# Environmental Assessment: Alexandria to Big Oaks 345 kV Transmission Project

**The Human and Environmental Impacts of Stringing Over 100 Miles of New 345 kV Transmission Line on Existing Structures to the Proposed Big Oaks Substation.**

**May 2024**

*PUC Docket Nos. ET10/TL-23-159 & E015/CN-22-538*
*OAH Docket No. 25-2500-39723*

COMMERCE DEPARTMENT

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The applicants propose to string approximately 105-108 miles of 345 kV transmission line on existing double-circuit capable structures from the existing Alexandria Substation in Alexandria, Douglas County to the proposed Big Oaks Substation on the north side of the Mississippi River in Becker, Sherburne County, Minnesota. New transmission lines will be required to cross the Mississippi River to connect the new transmission line to the Big Oaks Substation. The applicants must obtain a certificate of need and a route permit from the Minnesota Public Utilities Commission before it can construct the proposed project.

## Sources

Much of the information used to prepare this environmental assessment comes from the route permit application. Additional sources include new information provided by the applicant and information from relevant federal and state environmental review documents for similar projects. Spatial data was used. Information was gathered from site visits. Unless otherwise noted, all URL addresses were current as of February 14, 2024.

### Document Availability

This environmental assessment and other materials related to this project are available (1) on the Commerce Department's website: https://mn.gov/commerce/energyfacilities, select *Transmission Lines*, and then select *Alexandria to Big Oaks 345 kV Transmission Project*, and (2) the Commission's website: https://mn.gov/puc, select *eDockets*, enter the year (23) and docket number (159) for the route permit or (22) and (538) for the certificate of need, and then select *Search*. This document can be made available in alternative formats, for example, large print or audio, by calling (651) 539-1529 (voice).

## Project Mailing List

To place your name on the project mailing list contact docketing.puc@state.mn.us or (651) 201-2246 and provide the docket number (23-159), your name, email address, and mailing address. Please

indicate how you would like to receive notices—by email or U.S. mail. Placing your name on the project mailing list ensures you receive the most up-to-date information about the project.

# How is this document organized?

**The Environmental Assessment (EA) addresses the matters identified in the scoping decision.**

This EA is based on the applicants' certificate of need (CN) and route permit application, and public scoping comments. It addresses the matters identified in the February 21, 2024, scoping decision (Appendix A).

**Chapter 1: Summary** briefly describes the state of Minnesota's role; discusses how this EA is organized; and provides a summary of potential impacts and mitigation.

**Chapter 2: Regulatory Framework** summarizes the regulatory framework, including the CN and route permit processes, the environmental review process, other approvals that might be required for the project, and the criteria the Commission uses to make its decisions.

**Chapter 3: Proposed Project and Alternatives** describes the project and the alternatives to the project presented in the scope — their design, construction, and operation.

**Chapter 4: Potential Impacts and Mitigation that are Similar Between Routing Options** describes the environmental setting; details potential human and environmental impacts anticipated to be similar across routing options; and identifies measures to mitigate adverse impacts. It summarizes the cumulative potential effects of the project and other projects as well as listing unavoidable impacts and irreversible and irretrievable commitments of resources.

**Chapter 5: Potential Impacts and Mitigation that Vary Between Routing Options** details potential human and environmental impacts and mitigative measures anticipated to be different across routing options.

**Chapter 6: Routing Factors** analyzes the routing factors that the Public Utilities Commission must consider for the project by applying the information available in the route permit application and this EA to the factors listed in Minnesota Rule 7850.4100.

**Chapter 7: Alternatives to the Proposed Project** discusses the feasibility, availability, and potential impacts of alternatives to the project.

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# Acronyms and Abbreviations

**AADT** average annual daily traffic

**AC** alternating current

**ALJ** administrative law judge

**APLIC** Avian Power Line Interaction Committee

**AQI** Air Quality Index

**ARMER** Allied Radio Matrix for Emergency Response

**DNR** American Transmission Company

**BMP** best management practices

**BWSR** Board of Water and Soil Resources

**CFR** Code of Federal Regulations

**CN** certificate of need

**CO** carbon monoxide

**Commerce** Department of Commerce

**Commission** Public Utilities Commission

**CSW Permit** construction stormwater permit

**dBA** A-weighted scale

**DC** direct current

**DNR** Department of Natural Resources

**DRP** draft route permit

**DSM** demand side management

**EA** Environmental Assessment

**EAW** Environmental Assessment Worksheet

**EERA** Energy Environmental Review and Analysis

**EJ** environmental justice

**ELF** extremely low frequency electromagnetic fields

**EMF** electromagnetic fields

**EPA** United States Environmental Protection Agency

**ER** environmental report

**FAA** Federal Aviation Administration

**FEMA** Federal Emergency Management Agency

**FERC** Federal Energy Regulatory Commission

**GHG** greenhouse gases

**HVDC** high voltage direct current

**HVTL** high voltage transmission line

**IPaC** Information for Planning and Consultation

**kV** kilovolt or 1,000 volts

**kV/m** kilovolts per meter

**MBS** Minnesota Biological Survey

**MDA** Department of Agriculture

**MDH** Minnesota Department of Health

**mG** milliGuass

**MHz** megahertz

**Minn. R.** Minnesota Rule

**Minn. Stat.** Minnesota Statute

**MISO** Midcontinent Area Independent System Operator

**MnDOT** Minnesota Department of Transportation

**MPCA** Minnesota Pollution Control Agency

**MW** megawatt

**MWI** Minnesota Well Index

**NA** not applicable

**NAAQS** National Ambient Air Quality Standards

**NAC** noise area classification

**NERC** North American Electric Reliability Corporation

**NESC** National Electrical Safety Code

**NEV** neutral-to-earth voltage

**NHIS** Natural Heritage Information System

**NLCD** National Land Cover Database

**NO2** nitrogen dioxide

**NRCS** Natural Resources Conservation Service

**NRHP** National Register of Historic Places

**NWI** National Wetland Inventory

**OAH** Office of Administrative Hearings

**OSA** Minnesota Office of the State Archaeologist

**PM** particulate matter

**project** Alexandria to Big Oaks 345 kV Transmission Project

**PUC** Public Utilities Commission

**PWI** public water inventory

**RIM** Reinvest in Minnesota Reserve Program

**ROI** region of influence

**ROW** right-of-way

**SBS** Sites of Biodiversity Significance

**SF6** sulfur hexafluoride

**SHPO** State Historic Preservation Office

**$SO_2$** sulfur dioxide

**SSURGO** Soil Survey Geographic Database

**SWPPP** stormwater pollution prevention plan

**THPO** Tribal Historic Preservation Offices

**USACE** United States Army Corps of Engineers

**USFWS** United States Fish and Wildlife Service

**VMP** Vegetation Management Plan

**WCA** Wetland Conservation Act

# Definitions

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

**anticipated alignment** is the anticipated location of the structures and transmission line within the right-of-way and route. It is NOT the final alignment. The anticipated alignment is considered the centerline of the project for review purposes only—the structures and transmission line might ultimately be located elsewhere within the route.

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

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

**distribution line** means power lines that operate below 41.6 kilovolts.

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

**local vicinity** means 1,600 feet from any route segment.

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

**project area** means the area one mile from any route segment boundary.

**right-of-way** means the land interest required within a route for the construction, maintenance, and operation of a high voltage transmission line (Minnesota Rule 7850.1000, subpart 15).

**route** means the location of a high voltage transmission line between two end points. The route may have a variable width of up to one and one-quarter miles (Minnesota Statute 216E.01, subdivision 8).

**route segment** means a portion of a route (Minnesota Rule 7850.1000, subpart 17).

**transmission line** means power lines that operate at 41.6 kilovolts and above

# Chapter 1: Summary

Northern States Power Company, doing business as Xcel Energy, along with Great River Energy, Minnesota Power, Otter Tail Power Company, and Missouri River Energy Services, on behalf of Western Minnesota Municipal Power Agency, (hereinafter the applicants) must obtain a certificate of need (CN) and a route permit from the Minnesota Public Utilities Commission (Commission) before it can construct the proposed Alexandria to Big Oaks 345 kV Transmission Project (project). The applicants propose to string approximately 105-108 miles of 345 kV transmission line on existing double-circuit capable structures from the existing Alexandria Substation in Alexandria, Douglas County to the proposed Big Oaks Substation on the north side of the Mississippi River in Becker, Sherburne County, Minnesota (Appendix B, Map 1).[1] New transmission lines will be required across the Mississippi River to connect the new transmission line to the Big Oaks Substation (Appendix B, Map 2A).

The new 345 kV high voltage transmission line (HVTL) from Alexandria to Becker will utilize existing right-of-way and existing transmission line structures for over 95 percent of the route.[2] Existing transmission line structures originate from the CapX2020 project[3], which was permitted by the Commission and constructed as double-circuit capable. The project also involves constructing a new Big Oaks Substation to interconnect the new second circuit of 345 kV transmission line in Becker, Minnesota.

This project is the East Segment of the larger Big Stone South to Alexandria to Becker 345 kV transmission line project. The need for the West Segment – Big Stone South to Alexandria – is discussed in this document. The routing for the West Segment will be a separate proceeding before the Commission that will commence in late 2024/early 2025.[4]

The proposed route generally follows existing right-of-way, with few deviations needed for new structures to facilitate stringing the second circuit. New structures are proposed in select areas to accommodate angles, highway crossings, or alignment deviations where installing the second monopole for the original CapX2020 project would not have been needed at the time. Approximately 67-78 new structures are proposed for the entire project, with the majority needed at four places[5] to accomplish:

(1) establishing new right-of-way to tap into the Alexandria Substation

(2) reconfiguration of the Alexandria to Quarry Substation circuit to bypass the Riverview Substation near the city of Freeport

(3) a bypass of the Quarry Substation near the city of Waite Park and

(4) crossing the Mississippi River to connect the new 345 kV transmission line to the new Big Oaks Substation.

[1] Xcel Energy Alexandria to Big Oaks 345 kV Transmission Project, Application to the Minnesota Public Utilities Commission for a Route Permit for a High Voltage Transmission Line, September 29, 2023, eDockets Numbers 20239-199287-01 (through -08), hereinafter the Route Permit Application.

[2] Route Permit Application, Section 1.

[3] Monticello to St. Cloud 345 kV Transmission Project (E002, ET2/TL-09-246) and the Fargo to St. Cloud 345 kV Transmission Project (E002, ET2/TL-09-1056).

[4] Commission Docket No. TL-23-160.

[5] Route Permit Application, Section 1.

Of the new right of way areas to be created, the first three listed are cumulatively less than one mile of new HVTL and associated infrastructure and can be viewed at a high level on Appendix B, Map 3 of the East Segment.[6] The Mississippi River crossing (hereinafter the River Crossing) considers two options for the proposed project ranging from 1.4 to 2.1 miles and can be viewed in detail on Appendix B, Map 1.[7] The River Crossing considers three options for the DNR Alternatives ranging from 3.7 to 8 miles and can be viewed in Appendix B, Maps 4A-4C. Detailed route maps for each section of the project can be viewed from the route permit application's Appendix C.[8]

The applicant filed a combined CN and route permit application (hereinafter "route permit application" or "application") on September 29, 2023. The Commission determined that the application was substantially complete on October 4, 2023.

The applicants indicate that the project is needed to provide benefits to the Midwest subregion of the Midcontinent Independent System Operator (MISO) footprint by facilitating more reliable, safe, and affordable energy delivery.[9] The current 345 kV transmission system is at capacity which leads to several reliability concerns that could affect customers' service.[10] The project intends to provide additional transmission capacity, mitigate current capacity issues, and improve electric system reliability throughout the region as more renewable energy resources are added to the electric system in and around the region.[11]

The project is currently scheduled to be placed in service by the fourth quarter of 2027.[12]

The Minnesota Department of Commerce (Commerce) has prepared this environmental assessment (EA) for the proposed project. The EA describes the project, highlights resources affected by the project, and discusses potential human and environmental impacts to these resources. It also discusses ways to mitigate potential impacts. These mitigation strategies can become enforceable conditions of the Commission's route permit.

An EA is not a decision-making document, but rather an information document. The EA is intended to facilitate informed decisions by state agencies, particularly with respect to the goals of the Minnesota Environmental Policy Act: "to create and maintain conditions under which human beings and nature can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations of the state's people."[13]

## What is Minnesota's role?

**The applicant needs two approvals from the Commission. Commerce prepared this EA. An administrative law judge will oversee a public hearing.**

[6] *Ibid.*

[7] Mileage of HVTL have been updated from the Route Permit Application due to personal communication with the applicants via email on May 21, 2024. Mileage was updated from comparative purposes to a common endpoint and was stated as more accurate than the mileage of HVTL provided in the Route Permit Application.

[8] Route Permit Application, Appendix C. *Detailed Route Maps*. Available online: https://apps.commerce.state.mn.us/web/project-file/12536.

[9] Route Permit Application, Section 1.1.

[10] *Ibid.*

[11] *Ibid.*

[12] Route Permit Application, Table 2.7-1.

[13] Minnesota Statutes 216E.02, subd. 1.

The applicant needs two approvals from the Commission before the project can be built – a certificate of need (CN) and a route permit. In addition, various federal, state, and local approvals may be required for activities related to the construction and operation of the project. These subsequent permits are referred to as *downstream* permits and must be obtained by the applicant prior to constructing the project.

