Project area (See Figure 3, Appendix A).

Phase I fieldwork was completed in accordance with standard Phase I methods as outlined by Anfinson (2005, 2011). Merjent archaeologist Stephen Larsen, with three archaeological technicians, executed the field reconnaissance on September 21 and September 22, 2022. Archaeologists located the Project using Geographic Information System (GIS) data in conjunction with a Trimble R1 series Global Positioning System (GPS) unit.

Mr. Larsen assessed ground surface visibility (GSV) to determine the proper survey techniques. Level areas without obvious evidence of previous disturbance and where GSV was greater than 25 percent were pedestrian surveyed. Shovel testing was conducted along landforms with high potential of containing archaeological resources with less than 25 percent GSV due to dense vegetation. These shovel tests were generally excavated in 15-meter intervals, with an allowance to offset the shovel test to avoid exposed rocks, trees, or other obstacles. Shovel tests were at least 30 centimeters in diameter and excavated to sterile subsoil or impregnable rock. Soils recovered from shovel tests were screened through 0.25-inch hardware cloth mesh and immediately returned to the excavation. For the single recorded site, six of the shovel tests were excavated on the landform above and around the site due to the slope.

Because no artifacts were collected, no laboratory methods are presented.

Merjent archaeologists photographed areas of varying conditions within the Project area and recorded ground surface and subsurface conditions on standard field forms. Field forms, photographs, and all archival material are on file at Merjent's office in Minneapolis, Minnesota. Surveys were completed across the entire Project Area where access was granted.

The Project area primarily consists of mixed woods, existing powerline corridors, and developed residential areas on steep slopes and around some wetlands (see Figure 3, Appendix A. Steep slopes and wetlands were not surveyed.

At the time of survey, not all parcels within the project area were available for survey and the entire project area could not be surveyed. Eight of the twenty-one total parcels were surveyed during this mobilization for a total of 126.55 acres (See Table 4.0-1; Figure 1). Parcels Merj_01, Merj_03, and Merj_04 share the same landforms, topography, and land use. Separately, parcels Merj_07, Merj_17, Merj_20, Merj_22, and Merj_23 share the same landforms, topography and land use. The parcels with similar ecological characteristics are color-coded in Table 4.0-1.

Table 4.0-1

Parcel Status: First Mobilization

Merjent Parcel #	Acreage	Permissions (At time of survey)	Survey Status
Merj_1	65.39	Survey Granted	Survey Complete
Merj_2	25.86	Denied	Incomplete
Merj_3	1.21	Survey Granted	Survey Complete
Merj_4	10.01	Survey Granted	Survey Complete
Merj_5	0.04	Denied	Incomplete
Merj_6	6.52	Denied	Incomplete
Merj_7	5.28	Survey Granted	Survey Complete
Merj_8	9.76	Denied	Incomplete
Merj_9	0.18	Denied	Incomplete

Merj_10	11.39	Denied	Incomplete
Merj_11	39.45	Denied	Incomplete
Merj_13	38.96	Denied	Incomplete
Merj_14	39.46	Denied	Incomplete
Merj_15	10.37	Denied	Incomplete
Merj_16	8.98	Denied	Incomplete
Merj_17	0.59	Survey Granted	Survey Complete
Merj_18	4.52	Denied	Incomplete
Merj_19	9.99	Denied	Incomplete
Merj_20	4.5	Survey Granted	Survey Complete
Merj_22	0.10	Survey Granted	Survey Complete
Merj_23	39.47	Survey Granted	Survey Complete

Topography in parcels Merj_01, Merj_03, and Merj_04 is somewhat undulating with a large, boggy, inundated, wetland area which follows a creek channel that runs through these properties (see Photo 4.0-1). Vegetation consists mostly of mixed woods. A powerline corridor runs through these parcels and there has been additional ground disturbance where the APE borders a power substation to the east. GSV was generally between 20 and 40 percent along the tops of the landforms. Several ATV trails have been cut through these parcels, presumably by the landowner. There are also deer stands throughout these properties and it is evident that the landowner(s) utilize these properties somewhat regularly.

4.0 PHASE I SURVEY RESULTS

Phase I survey within these parcels was conducted by focusing on the landforms throughout the area. Eleven shovel tests were excavated on relatively level landforms as those were judged to have a higher probability to contain archaeological sites (See Figure 3). All shovel tests were negative. Site 21SL1274, a historic stone foundation with associated depressions and scatter of historic artifacts, was identified in this area, specifically parcel Merj_01 (see Figure 3, Map 6, Appendix A).

Photo 4.0-1: Overview of the creek channel running through parcels Merj_01, Merj_03, and Merj_04. View to the North.

Photo 4.0-2: Overview of partially developed area, parcel Merj_20. View to the north.

Topography in parcels Merj_07, Merj_17, Merj_20, Merj_22, and Merj_23 is somewhat undulating with small pockets of wetland. Vegetation is cut grass with small patches of mixed woods where trees have been allowed to grow. Several private residences consisting of multiple structures, driveways, and fences are located on these parcels along with a powerline corridor. These parcels have seen heavy disturbance from these various sources. Pedestrian transects were performed throughout the parcels to identify surface features. Ten shovel tests were excavated in parcel Merj_23 where the landform was relatively level and appeared undisturbed (see Figure 3). All shovel tests were negative. No archaeological materials were identified on these parcels.

Photo 4.0-3: Shovel tested area in parcel Merj_23. View to the southeast.