The project requires a CN from the Commission because it meets the definition of *large energy facility* in Minnesota statute, which is any high-voltage transmission line with a capacity of 200 kilovolts or more and greater than 1,500 feet in length.[14]

The project requires a route permit from the Commission because it meets the definition of *high voltage transmission line* in Minnesota statute, which is a conductor of electric energy and associated facilities designed for and capable of operation at a nominal voltage of 100 kilovolts or more and is greater than 1,500 feet in length.[15] A route permit supersedes local zoning, building, and land use rules.[16] However, the Commission's route permit decision must be guided in part by consideration of impacts to local zoning and land use in accordance with the legislative goal to "minimize human settlement and other land use conflicts".[17]

This EA studies three route alternatives in addition to the route proposed by the applicant. All three alternatives were proposed by the Minnesota Department of Natural Resources (DNR) and can be seen in Appendix B, Maps 4A-4C as DNR Alternatives 1, 2, and 3. These three alternatives aim to reduce environmental impacts and minimize disturbance to ecologic and biologic resources near the River Crossing, especially where a proposed alignment would affect Minnesota Biological Survey (MBS) Sites of Biodiversity Significance and Native Prairies.

The applicant applied to the Commission for a CN and route permit[18] for the project in June 2023. With this application, the Commission has before it two considerations:

- Is the project needed? Or would another project be more appropriate for the state of Minnesota, for example, a project of a different type or size?
- If the project is needed, what conditions should be placed on the route permit?

To ensure a fair and robust airing of the issues, the Minnesota Legislature set out a process for the Commission to follow when considering CN and route permit applications.[19] In this instance, an EA was prepared, and a public hearing will be held. The goal of the EA is to describe potential human and environmental impacts of the project (*the facts*), whereas the intent of the public hearing is to allow interested persons the opportunity to advocate, question, and debate what the Commission should decide about the project (*what the facts mean*). The record developed during this process—including all

[14] Minnesota Statutes 216E.04, subd. 2(4).
[15] Minnesota Statutes 216E.04, subd. 4.
[16] Minnesota Statutes 216E.10, subd. 1.
[17] Minnesota Statutes 216E.03, subd. 7.
[18] Xcel Energy Alexandria to Big Oaks 345 kV Transmission Project, Application to the Minnesota Public Utilities Commission for a Route Permit for a Large Electric Generating Facility, June 1, 2023, eDockets Numbers 20236-196333-02 (through -16) and 20236-196346-02, hereinafter the Route Permit Application.
[19] *See generally* Minnesota Statutes 216B and 216E.

public input—will be considered by the Commission when it makes its decisions on the applicants' CN and route permit application.

## What is the public's role?

**Minnesota needs your help to make informed decisions.**

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

## What is an Environmental Assessment?

**This document is an Environmental Assessment (EA). The Commission will use the information in this document to inform their decisions about issuing a CN and route permit for the project.**

This EA contains an overview of affected resources and discusses potential human and environmental impacts and mitigation measures. Energy Environmental Review and Analysis (EERA) staff within Commerce prepare this document as part of the environmental review process. Scoping is the first step in the process. It provides opportunities to submit comments on the content of this environmental assessment, suggest alternatives, and to mitigate potential impacts.

## What are the potential impacts of the project?

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

A potential impact is the anticipated change to an existing condition caused directly or indirectly by the project.[20] Potential impacts can be positive or negative, short- or long-term, and can accumulate incrementally. Impacts vary in duration and size, by resource, and across locations. The impacts of constructing and operating a project can be mitigated by avoiding, minimizing, or compensating for the adverse effects and environmental impacts of a project.

The context of an impact—in combination with its anticipated on-the-ground effect and mitigation measures—is used to determine an impact intensity level, which can range from highly beneficial to highly harmful. Impacts are summarized in the next section below.

The transmission line construction involves both short and long-term impacts. For example, noise impacts will be the highest during construction, but intermittent and temporary. Some impacts may be avoidable; some may be unavoidable but can be mitigated; others may be unavoidable and unable to be mitigated. In general, impacts can be avoided and mitigated by prudent design and construction measures – i.e., by placing structures away from human and environmental resources.

### Potential Impacts of Proposed Project

Project-related impacts to human settlement are anticipated to be minimal. Impacts range from short-term and positive, such as increased local expenditures during construction, to long-term and negative, such as changes to viewsheds. Project-related aesthetic impacts are unavoidable, with landscape

[20] Minnesota Rule 4410 (analytical practices under Minn. R. 7850 are informed by practices developed under 4410 Rules).

changes anticipated to be minimal and mostly obstructed from view; however, individual reactions to these changes will vary widely as visual impacts are subjective and unique to the individual. The following impacts to human settlement are anticipated to be minimal: property values, public health and safety, public services, socioeconomics, known archaeological and historic resources, operational noise, cultural values, environmental justice, land use and zoning, public services, and recreation.

Impacts to land-based economies, including agriculture, are anticipated to be minimal. Because most of the project does not involve new ROW clearing, impacts to prime farmland or farmland of statewide importance will be minimal. Potential impacts are localized and unavoidable but can be minimized.

Impacts to natural resources such as air quality and climate change are expected to be short-term and minimal during construction, but beneficial over time because the project will reduce the need for carbon-based electric generation processes and additional transmission infrastructure. Impacts to groundwater, soils, topography, wetlands, and surface water are anticipated to be minimal; such impacts can be mitigated by construction best management practices or through a vegetation management plan. Potential impacts to wildlife and habitat may be positive or negative and are species dependent, and are expected to be minimal overall but moderate for avian species because a new transmission line will be introduced to this segment of the Mississippi River corridor and increase the potential for collisions. Depending on the routing option, the impacts to forested land to clear the ROW at the River Crossing varies between minimal and moderate, and can be minimized by choosing an alignment that requires the least amount of tree clearing.

### Potential Impacts of DNR Alternatives 1-3

Impacts of the route alternative analyzed in this EA are similar to those of the proposed project and to each other. In some instances, the DNR Alternatives 1-3 offer a means to avoid or mitigate potential impacts, however, tradeoffs exist. For instance, although the DNR Alternative 1 utilizes 75 feet of existing right-of-way, it would require more forested tree clearing on an island that is likely important for wildlife and habitat that is also a high-quality State Biological Survey Site of Biodiversity Significance.

A wide difference with cost among the proposed project and DNR Alternatives 1-3 at the River Crossing exists due to the length of the transmission line, the amount of new ROW clearing required, the type of structures to be utilized, the complexity of construction, and whether coordination with other utilities such as modifying existing transmission lines or planning with the Monticello Nuclear Generating Plant is needed. For example, the Eastern Option and DNR Alternative 1 would construct on an island, which requires heavy equipment and concrete truck access or the more expensive use of maneuvering a helicopter around a small section. DNR Alternative 1 also requires a unique monopole for two transmission lines with different voltages and a structure that can reduce the lateral loading on the foundation given the poor soil conditions anticipated on the island.

For the listed reasons, DNR Alternative 1 costs the most at $27 million. DNR Alternative 3 costs the next most due to the length of the transmission line at $21.2 million. Since the Eastern Option also requires more complex construction on an island and would be longer than the cheapest options, it is the third most expensive at $15.3 million. The cheapest options are shorter than the others at $10.14 and $10.13 million for DNR Alternative 2 and the Western Option, respectively.

The largest differences in impacts between DNR Alternatives 1-3 and the proposed project among impacts that are not ultimately minimal are with vegetation and wildlife and habitat. All other impacts are expected to be comparable, albeit incrementally different. Vegetation impacts are minimal among

routing options except for the Eastern Option and DNR Alternative 1, which would be moderate. Based on the alignments as they are currently proposed, the Eastern Option and DNR Alternative 1 would remove over 25 acres of forested land for the ROW, whereas the other routing options would remove less than 9 acres.

Overall, impacts to wildlife and habitat are expected to be minimal to populations for most routing options, however, the Eastern Option and DNR Alternative 1 are rated moderate due to the acreage of MBS Sites of Biodiversity Significance that would be cleared for new ROW, the percentage of those MBS Sites of Biodiversity Significance considered high quality, acreage of forested habitat that would be cleared for new ROW, clearing on an island likely important to avian species, and an Aquatic Management Area nearby the island. The Eastern Option also has the highest potential for impacts from edge effect and avian collision. All routing options will represent a moderate impact to avian species because they would introduce an additional transmission line to the existing five in the local vicinity that cross the Mississippi River, an area that likely supports large numbers of raptors and migratory birds near high quality habitat and sensitive plant communities. This new corridor will result in a new flight obstacle and increased habitat loss. Impacts to wildlife and habitat are expected to be the greatest for the Eastern Option and the least for DNR Alternative 2.

## What factors guide the Commission's decision?

**Minnesota statute and rule identify the factors the Commission must consider when determining whether to issue a CN and route permit.**

After reviewing the project record—including public comments—the Commission will make two decisions:

- Is the project needed? Or would another project be more appropriate for the state of Minnesota, for example, a project of a different type or size?
- If the project is needed, should a route permit be issued for the project, and, if so, what permit conditions are appropriate?

### Certificate of Need

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

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

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

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

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

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

### Route Permit

If the Commission determines the transmission facility is needed, it must determine where it will be located. Minnesota Statutes 216E.03 lists 12 considerations that guide the study, evaluation, and designation of route permits. Minnesota Rule 7850.4100 further clarifies and expands these considerations by identifying 14 factors the Commission must consider when making a route permit decision.

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

B. Effects on public health and safety.

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

D. Effects on archaeological and historic resources.

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

F. Effects on rare and unique natural resources.

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

H. Use or paralleling of existing right-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 systems reliability.

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

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

N. Irreversible and irretrievable commitments of resources.

When the Commission makes a final decision about the route permit, it must determine if the EA and public hearing record address the issues identified in the scoping decision.[21] The Commission must also make specific findings that it has considered locating a route for a new HVTL along an existing HVTL route or parallel to existing highway right-of-way (ROW), and, to the extent these are not used, the Commission must state the reason(s).[22]

[21] Minn. R. 7850.3900, subp. 2.
[22] Minn. Stat. 216E.03, subd. 7(e).

The Commission must make a final decision on the route permit within 60 days of receiving the ALJ report.[23] A final decision must be made within six months after the Commission's determination the application is complete; however, this time limit may be extended.[24] A route permit decision for this project is anticipated in October 2024.

The Commission may not issue a route permit for a project that requires a CN until a CN has been approved by the Commission, though these approvals may occur consecutively at the same Commission meeting.

## What does the Commission approve in a route permit?

**The Commission approves a route and anticipated alignment. The route is a temporary designation; the HVTL must be constructed within the route. The permit also authorizes permittees to obtain permanent right-of-way for the HVTL and any associated facilities.**

When the Commission issues a route permit it designates a route and an anticipated alignment (Figure 1).[25] The right-of-way is the area required for safe operation of the HVTL. It must be within the designated route and is the area from which the permittee may obtain easements to construct and operate the HVTL. The route width is typically wider than the actual right-of-way needed for the HVTL. This extra width provides flexibility when constructing the HVTL but is not so wide that it is impossible to determine where the HVTL would be constructed. This makes predicting potential impacts possible. A wider route width also allows permittees to work with landowners to address their concerns and to address engineering issues that may arise after a permit is issued. The route width, in combination with the anticipated alignment, is intended to balance flexibility and predictability.

The HVTL must be constructed within the Commission's designated route and along the anticipated alignment. The anticipated alignment is where the structures and HVTL are expected within the right-of-way and route. It is **not** the final alignment. The anticipated alignment is considered the centerline of the project for review purposes only—the structures and HVTL might ultimately be constructed elsewhere within the route.

Notwithstanding the previous paragraph, the HVTL must be constructed along the anticipated alignment unless subsequent permissions are requested and approved by the Commission. "Any [right-of-way] modifications within the designated route [must be] located so as to have comparable overall impacts relative to the factors in Minnesota Rule 7850.4100 and shall be specifically identified and documented in and approved as part of the plan and profile."[26] Modifications to the anticipated alignment generally result from landowner requests or unforeseen conditions.

The route permit also outlines conditions specifying construction and operation standards.[27] A draft route permit (DRP) is included as Appendix C.

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[23] Minn. R. 7850.3900, subp. 1.

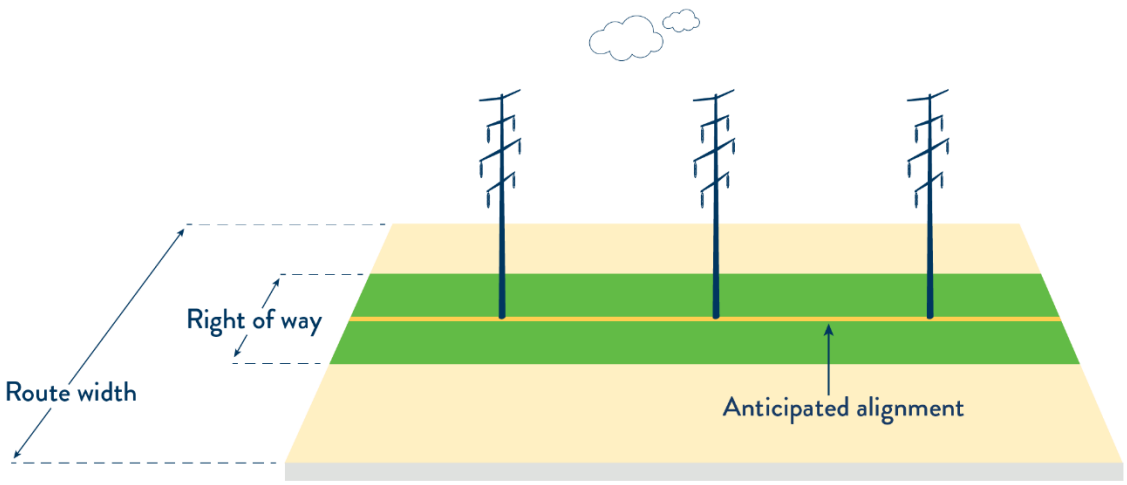
[24] *Ibid.*

[25] Minn. Stat. 216E.01, subd. 8.

[26] Plan and Profile requirements are under the DRP Section 9.2.

[27] *E.g.*, DRP, Section 5.4.2 (stating "the transmission line shall be designed, constructed, and **operated** in such a manner that the electric field measured one meter above ground level immediately below the transmission line shall not exceed 8.0 kV/m rms" (emphasis added)).

**Figure 1: Route and Right-of-Way Illustration**




## Eminent Domain

**The applicant may exercise the power of eminent domain.**

At times, negotiated easement agreements for permanent rights-of-way – the land needed for the construction, maintenance, and operation of a HVTL—cannot be reached. Should this occur, the applicant may exercise the power of eminent domain to acquire land for the project. This process is called condemnation.

The eminent domain process involves an independent panel of three court-appointed authorities determining the easement's value, and both the landowner and the applicant are bound by this determination. If the eminent domain process is used, the applicant must obtain at least one appraisal for the property proposed to be acquired.[28]

## What's next?

**Public hearings will be held in the project area and virtually; you can provide comments at the hearings. The public can provide comments at the hearings or as part of an associated public comment period. An administrative law judge will consider public comments and prepare a report and make recommendations for the Commission to consider. The Commission will then review the record and decide whether to grant a CN and a route permit.**

An administrative law judge (ALJ) from the Office of Administrative Hearings (OAH) will hold public hearings in the project area and virtually after the EA is complete and available. At the hearings, people may ask questions and submit comments about the project. After the close of the comment period, the ALJ will provide a written report to the Commission summarizing the public hearings and any comments received. The ALJ report may recommend ways to mitigate potential impacts of the project.

[28] Minn. Stat. 117.036, subd. 2.

The ALJ will also provide the Commission with proposed findings and a recommendation on whether to issue a CN and route permit. The Commission reviews all the information in the project record in determining whether to grant a CN and issue a route permit. The Commission may grant a CN for the project as proposed, grant a CN contingent upon modifications to the project, or deny the CN. The Commission may also place conditions on the granting of a CN. If a CN is granted, the Commission will then decide whether to issue a route permit. Route permits define the location of the project and include conditions specifying mitigation measures. The Commission is expected to make a CN and route permit decision in the summer of 2023.

## Where do I get more information?

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

If you would like more information or if you have questions, please contact Commerce staff: Jenna Ness (jenna.ness@state.mn.us), (651) 539-1693 or the Commission public advisor: Scott Ek (publicadvisor.puc@state.mn.us), (651) 539-1070.

The CN application and route permit application can be found on eDockets: https://www.edockets.state.mn.us/EFiling/search.jsp by searching "23" for year and either "538" (CN) or "159" (route permit) for number. Information is also available on the commerce webpage: https://apps.commerce.state.mn.us/web/project/15111.

# Chapter 2: Regulatory Framework

This chapter discusses the approvals required from the Commission—a CN and route permit. It further describes the environmental review process and lists the factors the Commission considers when making decisions. The project will also require approvals from other state and federal agencies with permitting authority for actions related to the project. Lastly, it lists topics outside the scope of this EA.

## Commission Approvals Required

**A CN and route permit are required because the project meets thresholds defined in Minnesota Statute.**

The project meets the definition of "large energy facility" as an HVTL with a capacity of 200 kV or more, and as such, requires a Certificate of Need to be issued by the Commission prior to siting or construction.[29]

The project also requires a route permit from the Commission because it meets the definition of "high voltage transmission line" under Minnesota Statute.[30] A transmission line qualifies as an HVTL when it is longer than 1,500 feet and capable of operating at a voltage greater than 100 kV.[31] The definition of HVTL also includes associated facilities, such as substations, buildings, equipment, guy wires, and other physical structures necessary for operation of the HVTL.[32]

## Environmental Review

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

Minnesota law requires that potential human and environmental impacts be analyzed before the Commission decides whether to grant a CN and a route permit. This analysis is called environmental review.

### Certificate of Need

Applications for a CN require preparation of an environmental report (ER).[33] An ER contains "information on the human and environmental impacts of the [project] associated with the size, type, and timing of the project, system configurations, and voltage".[34] It also contains information on system alternatives to the project, as well as mitigation measures.

### Route Permits

Minnesota law provides the Commission with two processes to review route permit applications. The alternative process requires an EA instead of an environmental impact statement be prepared for the project, and a public hearing instead of the more formal contested-case hearing occur for the project.[35]

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[29] Minn. Stat. 216B.2421, Subd. 2 (2) and 216B.243 Subd. 2.
[30] Minn. Stat. 216.03, subd. 2.
[31] Minn. Stat. 216E.01, subd. 4.
[32] Ibid.
[33] Minnesota Rule 7849.1200.
[34] Minn. R. 7849.1500.
[35] Minnesota Statutes 216E.04, subd. 5; Minn. R. 7850.3700, subp. 1. applicants are free to elect the alternative process if their project qualifies for it.

### Joint Proceeding

When there are multiple applications before the Commission for a single project, the environmental review required for each application may be combined.[36] For this project, the Commission has authorized EERA staff to combine the environmental reviews required for the CN (an ER) and route permit (an EA). Thus, the Department developed a combined EA—an EA that covers applicant proposals in both the CN and route permit applications.

Issues typically analyzed and reviewed in an EA and the system alternatives studied in an ER are combined into a single document. This is the only state environmental review document required for the project.[37]

### Public Hearing

**A public hearing will be held that allows for oral public comments. Comments may also be written and submitted during an associated comment period.**

Minnesota Rule 7850.3800, subpart 1, requires a public hearing be held and a comment period be opened once the EA is complete and available. An ALJ will preside over the public hearing. The public will have the opportunity to speak at the hearing, ask questions, and submit comments. EERA staff will respond to questions and comments about the EA at the public hearing but is not required to revise or supplement the document.[38] Comments received during the hearing and the associated comment period become part of the project record.

After the comment period closes, the ALJ will provide the Commission with a written report summarizing the public hearing and comment period, and any spoken or written comments received. The ALJ will also provide the Commission with proposed findings and a recommendation whether to issue a route permit. The record developed during the environmental review process—including all public input received during the public hearing and comment period—will be considered by the Commission when it makes a route permit decision.

## Permitting Steps to Date

**The Commission accepted the CN and route permit applications as complete on December 5, 2023.[39] Public information and scoping meetings were held in Alexandria and Monticello (December 12, 2023), Ortonville and Benson (December 13, 2023), and St. Joseph and virtually (December 14, 2023).[40]**

### Application Filing and Acceptance

On September 29, 2023, Northern States Power Company, doing business as Xcel Energy, along with Great River Energy, Minnesota Power, Otter Tail Power Company, and Missouri River Energy Services, on behalf of Western Minnesota Municipal Power Agency, (hereinafter the applicants) filed certificate of

[36] Minnesota Rule 7829.1200 and Minnesota Rule 7850.2800 to 7850.3900

[37] Minn. R. 7849.1900, subp. 1; Mnn. R. 7859.3700, subp. 8.

[38] Minn. R. 7850.3800, subp. 4.

[39] Commission Order, December 5, 2023, eDockets No. 202312-200978-02.

[40] Notice of Public Information and Environmental Assessment Scoping Meetings, November 28, 2023, eDockets No. 202311-200772-01.

need[41] and route permit applications[42] with the Commission. Subsequently, the Commission found both applications to be complete and authorized joint hearings and combined environmental review for these two approvals.[43] Commission staff provided a *Sample HVTL Route Permit* on November 21, 2023.[44]

## Scoping Process

**Scoping was the first step in the environmental review process. It helped focus this EA on the most relevant information needed by the Commission to make an informed route permit decision.**

In accordance with Minnesota Rule 7850.3700, subpart 2, Commerce and Commission staff initiated the scoping process. The scoping process has two primary purposes: (1) to gather public input as to the impacts and mitigation measures to study in the EA and (2) to focus the EA on those impacts and mitigation measures that will aid in the Commission's decisions on the CN and route permit applications. Staff use the information gathered during scoping to inform the content of the EA. Scoping includes a public meeting and comment period that provide opportunities for interested persons to help develop the scope (or contents) of the EA.[45]

Commerce and Commission staff held public information and scoping meetings in December 2023 – five in-person and one virtual. The meetings provided information to the public about the proposed project, answered questions, and allowed the public an opportunity to suggest alternatives and impacts for consideration during preparation of the EA. A court reporter was present at the meetings to document oral statements. The meeting and associated comment period also provided an opportunity to gather input on potential impacts and mitigative measures that should be studied further in the EA and to solicit potential site or system alternatives.

In addition to the oral comments received at the public meeting, a public comment period, ending on January 8, 2024, gave the public further opportunity to provide input on the project. Comments highlighting or identifying issues of concern, mitigation measures, and consideration for alternative routes or route segments were considered in development of the final EA scope.

## Scoping Comments Received

**Scoping comments are compiled and available to view or download.**[46]

The public expressed concern about the project, mainly through oral public comments made at the in-person public information and scoping meetings. Commenters asked questions about the project layout and voltage, capacity, permitting process, and timing, as well as detailed concerns about new transmission infrastructure siting, public hearing timing, the EA, and personal property and easements. Commenters noted concerns with topics such as electric and magnetic fields (EMF), stray voltage,

[41] Big Stone South – Alexandria – Big Oaks Transmission Project, Application to the Minnesota Public Utilities Commission for a Certificate of Need for a High Voltage Transmission Line, September 29, 2023, eDockets Numbers 20239-199284-01 (through -05), hereinafter the Certificate of Need Application.

[42] Xcel Energy Alexandria to Big Oaks 345 kV Transmission Project, Application to the Minnesota Public Utilities Commission for a Route Permit for a High Voltage Transmission Line, September 29, 2023, eDockets Numbers 20239-199287-01 (through -08), hereinafter the Route Permit Application.

[43] Commission Order, December 5, 2023, eDockets Number 202312-200978-02.

[44] Sample HVTL Route Permit, November 21, 2023, eDockets No. 202311-200657-01.

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

[46] Combined Public Comments on Scope of Environmental Assessment, eDockets No. 20241-202015-01.

frequency interference, and human health in addition to requesting mitigation measures such as bird diverters for the project.

Written comments were received during this comment period from two state agencies, one local unit of government, one labor union, and seven community members.

DNR comments focused on potential environmental impacts and three proposed alternative River Crossing options (hereinafter "DNR Alternatives 1-3").[47] DNR requested that the EA analyze impacts to ecologically significant areas including several Minnesota Biological Survey (MBS) sites around the applicants' proposed River Crossings, St. Martin 15 Calcareous Fen, and several fauna and flora species. Additionally, DNR requested the EA analyze lighting, dust control, erosion control, and control of invasive species. DNR's three alternatives aim to reduce environmental impacts and minimize disturbance to ecologic and biologic resources near the River Crossing.

### Consideration of Alternatives and Scoping Decision

**The Commission requested three route alternatives be studied in the EA. The scoping decision identified the topics studied in this EA.**

This EA studies three route alternatives in addition to the route proposed by the applicant. All three alternatives were proposed by the DNR and can be seen in Appendix B, Maps 4A-4C as DNR Alternatives 1, 2, and 3.

The Commission ordered the study of DNR Alternatives 1, 2, and 3 along with the applicant's proposed route (as modified). The final scoping decision reflects this input from the Commission, and identifies the issues and route segments to be evaluated in this EA. The EA scoping decision was issued on February 21, 2024 (Appendix A).

### Issues Outside of Scope

**The scoping decision identified several issues that will not be studied.**

- Any route, route segment, or alignment alternative not specifically identified for study in the scoping decision.
- Any system alternative not specifically identified for study in the final scoping decision.
- Potential impacts of specific energy sources.
- How landowners are compensated for the project.

## Other Permits and Approvals

**Other permits and approvals outside of the certificate of need and route permit are required for the project.**

A CN and a route permit from the Commission are the only state permits required for routing the project. A route permit supersedes local planning and zoning and binds state agencies; therefore, state agencies are required to participate in the Commission's permitting process to aid the Commission's decision-making and to indicate routes that are not permittable.[48]

[47] Minnesota DNR Scoping Comments, January 8, 2024 eDockets No. 20241-201967-01.

[48] Minn. Stat. 216E.10.

In addition to the route permit, various federal, tribal, state, and local approvals might be required for activities related to construction and operation of the project. These subsequent permits (commonly referred to as "downstream" permits) must be obtained prior to construction. Table 1 lists potential downstream permits that may be required, several of which are discussed below.