4.1 FIELD NUMBER 21SL1274

Site 21SL1274 is located in the [redacted] in Township 50 North, Range 15 West in St. Louis County, Minnesota (see Figure 3). This site consists of one stone foundation (CF003), two depression features (CF001; CF002), and a scatter of historic artifacts dating from the early-mid 20th-century (See Figure 4 and Figure 5, Appendix A). Vegetation at the site consists of ferns and mixed woods that have been partially cleared at some point. The features themselves are very overgrown with trees of various ages, along with ferns and a thick mat of moss.

All three features are dug into the south-facing slope of a narrow finger ridge, above a creek floodplain to the east, and are aligned east-west with all three features opening to the south. Feature CF001 consists of a depression measuring 23 feet north-south, 6 feet east-west, and approximately 2 feet deep at its center. The feature is just outside the west wall of CF003 and contained a light scatter of approximately 20-30 glass shards of various colors including clear bottle and clear window, milk, aqua, and brown glass along with approximately 10 unidentifiable pieces of rusted metal. Feature CF002 consists of a depression measuring 28 feet north-south, 5 feet east-west, and approximately 2 feet deep at its center. The feature is just outside the east wall of CF003 and contained a light scatter of glass shards of various colors, some modern aluminum soda cans, some small sherds of whiteware, and some unidentifiable pieces of rusted metal. One semi-complete soda bottle reading “Mission Beverages” was identified and dates to around 1940 (Portsmouth Public Library 2022). Feature CF003 consists of a square foundation built from dry-laid limestone boulders and cobbles measuring 20 feet north-south, 15 feet east-west, and approximately 4 feet deep at its center. There is a roughly 2-foot-wide gap in the south-facing wall of the foundation that was presumably a door, or entrance, to the structure. The outer walls of the foundation appear to have been intentionally covered with soil. The feature has been partially filled in by natural forest debris like leaves and fallen timber. There are possible remnants of semi-processed timber used for some type of structure, but this could not be confirmed without some form of excavation of the foundation. A scatter of postcontact artifacts and modern trash was identified within this feature. Notable postcontact artifacts include, a large square nail, two tin pails, a metal oil can, and an unidentifiable early-mid 20th-century electronic device, possibly an early radio. The range of artifacts along with the modern trash dumped within the feature suggests that the site has been utilized in various ways, or at least visited, continuously over a relatively long period of time. The location of features CF001 and CF002 directly adjacent to CF003 possibly indicate they are depressions left by removing soil to create the foundation. The function of this site is indeterminable based on the current available information.

Six shovel tests were excavated on the ridge above, and around the site. All tests were negative for any archaeological materials and no additional archaeological materials were identified at ground surface on the ridge around the site. No shovel tests were excavated within the site or its features to avoid damaging the site. The site's location on a slope is also not conducive to conventional shovel testing. No artifacts were collected.

According to GLO records there are no patents associated with this property (BLM 2022). The 1916 plat map of St. Louis County shows no notable details on this property (University of Minnesota 2022). No historically significant people could be identified in association with this property.

Photo 4.1-1: Feature CF003 overview. View to south, angled down from above.

Photo 4.1-2: Eastern wall of Feature CF003.

Photo 4.1-3: "Mission Beverages" soda bottle, identified in Feature CF002.

Photo 4.1-4: 21SL1274 overview. View to the east.

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 PHASE I CONCLUSIONS

Merjent archaeologists conducted a Phase I survey of 126.55 acres for the proposed Project. Pedestrian survey was conducted on all parcels where access was granted. Landform pedestrian survey was conducted and twenty-one shovel tests were excavated on those landforms with a higher potential for intact archaeological sites such as flat areas (see Figure 3, Maps 1-6, Appendix A).

During the survey, Merjent identified site 21SL1274. This site includes two historic depression features, one stone foundation feature, and an associated historic artifact scatter dating from the early-mid 20th-century and is considered unevaluated for the NRHP.

Merjent recommends that the survey be completed. Should Project construction plans impact Site 21SL1274 Merjent recommends site evaluation by means of Phase II Intensive Survey, to determine eligibility for listing on the NRHP. Until the site can be formally evaluated Merjent recommends the site be avoided by all construction activities with a 25-foot buffer around the site boundary.

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Appendix A

Phase I Figures

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For Environmental Review Purposes Only

Figure 1: Project Location and Previous Cultural Resources

Minnesota Power
HVDC Modernization Project
St. Louis County, Minnesota

▭ Project APE
▭ One-Mile Buffer
▲ SHPO Architectural Structure
▭ Quad Map
▭ Site Boundary
▭ Township Boundary
▭ County Boundary

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For Environmental Review Purposes Only

Figure 2: 1857-1871 GLO Map

Minnesota Power
HVDC Modernization Project
St. Louis County, Minnesota

▭ Project APE	⬚ Township Boundary
⬚ One-Mile Buffer	▭ County Boundary

Appendix P
Page 25 of 42
MPUC Docket No. E015/CN-22-607
MPUC Docket No. E015/TL-22-611