**Table 1: Potential Permits**

| Government | Type of Application | Purpose |
|---|---|---|
| **Federal** | | |
| Environmental Protection Agency | Spill Prevention, Control, and Countermeasures Plan | Response plan to respond to a worst-case oil discharge or threat of a discharge. |
| U.S. Army Corps of Engineers | Section 404 Clean Water Act – Dredge and Fill | Protects water quality by controlling discharges of dredged and fill material. |
| | Section 10 Permit | Permit to work in, over, or under a navigable water to regulate impacts. |
| U.S. Fish and Wildlife Service | Threatened and Endangered Species Consultation (Section 7) | Consultation to mitigate impacts to federally listed species. |
| Federal Aviation Administration | Part 7460 Airport Obstruction Evaluation | To identify structures that exceed thresholds from ground level as defined in CFR 77.9. |
| **Tribal** | | |
| American Indian Tribes | National Historic Preservation Act Section 106 Coordination | Coordination to prevent impacts to traditional cultural properties. |
| **State** | | |
| Department of Natural Resources | State Threatened and Endangered Species Consultation | Consultation to mitigate impacts to state-listed species. |
| | Water Appropriation Permit | To balance competing management objectives. |
| | License to Cross Public Lands and Waters | License to prevent impacts associated with crossing public lands and waters. |
| Pollution Control Agency | Construction Stormwater Permit | Minimizes temporary and permanent impacts from stormwater on one or more acres of land. |
| | Section 401 Clean Water Act – Water Quality Certification | Ensures project will comply with state water quality standards. |
| State Historic Preservation Office | National Historic Preservation Act Section 106 Consultation | Ensures adequate consideration of impacts to significant cultural resources. |
| Department of Labor and Industry | Electrical Inspection | Necessary to comply with state electric codes. |

| Government | Type of Application | Purpose |
|---|---|---|
| Department of Agriculture | Agricultural Impact Mitigation Plan | Establishes measures for protection of agricultural resources. |
| Department of Transportation | Utility Permit | Controls utilities installed along, across, or within highway rights-of-way. |
| | Driveway Access Permit | Controls access to driveways along highways. |
| | Oversize/Overweight Permit | Controls use of roads for oversized or overweight vehicles. |
| Board of Water and Soil Resources | Wetland Conservation Act (WCA) | Coordination with the Board of Water and Soil Resources to ensure conservation of wetlands. |
| **Local** | | |
| Local Approvals (County, Township, and City) | Road Crossing, Public Lands Permits, Driveway/Access, Utility Permits, Oversize or Overweight, and Municipal Stormwater Permits. | Ensures proper use of local roads and lands. Includes permits needed to construct on or work within local jurisdictions. |

### Federal

A Spill Prevention, Control, and Countermeasure (SPCC) plan is required to contain and prevent discharge of oil or other petroleum products into waters of the U.S. The applicants will prepare an SPCC plan for the construction phase of the project if contractors bring in stationary or mobile fueling tanks that exceed the 40 Code of Federal Regulations (CFR) Part 112 threshold (1,320 gallons of oil capacity). The SPCC plan will cover all laydown, staging, parking, and refueling activities along the right-of-way. A separate facility SPCC plan will be created for Big Oaks Substation if regulatory oil thresholds are exceeded.

The U.S. Army Corps of Engineers (USACE) "regulates the discharge of dredged or fill material into waters of the United States, including wetlands".[49] Dredged or fill material, including material that moves from construction sites into these waters, could impact water quality. A permit is required from USACE if the potential for significant adverse impacts exist. The USACE is also charged with Tribal Government coordination on the potential impacts to traditional cultural properties. Lastly, the USACE regulates impacts to navigable waters of the U.S. under Section 10 of the River and Harbors Act. The applicants will apply for a permit to cross the Mississippi River once a route permit is issued for the project.

A permit is required from the U.S. Fish and Wildlife Service (USFWS) for the incidental take[50] of any federally listed threatened or endangered species. The USFWS encourages consultation with project proposers to ascertain a project's potential to impact these species and to identify mitigation measures for the project. The project's specific USFWS review is discussed more in depth in Chapter 4 under Wildlife and Habitat.

[49] U.S. Environmental Protection Agency (October 27, 2015) *Section 404 Permit Program*, retrieved from: http://www.epa.gov/cwa-404/section-404-permit-program.

[50] 16 U.S. § 1532(19) (defining "take" to mean to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in such conduct).

FAA notice and approval are required for structures 200 feet above ground level or those that may exceed a surface at certain slopes as defined in the 14 CFR Part 77.9. Once the applicant submits notice of construction to the FAA, an aeronautical study is conducted for potential airspace impacts. The FAA issues a final determination of hazard or no hazard.

### State

Potential impacts to state lands and waters, as well as fish and wildlife resources, are regulated by the DNR. Licenses are required to cross state lands or waters.[51] Projects affecting the course, current, or cross-section of lakes, wetlands, and streams that are public waters may require a *Public Waters Work Permit*.[52] Not unlike the USFWS, DNR encourages applicants to consult with the agency to determine if a project has the potential to impact state-listed threatened or endangered species. Additionally, consultation can lead to the identification of measures to mitigate potential impacts associated with the project. The need for a public waters work permit for the project is not anticipated, however, the applicants will work with the DNR to obtain one if its required.

The DNR also regulates water appropriation activities that exceed 10,000 gallons per day or a total of one million gallons per year under Minn. R. 6115.0620. The applicants will obtain authorization for the project under DNR's General Permit 1997-2005 for Temporary Projects as necessary for activities such as construction site dewatering.

Construction projects that disturb one or more acres of land require a general *National Pollutant Discharge Elimination System / State Disposal System Construction Stormwater Permit* (CSW Permit) from the Minnesota Pollution Control Agency (MPCA). This permit is issued to "construction site owners and their operators to prevent stormwater pollution during and after construction."[53] The CSW Permit requires use of best management practices; development of a Stormwater Pollution Prevention Plan (SWPPP); and adequate stormwater treatment capacity once the project is complete. Projects must be designed so that stormwater discharged after construction does not violate state water quality standards. Specifically, projects with net increases of one acre or more to impervious surface must be designed to treat water volumes of one-inch multiplied by the net increase in impervious surface.

A Clean Water Act Section 401 *Water Quality Certification* from MPCA might also be required. "Section 401 of the Clean Water Act requires any applicant for a federal license or permit to conduct an activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification from the State in which the discharge originates that the discharge complies the applicable water quality standards."[54] The certification becomes an enforceable condition of the federal permit.

Additionally, MPCA regulates generation, handling, and storage of hazardous wastes.[55]

A permit from the Minnesota Department of Transportation (MnDOT) is required for construction, placement, or maintenance of utility lines adjacent or across trunk highway rights-of-way.[56]

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[51] Minnesota Statutes 84.415.

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

[53] MPCA. *Construction Stormwater*. (2022). https://www.pca.state.mn.us/business-with-us/construction-stormwater

[54] MPCA. (n.d.) *Clean Water Act Section 401 Water Quality Certifications*, https://www.pca.state.mn.us/water/clean-water-act-section-401-water-quality-certifications.

[55] Minnesota Rules 7045.

[56] Minnesota Rule 8810.3300, subp. 1.

Oversize/Overweight Permits are required for vehicle loads of excess height, length, and/or weight that travel on state trunk highways during construction and operation. Coordination would be required to construct access roads or driveways from trunk highways.[57] These permits are required to ensure that use of the right-of-way does not interfere with free and safe flow of traffic, among other reasons.[58] Lastly, an Access/Driveway Permit will be required for using driveways and access points to trunk highways crossed or paralleled by the project during construction.

The State Historic Preservation Office (SHPO) is charged with preserving and protecting the state's historic resources. SHPO consults with applicants and state agencies to identify historic resources to avoid and minimize impacts to these resources.[59]

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

The Board of Water and Soil Resources (BWSR) oversees implementation of Minnesota's *Wetland Conservation Act* (WCA).[60] The WCA is implemented by local units of government. The project may require a permit under these rules if permanent impacts to wetlands cannot be avoided.

### Tribal

Coordination with Tribal Historic Preservation Offices (THPO) prevents impacts from the project to known traditional cultural properties. THPOs are officially designated by Tribes and serve the same function as a State Historic Preservation Office.[61] THPOs assist with the preservation of Tribal historic properties and cultural traditions. They are also available to advise federal, state and local agencies on the management of Tribal historic properties and instruct municipalities on Section 106 reviews to represent tribal interests.

### Local

The counties overlaying the project oversee local implementation of the WCA. The WCA requires that any person "proposing to impact a wetland to first, attempt to avoid the impact; second, attempt to minimize the impact; and finally, replace any impacted area with another wetland of at least equal function and value."[62]

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

[57] MnDOT *Land Management*. (2022). https://www.dot.state.mn.us/utility/forms.html:.

[58] MnDOT. Utility Accommodation on Trunk Highway Right of Way: Policy OP002. (2017).

[59] Minn. R. 4410.4300, subp. 31.

[60] Minn. R. 8420.

[61] See generally Minnesota Indian Affairs Council, Tribal Historic Preservation Officers. Retrieved from: https://mn.gov/indian-affairs/cultural-resources/tribal-historic-preservation-officers-.jsp

[62] Minnesota. Rule. 8420.0100, subp. 2.

#### ACCESS/DRIVEWAY
Coordination may be required to construct access roads or driveways from county, city, or township roads.

#### OVERSIZE OR OVERWEIGHT LOAD
Coordination may be required to move over-width or heavy loads on county, city, or township roads.

#### ROAD CROSSING AND RIGHT-OF-WAY
Coordination may be required to cross or occupy county, city, or township road rights-of-way. Utility permits may also be required to place infrastructure in these rights-of-way.

#### PUBLIC LANDS
Permits may be required to occupy county, township, and city lands such as park lands, watershed districts, or other properties owned by these entities.

### Regional Transmission Planning
Minnesota's electric grid is part of the high-voltage transmission system that connects the entire eastern two-thirds of the United States. The Federal Energy Regulatory Commission (FERC) has jurisdiction over the planning and operation of most of that system.

FERC implements its policies and regulations through various regional transmission organizations. One of these regional organizations, called the Midcontinent Independent System Operator (MISO), is responsible for planning and operating the high-voltage system in most of the central United States. MISO manages approximately 72,000 miles of transmission lines across 15 states, including most of Minnesota. Xcel Energy, Great River Energy, Minnesota Power, and Otter Tail Power Company are MISO members.

Every year, MISO evaluates various projects through annual its transmission expansion planning process that aims to build an electric infrastructure to meet local and regional reliability standards, enable competition among wholesale capacity and energy suppliers, and allow for competition among transmission developers. MISO approval for this project as part of the Tranche 1 Portfolio was granted in July 2022 as part of its 2021 Transmission Expansion Plan.

## Electric Safety Codes
**If constructed, the project must meet electrical safety code requirements.**

The project must meet requirements of the National Electrical Safety Code (NESC).[63] Utilities must comply with the most recent edition of the NESC, as published by the Institute of Electrical and Electronics Engineers, Inc., and approved by the American National Standards Institute, when constructing new facilities or upgrading existing facilities.[64] These standards are designed to safeguard human health "from hazards arising from the installation, operation, or maintenance of conductors and equipment in electric supply stations as well as overhead and underground electric supply lines".[65] They

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

[64] Minnesota Statute 326B.35.

[65] IEEE Standards Association (n.d.) *2017 – National Electrical Safety Code Brochure*, retrieved from: https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/nesc_2017_brochure.pdf.

also ensure that facilities and all associated structures are built from materials that will withstand the operational stresses placed upon them over the expected lifespan of the equipment, provided that routine maintenance is performed.

Utilities must also comply with North American Electric Reliability Corporation's (NERC) standards,[66] which define the reliability requirements for planning and operating the electrical transmission grid in North America.[67]

[66] Appendix C, Draft Route Permit, Section 4.5.1.

[67] North American Electric Reliability Corporation (2017) *Standards*, retrieved from: http://www.nerc.com/pa/stand/Pages/default.aspx.

# Chapter 3: Proposed Project and Alternatives

The applicants propose to string approximately 105-108 miles of 345 kV transmission line on existing double-circuit capable structures from the existing Alexandria Substation in Alexandria, Douglas County to the proposed Big Oaks Substation on the north side of the Mississippi River in Becker, Sherburne County, Minnesota. New transmission lines will be required to cross the Mississippi River to connect the new transmission line to the Big Oaks Substation. This chapter describes the project and the three route alternatives to the project proposed by the DNR (DNR Alternatives 1-3). This includes how they would be constructed, operated, and maintained. **Unless otherwise noted, the source of information for this chapter is the combined certificate of need and route permit application.**

## How is the project designed?

**The project will provide benefits to the Midwest subregion of the Midcontinent Independent System Operator (MISO) footprint by facilitating more reliable, safe, and affordable energy delivery.[68] The current 345 kV transmission system is at capacity which leads to several reliability concerns that could affect customers' service.[69] The project intends to provide additional transmission capacity, mitigate current capacity issues, and improve electric system reliability throughout the region as more renewable energy resources are added to the electric system in and around the region.[70]**

The project runs from Alexandria to Becker where a second circuit will be strung on existing transmission lines structures (Appendix B, Map 3). New foundations and poles will be required along parts of this alignment as described later in this section. Townships, Ranges, and Sections within this entire route can be found in Table 2.1-1 of the Route Permit Application. The project will also deviate from the existing infrastructure in three other places to accommodate 0.2 miles of new HVTL to tap into the Alexandria Substation, reconfiguration with 0.5 miles of new HVTL to bypass the Riverview Substation, and reconfiguration with 0.2 miles of new HVTL to bypass the Quarry Substation (Appendix B, Maps 5A-5C).

The majority of the project that will be newly built is north of Interstate 94 and south of U.S. Highway 10, bisected by the Mississippi River near both Becker and Monticello (Appendix B, Map 2A).

The project will be designed in compliance with all applicable standards regarding clearance to ground, clearance to existing utilities, clearance to buildings, strength of materials, and right-of-way widths. Crews will follow standard construction practices and industry safety procedures.

### Second Circuit HVTL Stringing

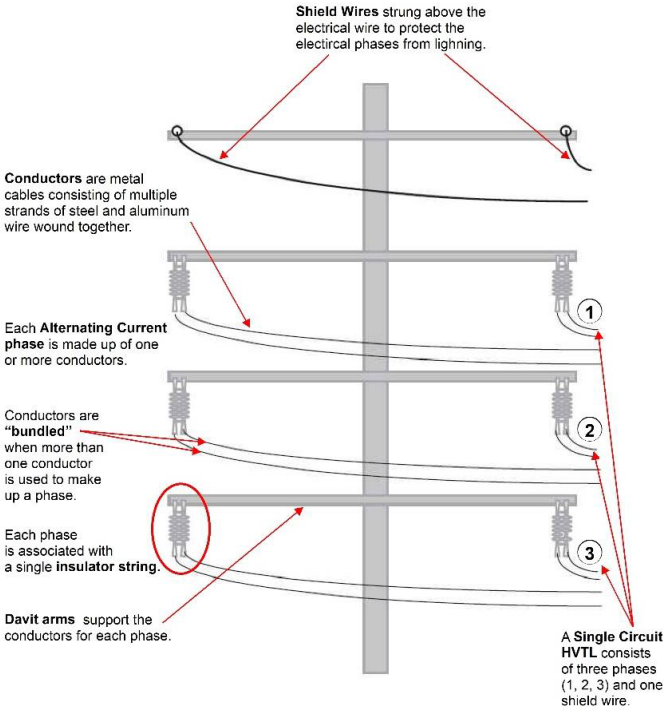
Transmission lines are usually either single-circuit (carrying one three-phase conductor set) or double-circuit (carrying two three-phase conductor sets). The project will be placing a second 345 kV alternating current (AC) line on existing double-circuit capable structures, thus there will be two three-phase conductor sets. Figure 2 below from the Route Permit Application represents how this second circuit would work and what it would look like. The length of this second circuit will be 105 to 108 miles.