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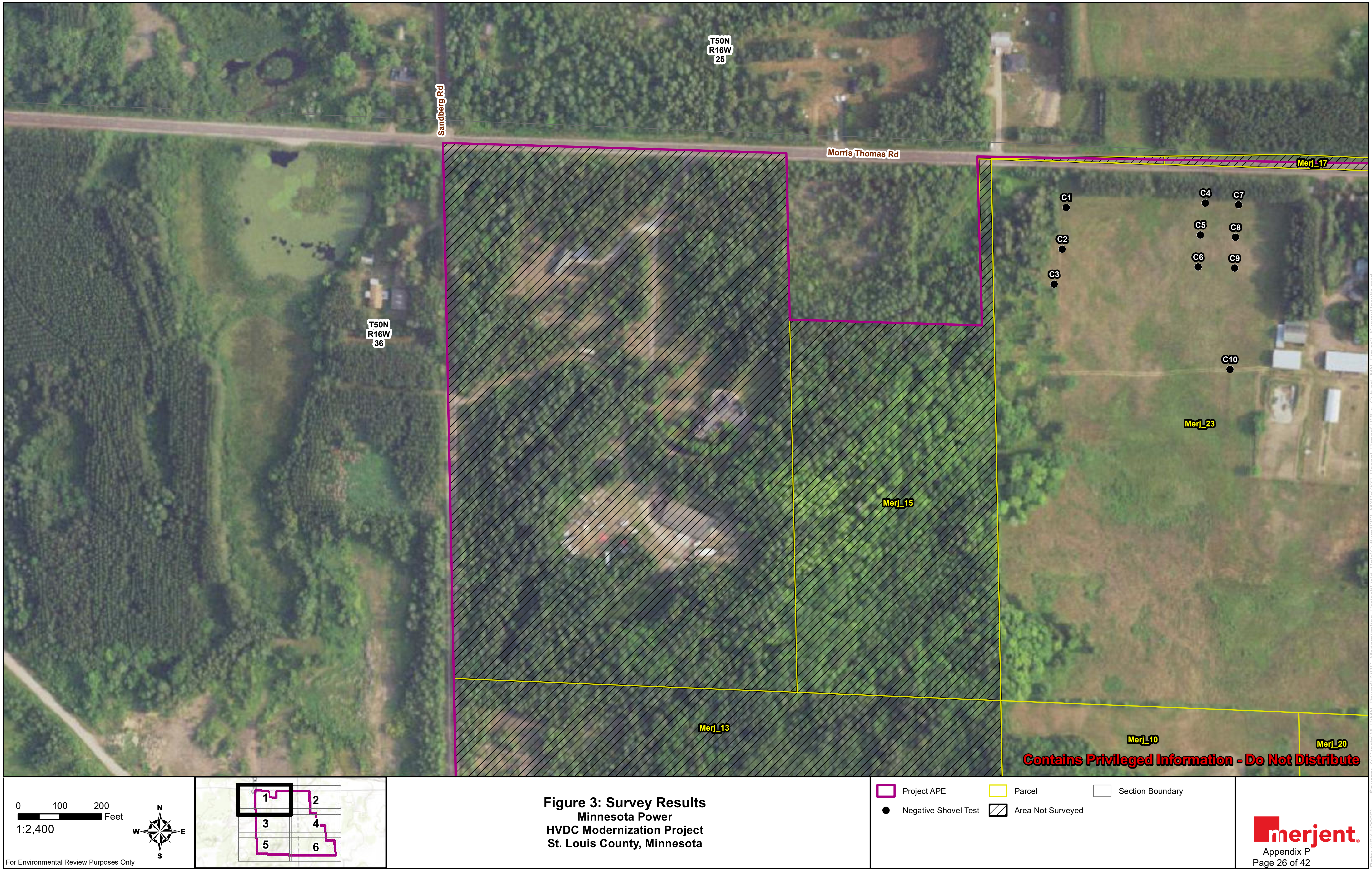

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For Environmental Review Purposes Only

Figure 3: Survey Results

Minnesota Power
HVDC Modernization Project
St. Louis County, Minnesota

🟪 Project APE	🟨 Parcel
☐ Section Boundary	● Negative Shovel Test
▨ Area Not Surveyed	

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Appendix P
Page 26 of 42

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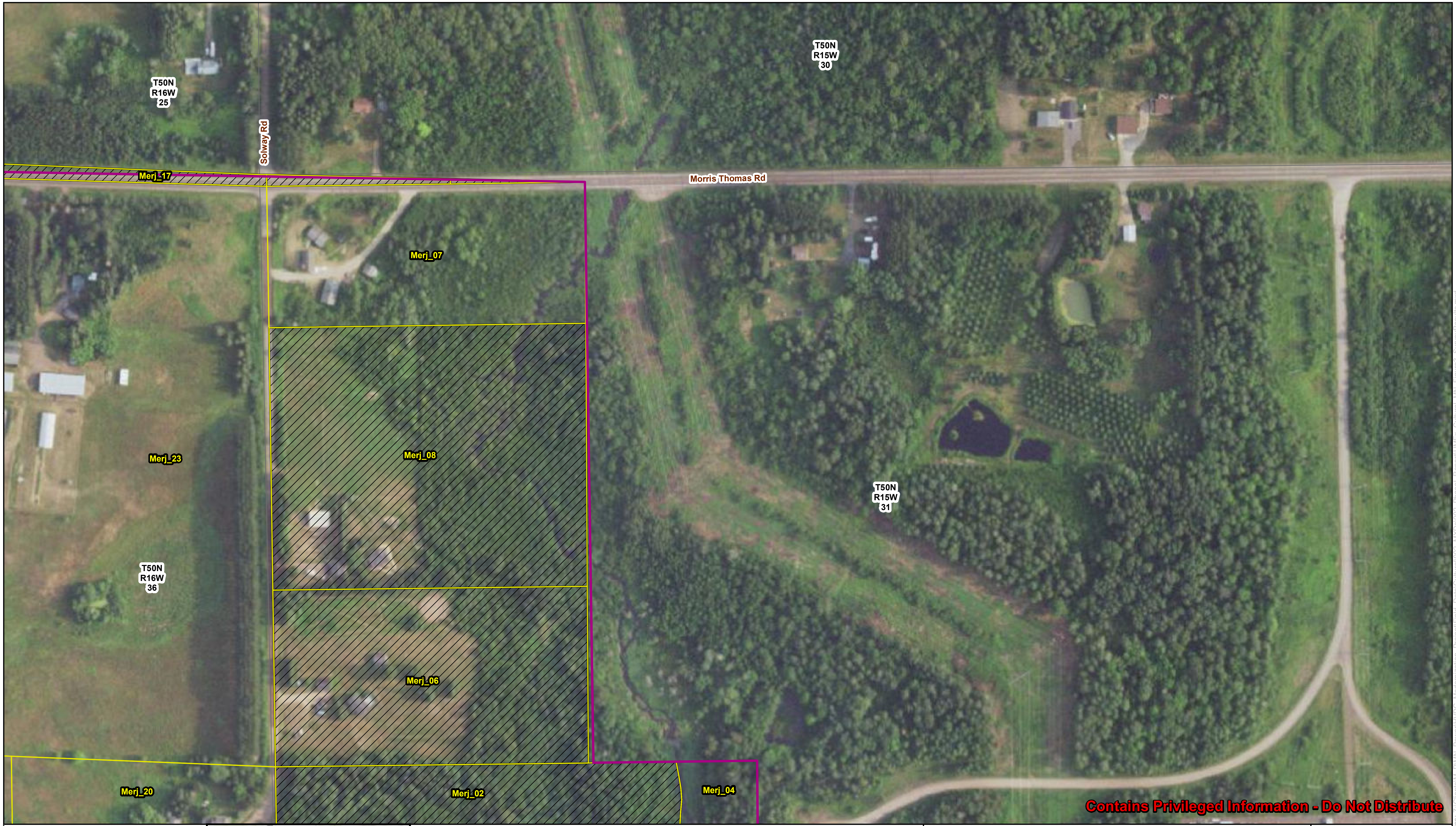