[68] Route Permit Application, Section 1.1.
[69] *Ibid.*
[70] *Ibid.*

AC transmission lines, such as the proposed project, consist of three separate phases that require a conductor to carry the electrical power. Conductors are metal cables consisting of aluminum wires stranded around a core of steel wires, typically less than one inch in diameter. A phase consists of one or more conductors; this project is still subject to final engineering design and is evaluating two conductor types for the new line. These include double bundled "Ibis" conductors and double bundled round (non-twisted pair) "Cardinal" conductors.

Each phase is at the end of a separate insulator and physically supported by a structure that holds it above ground. These existing structures are primarily galvanized steel monopoles, as can be seen in Figure 2. There will be two shield wires strung above the phases to prevent damage from lightning strikes. The shield wire can also include fiber optic cable which provides a communication path between substations for transmission line protection equipment.

**Figure 2: Second Circuit Transmission Line and Structure Design**




## New Transmission Structures

There are certain locations where new structures will be required, approximately 67 to 78 in total depending on the River Crossing selected for the project. These would be needed in select areas along the existing infrastructure to accommodate angles (i.e., where the alignment turns), highway crossings, or where the anticipated alignment deviates from the existing infrastructure (e.g., substation bypasses, new substation taps and the Mississippi River crossing). Everywhere between the Alexandria and Quarry Substations where there is an angle in the existing alignment will require a new structure – all foundations and poles from Quarry Substation to Monticello are already built because the original project was approved for and erected poles that would not immediately have the second circuit installed. The approximate location of new foundations and poles where detailed engineering has been completed are compiled in Appendix B, Maps 6A-6EE. Structures are not shown in areas where detailed design has not been completed such as at the River Crossing.

New structures will primarily be monopole; H-frame structures may be used at the Mississippi River crossing or if needed to accommodate longer spans. The new steel pole structures will be approximately 75 to 160 feet tall with a typical span of 1,000 feet. Anticipated support for single pole structures will be primarily concrete foundations; H-frame structures can use two concrete foundations or be directly embedded into the ground.

Angle structures along the East Segment were originally designed as 2-pole structures (one full circuit and a shield wire attached to each pole), which is typical for double circuit 345 kV lines. When the first circuit was installed, there was no need for the second monopole and without wires attached, the second monopole would have been susceptible to vibration damage. The second monopole would need to be installed for the project. Where a second monopole structure is required next to an existing structure, it will be placed within the existing right-of-way, 40 to 60 feet from the existing structure. Table 2 below summarizes typical structure designs for the project.

**Table 2: Project Structure Designs**

| Line Type | Structure Type | Structure material | Typical Right-of-Way Width | Structure Height | Foundation Diameter |
|---|---|---|---|---|---|
| 345 kV Double-Circuit | Monopole with Davit Arms | Galvanized or Self-Weathering Steel | 150 feet | 90-160 feet | 7-12 feet |
| 345 kV Single-Circuit | Monopole with Davit Arms | Galvanized or Self-Weathering Steel | | 90-150 feet | 7-12 feet |
| 345 kV Single-Circuit | H-Frame | Self-Weathering Steel | | 75-150 feet | 5-8 feet |

## River Crossing Options

A new crossing over the Mississippi River near the city of Monticello would be constructed to connect to the proposed Big Oaks Substation, northwest of the Monticello Nuclear Generating Plant in Becker (Appendix B, Map 2A). The proposed route includes 500-foot buffers around the two River Crossing options: the Western Option and the Eastern Option (Appendix B, Map 2). The DNR offered three alternatives to cross the Mississippi River which will also be analyzed in this EA and discussed later (Appendix B, Maps 4A - 4C). The proposed route encompasses the area along the Mississippi River from the Western Option to east of the Monticello Nuclear Generating Plant and includes the 150-foot right-of-away of the existing infrastructure (Appendix B, Map 2).

### Western Option

The Western Option would construct a new crossing of the Mississippi River directly south of the proposed Big Oaks Substation and would be approximately 1.4 miles long. This alignment would include new right-of-way entirely on land owned by the applicants.

### Eastern Option

The Eastern Option would construct a new crossing of the Mississippi River just west of the Monticello Nuclear Generating Plant. This option would be approximately 2.9 miles and parallel an existing 115 kV transmission line. 2.1 miles of new right-of-way would be required entirely on land owned by the applicants. Two new helical pier structures would need to be placed on an island in the Mississippi River.

**Table 3: Applicant's Proposed River Crossing Options**

| Option | Total Project Length | Option Length | River Crossing Length | Total New Right-of-Way Length[71] | Percent of Project New Right-of-Way |
|---|---|---|---|---|---|
| **Western Option** | 105.3 miles | 1.4 miles | 450 feet | 1.4 miles | 1.4% |
| **Eastern Option** | 108.0 miles | 2.9 miles | 2,200 feet | 2.9 miles | 2.7% |

## Big Oaks Substation

The eastern terminus of the project is the new Big Oaks Substation. The easternmost portion of the project will deviate from existing HVTL infrastructure to the northwest to connect to the proposed Big Oaks Substation (Appendix B, Map 2). The exact location of the substation has not yet been determined, but a 250-acre portion of land owned primarily by Xcel Energy has been identified and is referred to as the Big Oaks Substation Siting Area throughout this EA (Appendix B, Map 2). The proposed route includes the Big Oaks Substation Siting Area as well as a buffer ranging from 600 feet to almost 2,000 feet extending west from the Siting Area to the Mississippi River (Appendix B, Map 2).

The applicants are evaluating the Big Oaks Substation Siting Area to confirm adequate space for planned facilities, future transmission line interconnections, and a buffer to minimize immediate encroachment with other existing or new land uses.

The Big Oaks Substation will include eighteen 345 kV circuit breakers configured to accommodate the connection of up to twelve 345 kV transmission lines. This equipment is designed to protect human health, as well as the equipment on the transmission system, by deenergizing the transmission line should any unsafe line faults occur. Substations are also designed with significant grounding grids in part to eliminate the potential for spark discharges.

Substation equipment necessary to provide reactive power support will also be installed. The Big Oaks Substation will be on a graded and fenced area of approximately 10 acres. Beyond the current project, a number of additional transmission lines will eventually connect to the Big Oaks substation.

## Substation Expansions and Adjustments

There are associated facilities for the project that include existing substation expansions, bypasses, and taps. Minor land purchases are planned for expansion of the Alexandria Substation. Where new right-of-way is required, the applicants will likely obtain an easement agreement.

### Alexandria Substation

The existing Alexandria Substation is on the southern edge of the City of Alexandria just south of Interstate 94 (Appendix B, Map 5A). This is where the proposed route begins with a 500 foot buffer around the substation. New substation equipment is necessary to accommodate the proposed 345 kV transmission line including new termination structures, circuit breakers, relays and associated control equipment. This will require an expansion of two to four acres from the existing fenced area to accommodate the new substation equipment. The applicants will have to purchase land to accomplish this expansion. A tap line requiring 0.2 miles of new right-of-way is also proposed as part of the project,

[71] Mileage of HVTL have been updated from the Route Permit Application due to personal communication with the applicants via email on May 21, 2024. Mileage was updated from comparative purposes to a common endpoint and was stated as more accurate than the mileage of HVTL provided in the Route Permit Application.

which would place one new structure. The land to purchase near the Alexandria Substation is currently in agricultural production.

#### RIVERVIEW SUBSTATION

The existing Riverview Substation is in Stearns County near the City of Freeport, Minnesota and south of Interstate 94 (Appendix B, Map 5B). The proposed route includes a 500 foot buffer around the substation and required transmission line bypass. The existing 345 kV circuit that routes from the Alexandria Substation (to the Quarry Substation) will be reconfigured to bypass the Riverview Substation. The new 345 kV circuit to be strung from the Alexandria Substation to the Big Oaks Substation will connect to the Riverview Substation. New substation equipment is necessary to install to provide reactive power support. The current fenced area will be expanded by approximately 0.5 acres on property owned by Great River Energy to accommodate this new substation equipment. This includes up to five new transmission line structures and 0.5 miles of new right-of-way.

#### QUARRY SUBSTATION

The existing Quarry Substation is in Stearns County near Waite Park, Minnesota north of State Highway 23 (Appendix B, Map 5C). The proposed route also has a 500 foot buffer around this substation, its existing infrastructure in and out, and the new bypass. The bypass includes approximately 0.2 miles of new right-of-way and up to six new transmission line structures. New substation equipment is necessary to provide reactive power support at the Quarry Substation. The current fenced area will be expanded by approximately 0.3 acres on Xcel Energy owned property to accommodate this new substation equipment.

## What alternatives does this EA study?

**For the purposes of this EA, the applicants' proposed route is subdivided into two route segments representing the Western and Eastern River Crossing options. This EA studies three route alternatives offered by the DNR. All route alternatives connect to the same endpoints and utilize the same project infrastructure but offer different paths to construct the new transmission lines that cross the Mississippi River.**

All alternatives follow the same route for over 95% of the proposed length by the applicants, and only in how they cross the Mississippi River (hereinafter the River Crossing). Should the Commission issue a route permit for the project, it must select either the applicants' proposed route via their Western or Eastern Option, or one of the three DNR Crossings, termed DNR Alternatives 1-3. DNR offered anticipated alignments and rights-of-way along their routes (Appendix B, Maps 4A - 4C). This approach allows for an appropriate comparison with the applicants' proposed route. Should a permit be issued for the project, the permittee can request changes to the anticipated alignment and right-of-way ultimately selected by the Commission. Such modifications "must have comparable overall impacts relative to the factors" used to make the route permit decision.[72]

### The Applicants' Proposed Alternatives

**The applicants' proposed route segments include the Western and Eastern River Crossing options as described in the Project Design section in this Chapter.**

[72] Minnesota Rule 7850.4100.

## DNR Alternatives 1-3

**The DNR Alternatives 1-3 were proposed for study in this EA during scoping. DNR's three proposed alternatives connect to the same endpoints and traverse geography nearby the applicant's proposed River Crossings. Two of three options would require tree clearing and an additional right-of-way to span the new transmission line across the Mississippi River. One of the options would utilize existing Xcel Energy transmission structures, and thus avoid tree clearing and establishment of an additional right-of-way.**

DNR stated in their scoping comments that all three of their alternatives would have less human and environmental impacts than the applicants' proposed River Crossing options. DNR believes that the applicants' crossing options would "further fragment the habitat in this area and would place two pole structures within the floodway of the Mississippi River, posing ongoing challenges for pole stability."[73]

Several new structures would be required for DNR Alternatives 2 and 3, however, the number of structures for DNR Alternative 2 would be comparable to either of the applicants' proposed crossing options. Regardless of which crossing option is chosen, structure heights, configurations, compositions, foundations, and spans are expected to be similar.

If the Commission orders implementation of any of the DNR Alternatives 1-3 as part of this proceeding, the applicants would still own and construct the project. Additional easements or fee ownership of property would likely be necessary to construct DNR Alternatives 2 and 3.

### DNR Alternative 1

This alternative is DNR's preferred route for crossing the Mississippi River. This option would rebuild an existing Xcel Energy 115 kV transmission line to accommodate the project's new 345 kV line (Appendix B, Map 4A). This option would create a double-circuit 345/115 kV crossing of the river.

An existing Xcel Energy 345 kV transmission line runs along Interstate 94 until it enters and terminates at Monticello Substation. An existing 115 kV line, which would have to be rebuilt to accommodate the project's new 345 kV line, exits Monticello Substation northwest to cross the Mississippi River, and ultimately routes near the north end of the Big Oaks Substation Siting Area. DNR Alternative 1 would route the new 345 kV line adjacent to the Monticello Substation and would connect to the existing 115 kV line west of the substation.

Using existing infrastructure for the project's transmission line would combine new right-of-way with existing right-of-way to the greatest extent possible. The applicants have stated this option would require a specialty tangent structure with a wider foundation on an island in the Mississippi River due to the acute angle of the alignment. Due to extensive tree clearing that would be required of a typical H-frame configuration ROW of 230 feet which would extend to another island, the applicants would instead utilize monopole structures with a 150-foot ROW. Thus, the proposed configuration would increase the existing 115kV transmission line's 75-foot ROW to a new 150-foot ROW for the new double-circuited 115kV and 345 kV line. This would result in an additional 75 feet of tree clearing for the entire length of line on the island (150 feet total).

The applicants proposed during the scoping period this route be modified to shift south after crossing the river to avoid a building that is currently under construction and to provide adequate clearance

[73] Minnesota DNR Scoping Comments, January 8, 2024 eDockets No. 20241-201967-01.

between the proposed and existing transmission lines in the area. This Alternative as proposed, with the applicants' modification, was approved for study in this EA and is reflected as such within.

### DNR Alternative 2

This alternative would cross at a narrower point of the Mississippi River northwest of the applicant's Western Option (Appendix B, Map 4B). An existing Xcel Energy 345 kV transmission line runs along Interstate 94 which is proposed for double-circuiting for the project. This alternative would terminate this double-circuiting slightly before Meridian Avenue North, and head north along a property parcel line through an agricultural field. The route would then head east along a property parcel line past Appleton Avenue NW to the banks of the Mississippi River. The route crosses the river directly northeast until it reaches the Big Oaks Substation Siting Area.

The applicants proposed during the scoping period this route be modified to shift east to avoid an existing pivot irrigation system that is north of Interstate 94. This Alternative as proposed, with the applicants' modification, was approved for study in this EA and is reflected as such within.

### DNR Alternative 3

This alternative deviates from the proposed route to along County Road 75 further west in between Curtis Avenue NW and Clementa Avenue NW. This point occurs before the existing line cuts south over County Road 75. The alignment then heads north in the middle of a parcel, and goes east when it reaches the next perpendicular parcel line. As the alignment heads east, it reaches 145th Street NW and follows it on the south side until it routes to the north side slightly before Barton Avenue NW. This street is followed north on its west side and is cut across as it heads east to the intersection of Appleton Avenue NW and Armitage Avenue NW. At this intersection, the route heads north on the west side of Armitage Avenue NW until it reaches the bank of the of the Mississippi River. The route crosses the river northeast until it reaches a parcel line, heads back southeast, and finally parallels the existing transmission lines to the southeast until it reaches the Big Oaks Substation Siting Area. The line would ultimately interconnect into or along existing Xcel Energy 345 kV transmission line infrastructure near Sherburne County Substation (Appendix B, Map 4C).

The applicants proposed during the scoping period this route be modified to shift south after crossing the river to provide sufficient clearance between the proposed and existing transmission lines in this area. The applicants note that this shift will likely result in impacts to MBS Sites of Biodiversity Significance of biodiversity significance and native plant communities. This Alternative as proposed, with the applicants' modification, was approved for study in this EA and is reflected as such within.

**Table 4: DNR Alternatives' Proposed River Crossing Options**

| Option | Total Project Length | Option Length | Total New Right-of-Way Length[74] | Percent of Project New Right-of-Way |
|---|---|---|---|---|
| **Alternative 1** | 112.6 miles | 8 miles | 2.2 miles | 2% |
| **Alternative 2** | 108.3 miles | 3.7 miles | 1.6 miles | 1.5% |

[74] Mileage of HVTL have been updated from the Route Permit Application due to personal communication with the applicants via email on May 21, 2024. Mileage was updated from comparative purposes to a common endpoint and was stated as more accurate than the mileage of HVTL provided in the Route Permit Application.

| | | | | |
|---|---|---|---|---|
| **Alternative 3** | 109 miles | 4.4 miles | 4.4 miles | 4% |

## Project Construction

**HVTL construction practices are similar for all routing options. The applicants anticipate construction will take 18 to 20 months to complete. This section summarizes construction sequencing and activities.**

The project will be jointly owned by the applicants: Xcel Energy, Great River Energy, Minnesota Power, Otter Tail Power Company, and Missouri River Energy Services, on behalf of Western Minnesota Municipal Power Agency. Each applicant will be responsible for the construction and maintenance of its own substation.

Xcel Energy will be responsible for the construction of the proposed 345 kV transmission circuit and for the maintenance of the 345 kV transmission circuit from the Quarry Substation to the Big Oaks Substation. The equipment and improvements required inside the Quarry Substation and the new Big Oaks Substation will be owned solely by Xcel Energy.

Great River Energy is anticipated to be responsible for the maintenance of the 345 kV transmission circuit from the Alexandria Substation to the Quarry Substation. The equipment and improvements required inside the Riverview Substation will be owned solely by Great River Energy.

The equipment and improvements required inside the Alexandria Substation will be owned solely by Western Minnesota Municipal Power Agency.

All construction information is expected to be the same if DNR Alternative 1, 2, or 3 is chosen by the Commission.

### HVTL Construction

Construction will not begin until the applicant obtains necessary approvals and land rights. The applicants will notify affected and adjacent landowners of the anticipated construction schedule and activities prior to initiation. The precise timing of construction will consider various requirements of permit conditions, environmental restrictions, availability of outages for existing transmission lines (if required), available workforce, and materials.

Land agents will discuss the construction schedule and requirements with the property owner. Special consideration may be needed for fences, crops, or livestock. Fences and livestock may need to be moved; temporary or permanent gates may need to be installed; and crops may need to be harvested early. In each case, the right-of-way agent and construction personnel coordinate these processes with the property owner.

The applicants will follow standard construction practices, including best management practices (BMPs) designed to mitigate impacts. BMPs are based on industry-specific standards and experience with previous projects. BMPs address right-of-way clearance, erecting transmission line structures, and stringing transmission lines. Construction would progress, generally, as follows:

- Survey marking of the transmission line alignment and/or pole locations;

- Right-of-way clearing (trees and other vegetation) and access preparation;
- Grading or filling as necessary (transmission structures are typically designed for installation at existing grades);
- Installation of culverts or concrete foundations;
- Installation of structures such as poles, insulators, and hardware;
- Stringing conductor wire and installing insulators;
- Installation of any aerial markers required by state or federal permits; and
- Restoration and clean-up.

Typical construction equipment includes semi and dump trucks, flatbed tractor trucks and trailers, tree removal equipment, mowers, cranes, backhoes, digger-derrick line trucks, drill rigs, front-end loaders, bucket trucks, bulldozers, pullers, tensioners, helicopters, pickup trucks, and concrete trucks. Excavation equipment is often on wheel or track driven vehicles.

The applicants will evaluate construction access opportunities by identifying existing transmission line easements, roads, or trails that are near the approved route. When feasible, the applicants will limit construction activities to the easement area. In certain circumstances, additional off-easement access may be required on a temporary basis. Permission will be obtained from property owners prior to using off-easement access. Improvements to existing access or construction of new access may be required to accommodate construction equipment. Field approaches and roads may be constructed or improved. Where applicable, the applicants will obtain permits for new access from local road authorities and work with appropriate road authorities to ensure proper maintenance of roadways that are traversed by construction equipment.

After right-of-way clearing and access preparation has been completed, pole and foundation installation will begin. Structures for the project will require drilled pier concrete foundations. The applicants will design the transmission line structures for installations at the existing grades. Where a site slope is required (typically on slopes exceeding 10 percent), working areas may be graded or leveled with fill. If acceptable to the property owner, the applicants propose to leave the graded/leveled areas after construction to allow access for future maintenance activities. If not acceptable to the property owner, the applicants will, to the best of their ability, return the grade of the site back to its original condition.

Temporary workspace generally includes a laydown yard(s) used to stage or store material, preassemble structures, vehicles, construction equipment, and supplies. Staging involves delivering the equipment and materials necessary to construct the new transmission line facilities. Construction of each segment will likely include two or more staging areas. Structures, conductor, matting, and other materials are delivered to staging areas and stored until they are needed for the project. Laydown yards are generally sited on previously disturbed or developed areas. A previously disturbed or developed area that includes sufficient space will be preferred. Disturbed areas will be restored to their original condition to the extent practicable.

### Right-of-way Preparation

Before ground disturbance occurs, surveyors will mark the anticipated alignment and right-of-way boundary. Construction begins by removing trees and other vegetation from the right-of-way that will interfere with safe construction and operation of the HVTL. The Commission requires that applicant

minimize tree removal to the maximum extent practicable and leave undisturbed low growing species that will not interfere with operation or construction.[75]

Structures are generally installed at existing grade; structure locations will not be graded or leveled unless it is necessary to provide a reasonably level area for construction access and activities. Crews will install erosion control where needed. Prior to structure installation, the HVTL alignment might be surveyed and marked again to guarantee proper placement of structures.

### Structure Installation

This phase of construction begins by marking underground utilities using Gopher State One Call. Structures will be moved from staging areas and delivered to the site of each foundation where they are assembled. Insulators and other hardware are attached to the structure prior to placing it on the foundation. Using a crane, the structure is lifted and placed into position so it can be secured.

The process used to secure the structure, along with the actual diameter and depth of a foundation depends on many factors including structure type, soil conditions, slope, line materials, line tension, and the angle of the lines on the structure. Structures can be directly imbedded, supported with a galvanized culvert, or placed on a concrete foundation, also referred to as drill pier foundations. All three foundation types require excavation of a hole to place the foundation. The project will utilize drilled pier foundations between eight to ten feet in diameter and 20 to 60 feet deep, depending on soil conditions. An angle or dead-end structure may require a foundation up to 12 feet in diameter. The actual diameter and depth of the hole and foundation depend on structure design and soil conditions determined during the initial survey and soil testing phases. Concrete is brought to the site by concrete trucks from a local concrete batch plant and filled around a steel rebar support cage and anchor bolts. Once the foundation is cured, the structure is bolted to the foundation.

All structure types might generate excess soil. Crews will spread and level excess soil from excavation near the structure or remove it from the site, as requested by the landowner or required by permit conditions. If a structure is located within a wetland, excess soil must be placed in uplands.[76] Some soil conditions and environmentally sensitive areas will require special construction techniques. The most effective way to minimize impacts to these areas will be to avoid placing poles in the sensitive areas by spanning over wetlands, streams, and rivers. When it is not feasible to avoid traversing sensitive areas, options will be used to minimize environmental impacts as well as impacts to private property as discussed in the Soils and Topography, Water Resources, and Wetlands sections of this EA.

Once structures are installed, conductors are strung along the line as the last major step of transmission line construction. Stringing setup areas are typically placed at two-mile intervals on the transmission line and occupy approximately 100-foot by 500-foot areas. These sites are within the right-of-way when possible or within temporary construction easements. Conductor stringing often uses helicopters to start the process by pulling a “sock-line” or high strength rope through pulleys attached to the insulators on each structure. Each structure is attached to the conductors which are pulled into place by the helicopter and sagged to meet design requirements that are compliant with good utility practice and minimum code clearances. This process requires brief access to each structure to secure the conductor wire to the insulator hardware and to fasten the shield wire on each structure. Conductors and a shield wire will be strung, tightened, and, once appropriate tension is obtained, secured to each structure.

[75] Draft Route Permit, Section 5.3.6.

[76] Draft Route Permit, Section 5.3.8.

Crews are expected to use temporary guard or clearance structures to protect the conductor and to provide adequate clearance over existing distribution lines, communication lines, waterways, or other potential obstructions. These structures may be installed before conductor stringing where the transmission line crosses streets, roads, highways, or other energized conductors or obstructions. The temporary guard or clearance poles ensure that conductors will not contact existing energized conductors or other cables or obstruct traffic during stringing operations as well as protect the conductors from damage if they were to fall during stringing.

After conductor installation is complete, conductor marking devices such as bird flight diverters or air navigational markers will be installed if required. The applicants will identify where marking devices need to be installed in coordination with appropriate agencies. The DRP includes a standard condition requiring the applicant to coordinate with the DNR to make final determinations. [77]

### Restoration

Crews will attempt to minimize ground disturbance whenever feasible, but areas will be disturbed during the normal course of work. Once construction is completed in an area, disturbed areas will be restored to their original condition to the maximum extent feasible. Removal of equipment and debris from the right-of-way, staging yard(s), and construction areas is the first step in restoration. Crews will repair disturbed areas to their original condition to the greatest extent practicable so that all surfaces drain naturally, blend with natural terrain, and facilitate revegetation. Where soil compaction has occurred, construction crews or the restoration contractor will use techniques to reduce the compaction.

Restoration includes removal of all temporary facilities, implementing erosion control measures, implementing any necessary permanent stormwater management system. Temporary restoration before the completion of construction in some areas along the right-of-way may be required per National Pollutant Discharge Elimination System (NPDES) and MPCA construction permit requirements. Ground-level vegetation disturbed or removed from the right-of-way during construction will naturally reestablish to pre-construction conditions. Vegetation consistent with substation site operation outside the fenced area will be allowed to reestablish naturally. Areas where significant soil compaction or other disturbance from construction activities occur will require additional assistance in reestablishing the vegetation stratum and controlling soil erosion. In these areas, the applicants will use seed that is noxious weed free to reestablish vegetation.

Another aspect of restoration relates to the roads used to access staging areas or construction sites. After construction activities are complete, the applicants will ensure that township, city, and county roads used for purposes of access during construction will be restored to their prior condition. The Applicants will meet with township road supervisors, city road personnel, or county highway departments to address any issues that arise during construction with roadways to ensure the roads are adequately restored, if necessary.

After construction activities have been completed, a utility representative will contact the property owner to discuss any damage that has occurred as a result of the project. This contact may not occur until after the applicants have started restoration activities. If fences, drain tile, or other property have been damaged, the applicants will repair damages or reimburse the landowner to repair the damages.

[77] Draft Route Permit, Section 5.3.15.

Farmers will be compensated for crop losses caused by project construction. The compensation will be based upon the area(s) affected, the typical yield for the crops lost, and the market rates for those crops. Following an approved Agricultural Impact Mitigation Plan (AIMP), attached to this EA as Appendix D, a utility representative will measure the area(s) in which planted crops were damaged or destroyed, or not planted at the applicants' request. The lost yields will be determined in coordination with the property owner. The market rate will also be determined in coordination with the property owner and local elevator and/or other evidence to determine the appropriate rate of payment. The applicants will also make a payment for future year crop loss due to soil compaction. In addition, property owners will be compensated for their expense to deep rip compacted areas. If an individual does not have access to deep ripping equipment, the applicants will provide this service or access to such equipment.

### Substations

The Big Oaks Substation will be on a graded and fenced area of approximately 10 acres. The Alexandria, Quarry, and Riverview Substations will increase their fenced footprints collectively by 2.8 to 4.8 acres as well as constructing approximately 0.9 miles of new right-of-way for transmission lines. Construction for this part of the project will take about 30-36 months from start to finish. Soil will be graded and may have permanent impacts to construct the Big Oaks Substation and expand the other substations. Once site grading is completed, all construction activities will be performed within fenced areas. Tree clearing would occur to interconnect the transmission lines that will power the Big Oaks Substation.