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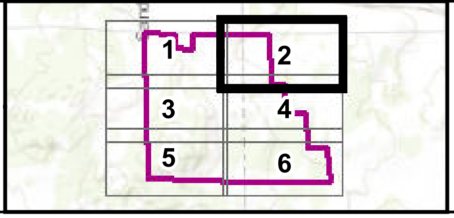

Figure 3: Survey Results

Minnesota Power
HVDC Modernization Project
St. Louis County, Minnesota

- ▭ Project APE
- ▭ Parcel
- ▭ Section Boundary
- ▨ Area Not Surveyed

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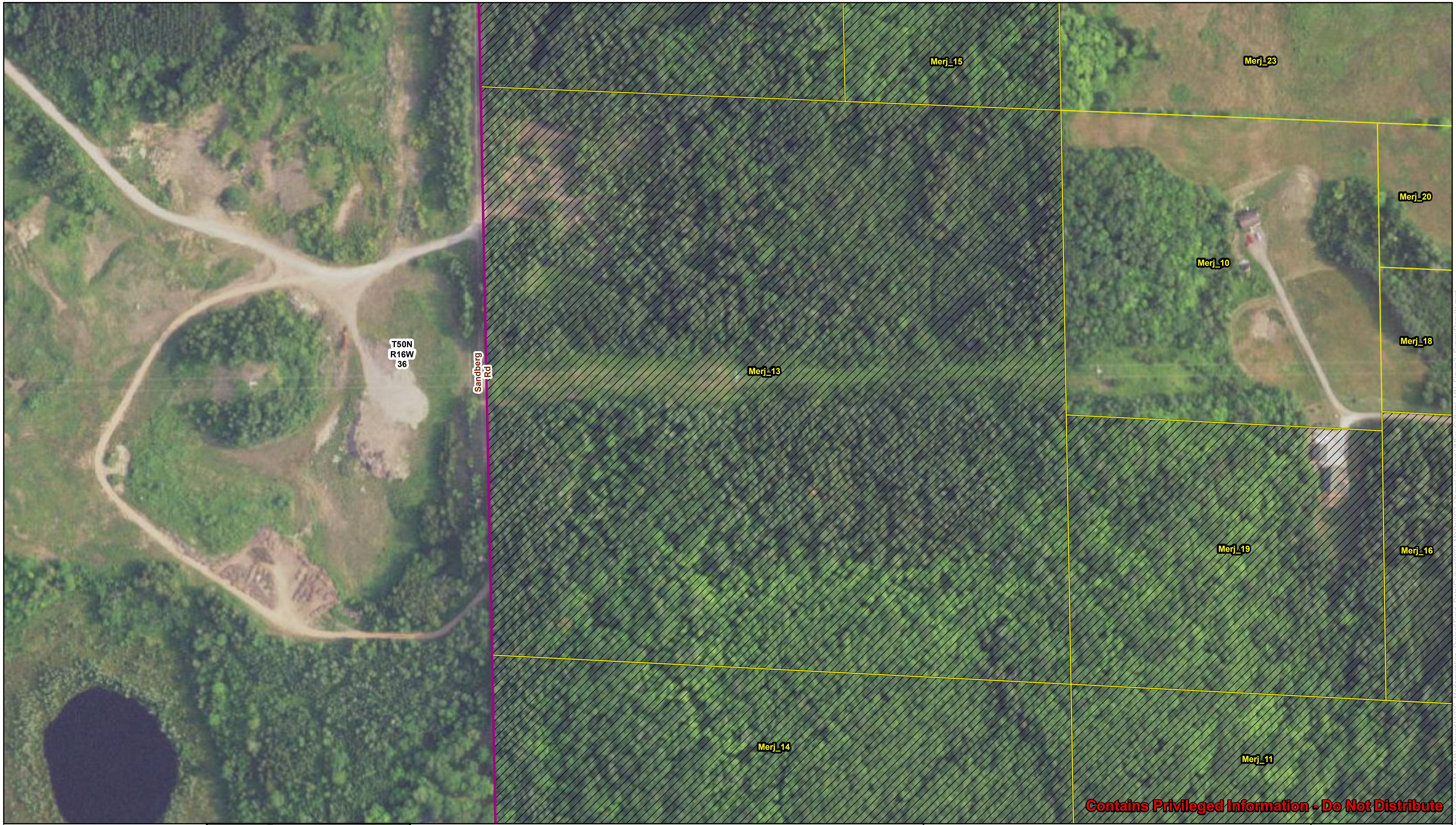
Date: (12/14/2022) Source: Z:\Clients\M_PMN_Power\HVDC_Modernization_Project\Field_Data\Cultural\002_MXDs\002_PhaseI_Report\UMEx_Cultural_MN_Figure3_SurveyResults.mxd



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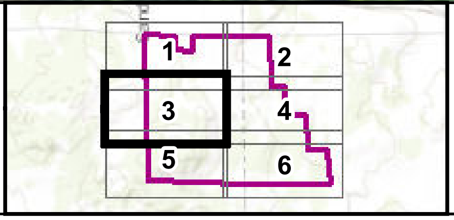

Figure 3: Survey Results

Minnesota Power
HVDC Modernization Project
St. Louis County, Minnesota

▭	Project APE
▭	Parcel
▨	Area Not Surveyed
▭	Section Boundary

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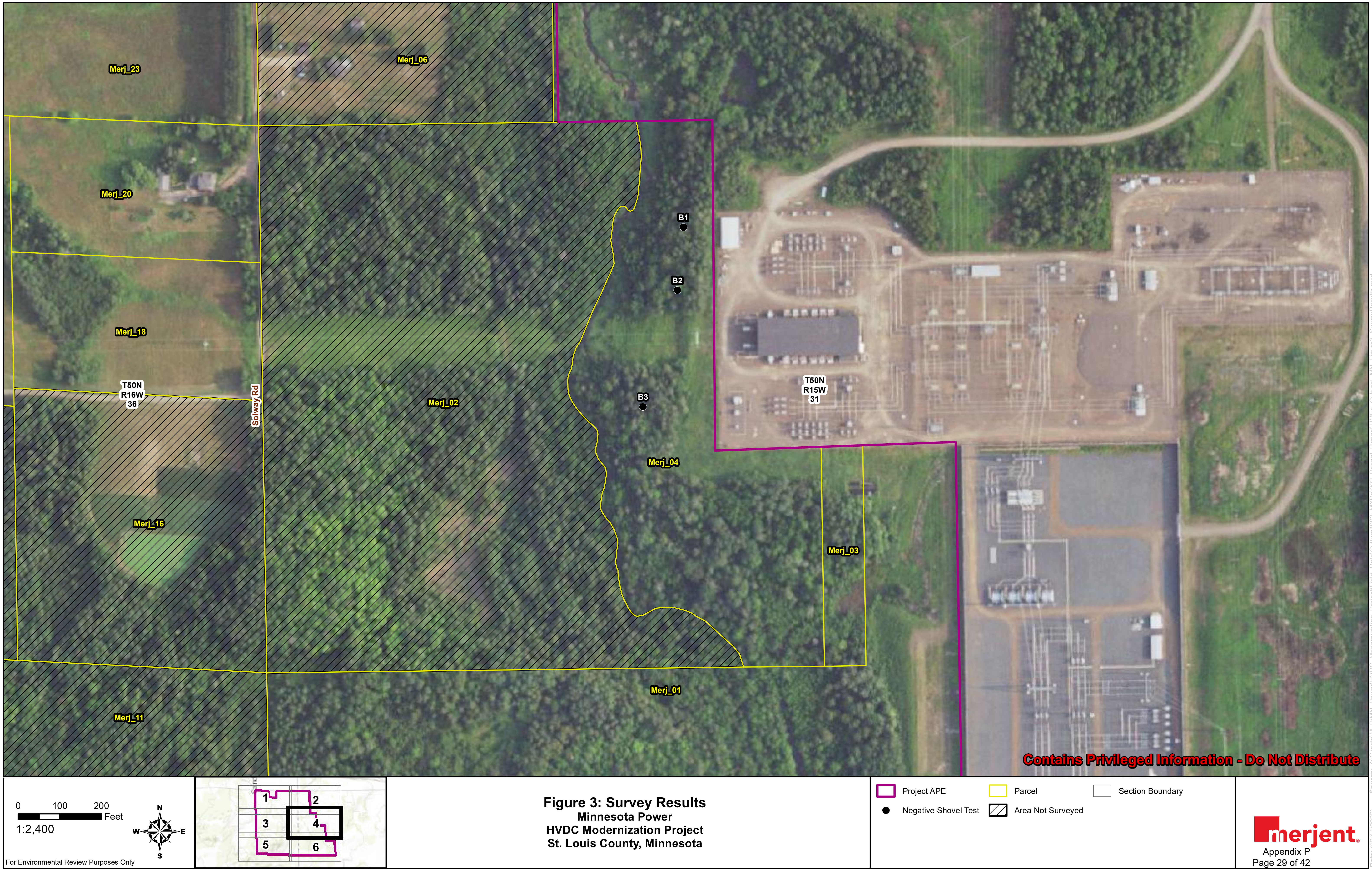