Substation construction typically progresses as follows:

- survey marking of property
- site grading
- installation of perimeter fencing
- installation of concrete foundations (drilled piers and slabs)
- installation of steel structures
- installation of electrical equipment enclosure (control house)
- installation of circuit breakers, switches, insulators, conductor, and hardware
- installation of buried control cables and grounding conductors
- installation of oil filled reactor
- testing and commissioning of new equipment
- connection of external transmission lines to substation terminals
- restoration and clean-up

### Land Rights

Minor land purchases are associated with each substation expansion or adjustment, none of which would displace any residents. Early in the detailed design process, typically after the route permit is obtained, the right-of-way acquisition process will begin. For transmission lines, utilities typically acquire easement rights across the parcels to accommodate the transmission line. The evaluation and acquisition process includes title examination, initial owner contacts, survey work, document preparation, and acquisition of easement rights. In areas of the project that will use existing rights-of-way and terms of the existing easements are sufficient, the applicants' right-of-way agent will work with the landowner to address any short-term construction needs, impacts, or restoration. Where new right-of-way is required, the applicants' right-of-way agent will handle negotiations with property owners, for example an easement agreement may be established.

Additional easements or fee ownership of property would likely be necessary to construct DNR Alternatives 2 and 3.

Companies must follow the procedure outlined in Minnesota Statute 84.415 and Minnesota Rules 6135 to cross state-owned land. The Division of Lands and Minerals within DNR grants permission to cross state lands and waters in the form of a crossing license. The license is usually granted for 25 to 50 years and may be renewed when it expires.[78] To apply for an easement the applicant must file an *Application for License to Cross Public Lands and Waters*.[79]

### Project Schedule

The applicants anticipate beginning construction in the fourth quarter of 2024 or first quarter of 2025 with completion in the fourth quarter of 2027. The project is scheduled to be in service by the fourth quarter of 2027. Table 5 shows the applicants' estimate of development and construction milestones. DNR Alternatives 1-3 are expected to coincide with the applicants' construction schedule if chosen by the Commission.

**Table 5: Anticipated Project Schedule**

| Activity | Anticipated Date |
|---|---|
| Minnesota Certificate of Need and Route Permit for Eastern Segment Issuance | Second/Third Quarter 2024 |
| Land Acquisition Begins | Third Quarter 2024 |
| Survey and Transmission Line Design Begins | Second Quarter 2024 |
| Other Federal, State, and Local Permits Issued | First Quarter 2025 |
| Start Right-of-Way Clearing | Second Quarter 2025 |
| Start Project Construction | Second Quarter 2025 |
| Project In-Service | Fourth Quarter 2027 |

## Operation and Maintenance

**The applicants would be responsible for the operation, maintenance, and, when necessary, repair of the entire project, including the HVTL and project substations.**

### HVTL

Transmission lines and substations are designed to operate for decades and require only moderate maintenance, particularly in the first few years of operation. The applicants use an approximately 60-year service life for its transmission assets. However, practically speaking, HVTLs are seldom completely retired. Periodically, the transmission line right-of-way must be accessed to conduct inspections, perform maintenance, and repair damage. To ensure continued integrity, regular maintenance and annual inspections of the infrastructure will be performed throughout the transmission line service life. The applicants perform aerial inspections and well as assessing the line from the ground once every six years. Typically, one to two workers are required to perform aerial inspections and three workers are

[78] Department of Natural Resources (n.d.) *Utility Crossing Licenses*, retrieved from: https://www.dnr.state.mn.us/permits/utility_crossing/index.html.

[79] Department of Natural Resources (June 13, 2015) *Application for License to Cross Public Lands and Waters*, retrieved from: http://files.dnr.state.mn.us/lands_minerals/utility/utility_crossing_application.pdf.

required to perform the ground inspections. Any defects identified during these inspections would be assessed and corrected.

Examples of items the applicants may look for during an inspection include pole or component problems such as woodpecker holes, cracked or broken insulators, frayed or damaged conductors, missing or loose hardware, rusted poles, and right-of-way encroachments. Generally, vegetation within the right-of-way that has potential to interfere with HVTL operation will be removed. Native shrubs that will not interfere with the safe HVTL operation will be allowed to reestablish in the outer edge of the right-of-way. When necessary, problem vegetation can be cleared through a combination of mechanical and hand clearing, along with herbicide application to remove or control vegetation growth. Vegetation management and maintenance for the line would generally occur every four years.

### Substations

Substations require a certain amount of maintenance to keep them functioning in accordance with accepted operating parameters and the NESC requirements. Transformers, circuit breakers, batteries, protective relays, and other equipment need to be serviced periodically in accordance with the manufacturer's recommendations. The substation sites must maintain adequate drainage and control vegetation.

Western Minnesota Municipal Power Agency will be responsible for the operation and maintenance of the Alexandria Substation, Great River Energy will be responsible for the operation and maintenance of the Riverview Substation, and Xcel Energy will be responsible for the operation and maintenance of the new Big Oaks Substation.

## Project Costs

Costs are dependent upon routing option. Table 6 below provides itemized cost estimates. These estimates are engineering estimates because regulatory approvals are secured prior to contracting with a vendor and finalizing material orders. In aggregate, the Alexandria to Big Oaks 345 kV Transmission Project is anticipated to cost approximately $209.5 to $238.2 million. This estimate is intended to be consistent with MISO's cost estimates approved as part of the 2021 MISO Transmission Expansion Plan.[80] These estimates will increase over time for any number of reasons such as, but not limited to, escalation, inflation and commodity pricing, especially for large-scale transmission projects that have multi-year schedules. Estimates may include a number of variables such as land acquisition, construction, engineering, materials, permitting, and design costs for the substations and associated HVTLs.

Line inspections are the principal operating and maintenance cost for transmission facilities. The aerial maintenance inspections cost approximately $75-$100 per mile and the ground inspections cost approximately $200-$400 per mile. Actual line specific maintenance costs depend on the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used, and the age of the line.

Substation cost estimates do not change based on the route selected to cross the Mississippi River. The applicants' substation operation and maintenance costs typically range from $50k to $100K annually. The applicants reported the following anticipated costs for the DNR Alternatives: Option 1 at $26.96

[80] See generally MISO's Executive Summary of the plan, retrieved from: https://cdn.misoenergy.org/MTEP_21_Exec%20Summary597426.pdf

million, Option 2 at $10.14 million, and Option 3 at $21.17 million. Compared to the project's river crossings, DNR's Option 1 and 3 are more expensive. The Western Option is projected to cost $10.13 million whereas the Eastern Options is $15.31 million.

**Table 6: Estimated Project Costs**

| Project Component | Cost (2022 dollars) |
|---|---|
| Transmission Line | $123-131 million |
| Alexandria Substation Modifications | $20-28 million |
| Riverview Substation Modifications | $3 million |
| Quarry Substation Modifications | $3-4 million |
| New Big Oaks Substation | $60-72 million |
| **Total Costs** | **$210-238 million** |

## Decommissioning

The project will be decommissioned at the end of its useful life, and funds collected for removal and restoration are included in the applicants' depreciation reserve for the facilities. Utilities are required to periodically update these costs. The Department of Commerce reviews the proposed costs to ensure that ratepayers are responsible only for reasonable and prudent costs and makes recommendations to the Commission regarding a final decision.

# Chapter 4: Potential Impacts and Mitigation that are Similar Between Routing Options

This chapter describes the environmental setting, affected resources, potential impacts and mitigative measures. It discusses the environmental setting, topics of abbreviated analysis, cumulative potential effects, unavoidable impacts, and irretrievable or irreversible impacts. The bulk of this chapter focuses on potential human and environmental impacts and mitigative measures that are similar between routing options. **Unless otherwise noted, the source of information for this chapter are the certificate of need and route permit applications.**

## Measuring Potential Impacts

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

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

### Duration

Impacts vary in length. Short-term impacts are temporary and generally associated with construction. Long-term impacts are associated with operation and usually end with decommissioning and reclamation. Permanent impacts extend beyond the decommissioning stage.

### Size

Impacts vary in size. To the extent possible, potential impacts are described quantitatively, for example, the number of impacted acres or the percentage of affected individuals in a population.

### Uniqueness

Resources vary in type, extent, quality, and quantity. Common resources are those that occur frequently, while uncommon resources are not typically encountered.

### Location

Impacts are location dependent. For example, common resources in one location might be uncommon in another.

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

This EA analyzes potential impacts of the project on various resources. The context of an impact—in combination with its anticipated on-the-ground effect—is used to determine an overall resource impact level. Impact levels are presented through scaled qualitative descriptors, described further in the

following section. These qualitative terms do not convey value judgments; rather, they serve as a mechanism to establish a shared understanding among readers and facilitate the comparison of potential impacts between different alternatives.

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

**Minimal** impacts do not considerably alter an existing resource condition or function. Minimal impacts might, for some resources and at some locations, be noticeable to an average observer. These impacts generally affect common resources over the short- or long-term.

**Moderate** impacts alter an existing resource condition or function and are generally noticeable to the average observer. Impacts might be spread out over a large area making them difficult to observe but can be estimated by modeling or related simulation. Moderate impacts might be long-term or permanent to common resources, but generally short- to long-term to uncommon resources.

**Significant** impacts alter an existing resource condition or function to the extent that the resource is impaired or cannot function. Significant impacts are likely noticeable or predictable to the average observer. Impacts might be spread out over a large area making them difficult to observe but can be estimated by modeling. Significant impacts can be of any duration and affect common or uncommon resources.

Also discussed are opportunities to mitigate by avoiding, minimizing, or compensating for potential impacts. Collectively, these actions are referred to as mitigation.

**To avoid** an impact means to eliminate it altogether, for example, by not undertaking parts or all of a project, or relocating the project.

**To minimize** an impact means to limit its intensity, for example, by reducing project size or moving a portion of the project.

**To correct** an impact means fixing it by repairing, rehabilitating, or restoring the affected resource, or compensating for it by replacing it or providing a substitute resource elsewhere. Correcting an impact can be used when an impact cannot be avoided or further minimized.

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

### Regions of Influence

Potential impacts to human and environmental resources are analyzed within specific geographic areas called regions of influence (ROI). The ROI is used in this EA as the basis for assessing potential impacts. ROIs vary between resources. As necessary, the EA discusses potential impacts and mitigation measures beyond the identified ROI to provide appropriate context. Also, direct impacts within the ROI might cause indirect impacts outside the ROI. This EA uses the following ROIs:

The anticipated **right-of-way (ROW)** width which is expected to be 150 feet; **Route Width** (project as proposed: 150-1,000 feet along alignments, up to 1 mile around substations; DNR Alternatives 1-3:

1,500 feet); **Local Vicinity** (1,600 feet); **project area** (one mile); and **Douglas to Sherburne County**. The ROIs are based on a distance from an anticipated alignment developed from working with the applicant and DNR and generally extend symmetrically from both sides of the alignment.

The ROI for each resource is the geographic area where the project might exert some influence. Table 7 summarizes the ROIs used in this EA by resource element. Impacts to resources may extend beyond these distances but are expected to diminish quickly.

**Table 7: Regions of Influence**

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

## Environmental Setting

**Land use within the project area is 35 percent cultivated cropland, 19 percent forested, and 14 percent pastureland. There are occurrences of open water, low to high development, wetland, and residential land use.**

The project is between the City of Alexandria in Douglas County and the City of Becker in Sherburne County, Minnesota alone I-94 (Appendix B, Map 3).

The proposed route is partially within the following municipalities: Alexandria, Becker, Clearwater, Freeport, Melrose, Monticello, Rockville, Saint Cloud and Waite Park, Minnesota. The project crosses about 101 roads, including 41 interstate, state, or county highways and 60 township or municipal roads (Appendix B, Map 7). The alignment largely parallels Interstate 94 along its length. Major roads crossed by the proposed route include Minnesota Trunk Highway (MN) 29, County State-Aid Highway (CSAH) 23, CSAH 17, CSAH 2, 137th Ave in West Union, MN 28, MN 4, Overton Road in Melrose, MN 237, CSAH 30, CSAH 10, CSAH 41, CSAH 50, CSAH 2, CSAH 138, MN 23, CSAH 6, MN 15, CSAH 74, CSAH 136, Roosevelt Road in St. Cloud, CSAH 75, and MN 24.

Four crude oil/petroleum product pipelines are crossed by the route, none of which are near the proposed new transmission line construction to cross the Mississippi River (Appendix B, Map 8). These include a crude oil line west of Rockville, two petrol product lines in Alexandria, and a petrol product pipeline that generally follows the Proposed Route from West Union to Clearwater, Minnesota. Five natural gas pipelines also intersect the project area. Two are near Alexandria, one in St. Cloud, one near Sauk Centre, and one in Freeport, Minnesota.

If a transmission line is sited too close to an operating railroad, it could interfere with safe operation of the railroad. The proposed route crosses two active rail lines: the SOO Line Railroad (SOO) that runs through Alexandria from West Glenwood to Thief River Falls, and the Northern Lines Railway (NLR) that runs from Cold Spring to St. Cloud (Appendix B, Map 7). The Big Oaks Substation Siting Area includes a portion of a BNSF Railway line related to the Monticello Nuclear Generating Plant in Becker.

The DNR and the USFWS have developed an Ecological Classification System (ECS) for ecological mapping and landscape classification in Minnesota that is used to identify, describe, and map progressively smaller areas of land with increasingly uniform ecological features.[81] Under this classification system, the proposed route is mainly within the Eastern Broadleaf Forest Province. A portion of the route is also in the North Central Glaciated Plains Section of the Prairie Parkland Province. These sections are further broken down into subsections, such as the Hardwood Hills' presence in the middle of the alignment. These subsections are used below to classify the environmental setting of the project.