For Environmental Review Purposes Only

Figure 3: Survey Results
Minnesota Power
HVDC Modernization Project
St. Louis County, Minnesota

▭	Project APE
▭	Parcel
▭	Section Boundary
●	Negative Shovel Test
▨	Area Not Surveyed

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Appendix P
Page 29 of 42

Date: (12/14/2022) Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Field_Data\Cultural\002_MXDs\002_PhaseI_Report\UMEx_Cultural_MN_Figure3_SurveyResults.mxd

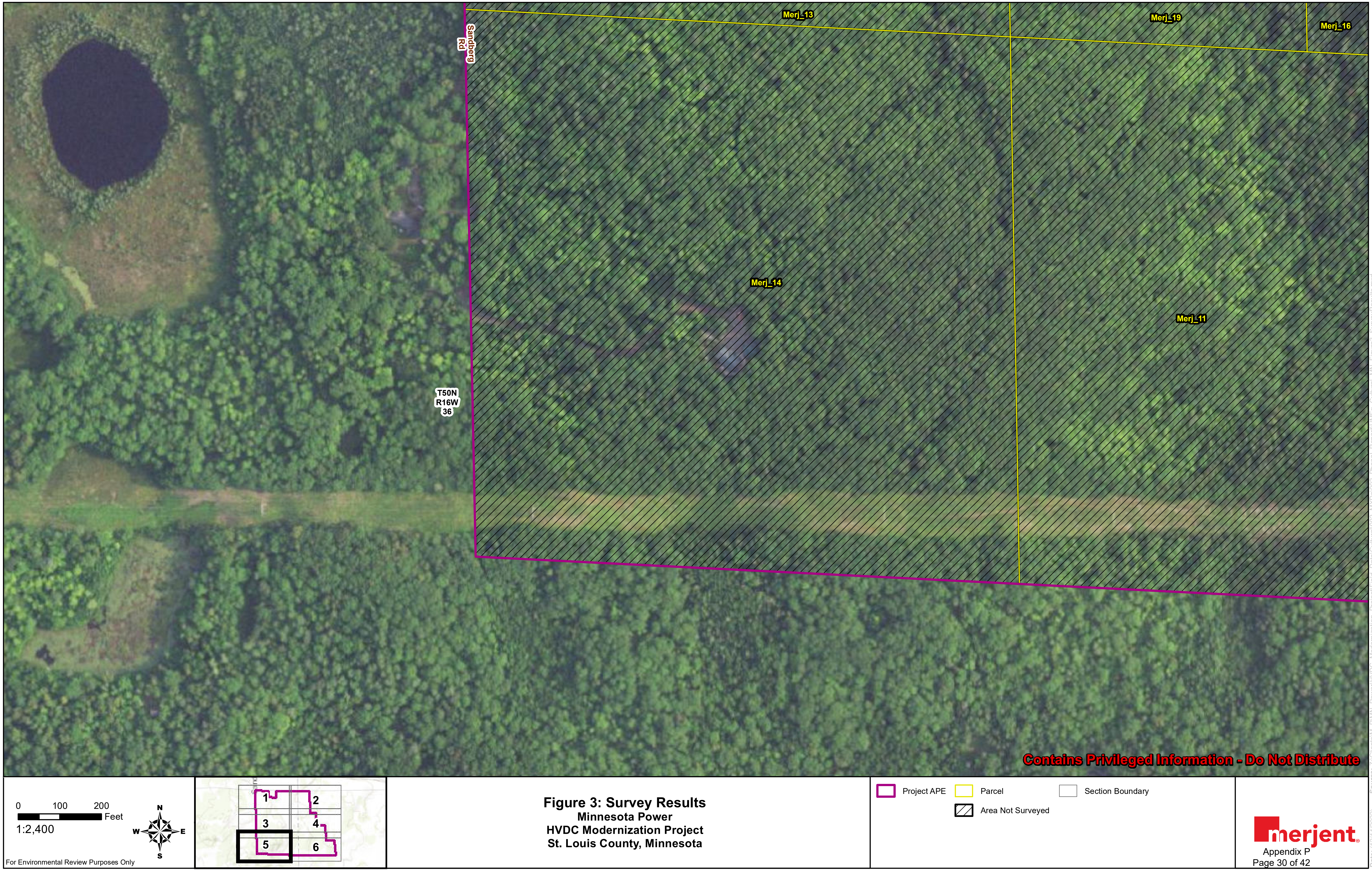

Figure 3: Survey Results

Minnesota Power
HVDC Modernization Project
St. Louis County, Minnesota

Project APE	Parcel
Section Boundary	▨ Area Not Surveyed

Appendix P
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MPUC Docket No. E015/CN-22-607
MPUC Docket No. E015/TL-22-611

Date: (12/14/2022) Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Field_Data\Cultural\002_MXDs\002_PhaseI_Report\UMEx_Cultural_MN_Figure3_SurveyResults.mxd

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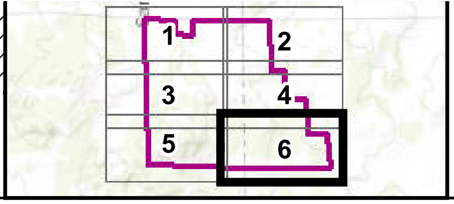

Figure 3: Survey Results

Minnesota Power
HVDC Modernization Project
St. Louis County, Minnesota

▭ Project APE
● Historic Surface Find
▣ Historic Feature
● Negative Shovel Test
▭ Parcel
▨ Area Not Surveyed
▭ Site Boundary
▭ Section Boundary

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Date: (12/14/2022)

Appendix B

Phase I Site Form

Rev.: 7/1/09

MINNESOTA ARCHAEOLOGICAL SITE FORM

OFFICE OF THE STATE ARCHAEOLOGIST
Fort Snelling History Center, St. Paul, MN 55111 (612) 725-2729

SITE #: 21- Site Name: Agency/Field #: CS-SL-001
(OSA assigns if New Site)

_X_ New Site _ Site Update OSA License #: SHPO RC #:

Type of Fieldwork: _X__ Reconnaissance/Phase I Date(s) of This Fieldwork: 09.21.22-09.22.22
___ Evaluation/Phase II
___ Excavation/Phase III

NRHP Status: _ Listed _ Determined Eligible _ CEF(106) _ CNEF(106) _X_ Undetermined

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SITE CHARACTERISTICS

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Rev.: 7/1/09

MINNESOTA ARCHAEOLOGICAL SITE FORM

SITE #: 21- Site Name: Agency/Field #: CS-SL-001

CULTURAL/TEMPORAL AFFILIATION

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[redacted] _ [redacted] _ [redacted] _ [redacted]
_ [redacted] _ [redacted] _ [redacted] ______________

[redacted] _ [redacted] _ [redacted] _ [redacted]
_ [redacted] _ [redacted] _ [redacted]
_ [redacted] _ [redacted] _ [redacted]
_ [redacted] _ [redacted] _ [redacted]
_ [redacted] ______________

[redacted] _ [redacted] _ [redacted] _ [redacted] _ [redacted]
_ [redacted] ______________

[redacted] _ [redacted] _ [redacted] _ [redacted] ______________

[redacted] _ [redacted] _ [redacted] _ [redacted] _ [redacted] ______________

[redacted] __[redacted]
[redacted] _ [redacted] _ [redacted] _[redacted] _ [redacted] ______________

[redacted] _[redacted]_ [redacted] _ [redacted] _ [redacted] ______________
_ [redacted] _ [redacted]

[redacted] __[redacted]
_ [redacted] _ [redacted]
[redacted] [redacted] _ [redacted]
[redacted] [redacted] _ [redacted]
_ [redacted] _ [redacted]

[redacted] ____[redacted]______________

[redacted]
_ [redacted] _ [redacted] _ [redacted] _ [redacted] _ [redacted]
_ [redacted] ______________
_ [redacted] ______________
_ [redacted] ______________

[redacted]

MATERIALS PRESENT *(√all that apply):*

[redacted]

[redacted] [redacted] [redacted] [redacted]
_ [redacted] _ [redacted] _ [redacted] _[redacted]_ [redacted]
[redacted] [redacted] _ [redacted] _ [redacted] _[redacted]_ [redacted]
_ [redacted] _ [redacted] _ [redacted]
_ [redacted] _ [redacted] _ [redacted] ______________
_ [redacted] _ [redacted]
_ [redacted] _[redacted]_ [redacted]

MINNESOTA ARCHAEOLOGICAL SITE FORM

SITE #: 21- Site Name: Rock-Box Foundation
Agency/Field #: CS-SL-001

[redacted]
_ [redacted] _ [redacted] _ [redacted]
_ [redacted] _ [redacted] _ [redacted] ____________________

[redacted]
[redacted] [redacted] ____________________
[redacted] ____________________
[redacted] ____________________
[redacted] ___[redacted]____________________
[redacted] ___[redacted]____________________
[redacted] ____________________

ENVIRONMENTAL DATA **Current Topographic Setting** *(√all that apply):*

[redacted] [redacted] [redacted]
_ [redacted] _ [redacted] _ [redacted]
[redacted] _ [redacted] _ [redacted] _ [redacted]
_ [redacted] _ [redacted] _ [redacted]
_ [redacted] _ [redacted] _ [redacted]
_ [redacted] _ [redacted] _ [redacted]
_[redacted] __________ _ [redacted] _ [redacted]
_ [redacted] __________ _ [redacted] __________
[redacted]

OWNERSHIP INFORMATION

[redacted]

[redacted] __[redacted]
___ [redacted] ___ [redacted] ___ [redacted] ___ [redacted] _[redacted]_ [redacted]

Land Owner *(name and address if known):*

CURRENT INVESTIGATION INFORMATION

[redacted]
_ [redacted] _ [redacted] _[redacted]_ [redacted]
[redacted] [redacted] _ [redacted] _ [redacted] [redacted] ___[redacted]___
_ [redacted] ____________________
_ [redacted] ____________________
_ [redacted] ____________________

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Principal Investigator *(name and affiliation):* Mike Madson, MS, RPA; Merjent Inc.

Form Completed By *(name and date):* Stephen Larsen 11/16/22

MAPS: *Attach/include original scale copy of 7.5' USGS map with site location clearly outlined or designated. Attach a sketch map if surface features present, if sub-surface testing done, or if complicated boundaries/setting. Sketch map must have re-locatable datum, scale, north arrow, and legend if symbols are used.*

Rev.: 7/1/09

MINNESOTA ARCHAEOLOGICAL SITE FORM - CONTINUATION SHEET

page __

SITE #: 21- Site Name: Agency/Field #: CS-SL-001

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Photo 1: Stone foundation overview facing south, and downward.

Photo 2: Eastern wall of stone foundation.

merjent
FIELD SERVICES

SITE FIELD MAP

Project MN Power Marvel Line Upgrade		**Recorder** Stephen Larsen	**Date** 9/21/22
Site Field ID or State Site Number LS.SL.001		**Parcel ID or Tract No.** —	
Site Type (Circle One) Prehistoric [✓ Historic] Both		**Site Center Point UTMs**	

[redacted]

Map Key

○ Negative Shovel Test
● Positive Shovel Test
x Surface Find
▲ Datum
* Site Overview
--- Hill/Slope line/edge

N ↑

Scale 1: 10

[redacted]

0 1,000 2,000 Feet

1:24,000

N W E S

merjent

For Environmental Review Purposes Only

Site CS-SL-001

24k Topo Map

St. Louis County, Minnesota

- □ Site Boundary
- □ Township Boundary
- □ Quad Map
- □ County Boundary

Source: Z:\Clients\M_P\MN_Power\UpperMidwest_Express\Field_Data\Cultural\002_MXDs\003_Site_Forms\UMEx_Cultural_MN_SiteForm_Figure1_24kTopo.mxd

Date: (10/6/2022)

[redacted]

0 25 50 Feet

1:600

N
W E
S

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For Environmental Review Purposes Only

Figure 4: Site CS-SL-001

Minnesota Power
HVDC Modernization Project
St. Louis County, Minnesota

▭ Site Boundary
● Historic Surface Find
▣ Historic Feature
● Negative Shovel Test

Date: (12/5/2022)

Sourc

[redacted]

0 5 10
Feet

N
W E
S

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Figure 5: Site CS-SL-001 Sketch Map

Minnesota Power
HVDC Modernization Project
St. Louis County, Minnesota

- ▢ Site Boundary
- ▢ Historic Feature
- - - Hilltop

Source: Z:\Clients\M_P\MN_Power\HVDC_Modernization_Project\Field_Data\Cultural\002_MXDs\002_PhaseI_Report\UMEx_Cultural_MN_SiteForm_Figure5_SiteFeatures.mxd
Date: (12/5/2022)

[redacted]

minnesota power
AN ALLETE COMPANY

merjent.

0 500 1,000
Feet

1 inch = 1,000 feet

For Environmental Review Purposes Only

N
W E
S

Map 6 - Cultural Resources
HVDC Modernization Project
St. Louis County, Minnesota

🟨 Proposed Route
▢ Project Study Area
○ Archaeological Site
🟧 Municipal Boundary

Date: (2/21/2023) Sourc

Z:\ lients\M_P\MN_Power\HVDC_Modernization_Project\Permitting\State\Minnesota\PUC\HVDC_ModProj_Route_Permit_Map_7.mxd

Appendix Q

Affected Landowner List

Appendix Q

Affected Landowners

PARCEL NO.	NAME	ADDRESS 1	ADDRESS 2
395-0010-09220	ALLETE INC / MINNESOTA POWER	30 W SUPERIOR ST	DULUTH, MN 55802
395-0010-09210	JULIANN K SANDSTEDT	3612 SOLWAY RD	HERMANTOWN, MN 55810
395-0010-09212	ALLETE INC / MINNESOTA POWER	30 W SUPERIOR ST	DULUTH, MN 55802
395-0010-09190	BRANDON THOMAS WIETMAN	5850 MORRIS THOMAS RD	DULUTH, MN 55811
395-0010-09202	WILLIAM P ETUX BERG	3602 SOLWAY RD	DULUTH, MN 55810
395-0010-09200	TINA M FREMLING	5890 MORRIS THOMAS RD	HERMANTOWN, MN 55811
395-0010-09207	THOMAS SANDSTEDT	3612 SOLWAY RD	HERMANTOWN, MN 55810
395-0010-09005	BARBARA J PEYTON	5891 MORRIS THOMAS RD	HERMANTOWN, MN 55810
530-0010-06684	SAMUEL P WILLIAMS & HANNAH J MORRIS	3537 SOLWAY RD	DULUTH, MN 55810
530-0010-06780	MARC SMITH	850 4TH AVE	PROCTOR, MN 55810
530-0010-04820	JOY HEDQUIST	5581 LILAC HILL RD	DULUTH, MN 55810
530-0010-06670	DAVID NARTNIK	3594 SANDBERG RD	PROCTOR, MN 55810
530-0010-06790	DAVID NARTNIK	3594 SANDBERG RD	PROCTOR, MN 55810
530-0010-06650	DAVID NARTNIK	3594 SANDBERG RD	PROCTOR, MN 55810
530-0010-06740	PATRICK & JULIE O'CONNOR	3603 SANDBERG RD	PROCTOR, MN 55810
530-0010-06681	BRANDON J & DANIELLE SOBCZAK	3535 SOLWAY RD	PROCTOR, MN 55810
530-0010-04830	THOMAS G EDEN	3709 SOLWAY RD	DULUTH, MN 55811
530-0010-06691	SARAH ROGALLA	6060 MORRIS THOMAS RD	DULUTH, MN 55810
530-0010-06680	MARK R BOYER	3539 SOLWAY RD	PROCTOR, MN 55810
530-0010-06683	BRANDON J & DANIELLE SOBCZAK	3535 SOLWAY RD	PROCTOR, MN 55810
530-0010-06652	STATE OF MINNESOTA		
530-0010-06660	MICHAEL RAY KRATT	5972 MORRIS THOMAS RD	DULUTH, MN 55810
530-0010-06682	MARK R BOYER ETUX	3539 SOLWAY RD	PROCTOR, MN 55810
530-0010-04832	SHAYNA & NEVADA R SHEEHAN	5949 MORRIS THOMAS RD	DULUTH, MN 55810
530-0010-06730	SARAH ROGALLA	6060 MORRIS THOMAS RD	DULUTH, MN 55810
530-0010-06640	ID THOMAS & ANNA HELGA DAVIS, TRUST	25756 HEATH RD	BROOKFIELD, MO 64628