The Hardwood Hills are characterized by steep slopes, high hills, and lakes formed in glacial end moraines and outwash plains. Most of this subsection is covered in 100 to 500 feet of glacial drift over diverse bedrock. Loamy soils are dominant, with loamy sands and sandy loams on outwash plains as well as loams and clay loams on moraines.

Another ecological subsection that predominantly spans the proposed route is the Minnesota River Prairie on the western end of the alignment. This area is characterized by large till plains that are bisected by the broad valley of the Minnesota River. Topography is steepest along the Minnesota River and the Big Stone Moraine, which has steep kames and broad slopes, while topography outside of the river valley consists of level to gently rolling ground moraine. Glacial drift generally ranges between 100 and 400 feet throughout this subsection. Soils are mostly well to moderately well-drained loams formed in gray calcareous till with some localized inclusions of clayey, sandy, and gravelly soils. Wetlands were common within this subsection prior to Euro-American settlement, and most have been drained to establish usable cropland.

[81] Minnesota Department of Natural Resources. Ecological Classification System: Ecological Land Classification Hierarchy. [Online] [Cited: March 13, 2023.] https://www.dnr.state.mn.us/ecs/index.html.

The Big Woods subsection occupies only a small portion of the proposed route, however, the Anoka Sand Plain has a substantial presence towards the east end of the alignment. This subsection is characterized by flat, sandy lake plains and terraces along the Mississippi River, which forms the western boundary of the subsection. Landforms in the Anoka Sand Plain consist of small dunes, kettle lakes, and tunnel valleys that create a level to gently rolling topography. Sandy terraces are found along the Mississippi River and its tributaries throughout the subsection. Bedrock outcrops can be found near St. Cloud and, in general, surface glacial deposits are less than 200 feet thick. Soils in the subsection are generally sandy, droughty upland soils, poorly drained prairie soils along the Mississippi River, and there are some organic soils in ice block depressions and tunnel valleys.

## Human Settlement

High voltage transmission lines have the potential to impact human settlement. Impacts might be short-term, such as noise during construction, or long-term, such as changes to the aesthetics in the project area.

### Aesthetics

**The ROI for aesthetics is the local vicinity. Aesthetic impacts reflect the human subject's reaction to a landscape change, though may also affect a population where the visual landscape defines a visual identity. This means that potential impacts are unique to an individual or group, with reactions that can vary widely. Potential impacts might dissipate over time depending on the individual. Impacts will be short- and long-term, and localized. Potential impacts are unavoidable but can be mitigated in part.**

**Visual impacts are expected to be minimal for those with low viewer sensitivity, such as people traveling to and from work. For those with high viewer sensitivity, for example, neighboring landowners or recreationalists, visual impacts are anticipated to be minimal for all routing options. The Big Oaks Substation and new River Crossing would be visible to some nearby residents west of the Mississippi River, further changing the viewshed into a more industrial area.**

**DNR Alternative 3 has the largest aesthetic impact because it crosses the most private properties, requires the most acres of new easements, is nearest to residences, has the most length within the Wild & Scenic River District, and would also create a new visual disruption over the Mississippi River. This impacts analysis is based on the proposed alignment in DNR's scoping comments – thus, it's likely that impacts can be minimized.**

Aesthetics refers to the visual quality of an area as perceived by the viewer and forms the impression a viewer has of an area. Aesthetics are unique to the human subject or population, meaning their relative value, held individually or communally, depends upon several factors that may include perception, and the strength of values, history, and memory, held either individually or communally resulting in potentially varied and unique responses. Impacts to aesthetic changes are expected to be equally diverse, depending upon individual perception of impact, degree of aesthetic change, strength of commitment to the unimpacted aesthetic, and acceptance of the proposed project. This means that how an individual values aesthetics and reacts to their change, especially perceived impacts to a viewshed, can vary greatly.

A viewshed includes both the natural and built landscape with features visible from a specific location. Natural landscapes can include wetlands, surface waters, distinctive landforms, and vegetation patterns. Homes, businesses, roads, bridges, cell towers, and power lines are examples of built features. Generally, an intact and harmonious viewshed is considered by many to be more aesthetically pleasing. Viewsheds might be important regardless of whether they are considered beautiful by the observer, for example, a scattered stone foundation of a historical resource.

Viewer sensitivity is understood as an individual's interest or concern for the quality of a viewshed and varies depending upon the activity viewers are engaged in, their values and expectations related to the viewshed, and their level of concern for potential changes to the viewshed. High viewer sensitivity is generally associated with individuals engaged in recreational activities; traveling to scenic sites for pleasure and to or from recreational, protected, natural, cultural, or historic areas; or experiencing viewsheds from resorts, road-side pull-outs, or residences. Residents have a higher sensitivity to potential aesthetic impacts than temporary observers. Low viewer sensitivity is generally associated with individuals commuting, working, or passing through an area.

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

#### POTENTIAL IMPACTS

The project will introduce slightly over 10 acres of new and expanded substation facilities along with up to 108 miles of new HVTL to connect those facilities together and the existing electrical grid on the landscape. These features will create aesthetic impacts. For the majority of the project where HVTL will be strung on existing double-circuit capable structures, aesthetic impacts are anticipated to be negligible. Where new poles and foundations are required along the existing double-circuit capable structures as well as where substation expansions with line taps and bypasses are occurring, aesthetic impacts would be minimal because of the existing industrial nature of these areas and the small footprints of this work.

At the River Crossing, right-of-way clearing and building construction will have the most visual impacts in areas close to roads and residents. To the extent these impacts can be quantified depends on the presence of several on-the-ground factors linked to the concepts of viewer quality, sensitivity, and exposure. These factors include:

- Views valued by the public at large, for example, scenic overlooks or scenic byways;
- Locations where relatively more people are present, for example, schools, churches, and residences; or
- Locations where people recreate or otherwise enjoy leisure activities.

Presently, the project area by the River Crossing is characterized by low density, agricultural land that is generally flat with areas of rolling plains. Near the Mississippi River, topography gives way to broad slopes with higher vegetative cover, including some forested areas. Residential land use exists on the opposite side of the Mississippi River than the project, with other nonresidential structures on large, wooded lots. Industrial features do exist on the west side of the river as well, such as the Martin Mariella Monticello Gravel Pit adjacent to some residents. The visual character of the landscape is partly

influenced by the presence of commercial and industrial features, however, the built environment within the footprint of this analysis is generally open.

*Big Oaks Substation*

Figure 3 below shows a representation of what a similar substation to the Big Oaks Substation looks like.

**Figure 3: Example of a Similar 345kV Substation**

Screening, the use of terrain and vegetation to obstruct the visibility of recently built infrastructure or lighting, helps to limit clear views of these developments. These features are also important when determining and abating potential aesthetic impacts. At the nearest possible point within the siting area in the northwest corner, the new substation could be built approximately 640 feet from the river. Elevation in this area starts lower than the bluff's elevation before dropping to the river. The applicants have not proposed additional screening for the project, however, the Mississippi River bluff does increase in elevation from the Big Oaks Substation Siting Area by approximately 32 feet. Depending on the final height of the substation, it could be mostly screen by this bluff's elevation and the forested vegetation on top of it. The substation fence is expected to be 10 feet tall whereas the tallest (dead-end) structures inside the fence will be 100 feet tall. These structures would be less likely to be visible over the bluff than the existing 150-foot tall 345kV lines in this area.

Individual landowners may also consider vegetative buffers on their own property. In their application, the applicants stated they would limit project-related aesthetic impacts from new structures by routing to avoid the removal of trees and vegetation and follow existing infrastructure corridors to the extent possible. The applicant stated the Big Oaks Substation would be sited near existing facilities such as the

landfill and the power plant to the extent possible in order to minimize intrusions to the rural landscape. Additionally, the applicants believe that existing vegetation and topography provide enough natural screening to obscure view of the Big Oaks Substation visibility from the Mississippi River.

*Transmission Lines*

New transmission lines will create new visual impacts that may be visible from adjacent roads or nearby residents. Typical structure heights would range from 75 to 160 feet with typical spans of 1,000 feet. Much of the new transmission line will be double-circuited on existing infrastructure, and much of the new poles and foundations will be within existing right-of-way, resulting in minimal aesthetic impacts. While new transmission lines and cleared rights-of-way will introduce new impacts, new construction is mostly within existing substations, right-of-way, and transmission lines. Transmission lines with new ROW will be designed such that vegetation clearing will use the typical right-of-way widths per voltage class at 150 feet wide. It is possible the project may utilize H-frame structures, which would increase the ROW width to 230 feet – however, this is less likely given the applicants' responses to EA information requests with anticipated impacts summarized based on 150-foot-wide ROWs.

DNR stated that their Alternatives 2 and 3 allowed a 1,500-foot route width so placement of the transmission line would be flexible and could be routed to avoid residences and crossing fields with center pivot irrigation to the greatest degree possible. The following analysis is based on DNR's proposed alignment in their scoping comments – thus, it's likely that impacts can be minimized.

For the Crossing Options, the Western Option, DNR Alternative 2, and DNR Alternative 3 would cause the most visual disruption to the existing Mississippi River landscape as this route would consist of new transmission line in an otherwise undisturbed river setting. The Eastern Option and DNR Alternative 1 minimize impacts by constructing the new line adjacent to existing transmission line infrastructure, however they would require the most new structures along the longest lengths of new transmission line. The new construction for the Eastern Option and DNR Alternative 1 would be completely within utility owned property. In contrast, DNR Alternative 3 has the largest aesthetic impact because it crosses the most private properties, requires the most acres of new easements, is nearest to residences, has the most length within the Wild & Scenic River District, and would also create a new visual disruption over the Mississippi River. A summary of aesthetic impacts for all routing options is presented in Table 8 below.

**Table 8: Aesthetic Impacts of All Routing Options**

| Route Option | Western Option | Eastern Option | DNR Alternative 1 | DNR Alternative 2 | DNR Alternative 3 |
|---|---|---|---|---|---|
| **New Private Property Easements** | | | | | |
| Total Parcels | 0 | 0 | 0 | 2 | 19 |
| Unique Landowners | 0 | 0 | 0 | 2 | 14 |
| Acres of new Easement | 0 | 0 | 0 | 6.9 | 34.5 |
| **New Residence Offset Distances** | **0** | **0** | **0** | **2** | **7** |
| 0 - 75 Feet | 0 | 0 | 0 | 0 | 0 |
| 75 - 300 feet | 0 | 0 | 0 | 0 | 1 |
| 300 - 500 feet | 0 | 0 | 0 | 2 | 6 |

| **Length (miles)** | **4.6** | **7.4** | **8** | **3.7** | **4.4** |
|---|---|---|---|---|---|
| Stringing 2nd Circuit (345kV) on Existing Structures | 3.2 | 4.5 | 4.9 | 2.2 | - |
| Single Circuit 345kV | 1.4 | 2.9 | 2.2 | 1.6 | 4.4 |
| Double Circuit (345kV/115kV) | - | - | 0.7 | - | - |
| Triple Circuit (345kV/345kV/115kV) | - | - | 0.3 | - | - |
| **New Length in Wild & Scenic River District (miles)** | **0.7** | **1.9** | **1.8** | **0.6** | **2.0** |
| **Structure Count** | **27** | **42** | **45** | **23** | **26** |
| Existing 345kV Structures (Stringing 2nd Circuit - 345kV) | 17 | 24 | 26 | 12 | - |
| Single Circuit 345kV Structures | 10 | 18 | 14 | 11 | 26 |
| Double Circuit (345kV/115kV) Structures | - | - | 3 | - | - |
| Triple Circuit (345kV/345kV/115kV) Structures | - | - | 2 | - | - |

### *Scenic Resources*

Great River Road (County Road 75), near the River Crossings, is considered a Scenic Byway. A Scenic Byway is defined by the DNR as, "a road corridor that has regionally outstanding scenic, natural, recreational, cultural, historic or archaeological significance."[82] These corridors are recognized through legislation, or other official declaration, as a unique resource worth preserving. A Scenic Byway corridor is managed to protect its character and to encourage economic development through tourism and recreation. The Great River Road follows the course of the Mississippi River spanning 565 miles.[83] It is unlikely that recreationalists on a scenic drive on Great River Road would be able to see new components of the project besides the existing infrastructure to be double-circuited along Interstate 94 – where the transmission line will deviate for the River Crossing is the only exception, however, in an area with similar existing infrastructure, impacts to this Scenic Byway would be negligible.

There are no other scenic overlooks or byways near portions of the project that could be affected by new construction other than the Mississippi River, which is a Wild and Scenic River District on this segment as well as a State Water Trail. The otherwise nearest recreation area is Lake Maria State Park, which would not be able to view the project over 3.5 miles away. While impacts to the Wild and Scenic River District will occur for all routing options from new transmission line infrastructure, this segment of the river is already crossed by other electric infrastructure, reducing the breadth of impact. Minimal impacts will occur to recreationalists engaged in activities on the Mississippi River in the local vicinity of the project.

[82] Minnesota DNR, *Minnesota Scenic Byways*. Retrieved from: https://www.dot.state.mn.us/scenicbyways/.

[83] Minnesota DNR, *Minnesota Great River Road - All-American Road*. Retrieved from: https://www.exploreminnesota.com/profile/minnesota-great-river-road-all-american-road/2334.

Visual sensitivity classifications should be taken into consideration when designing and constructing the project to develop appropriate visual quality guidelines. DNR visual sensitivity classification have not been prepared for counties associated with the project.[84]

There are otherwise no WMAs, trout or muskie lakes, state trails, public water access or fishing sites, designated wildlife lakes, or state lands in the local vicinity. The nearest is a public water access and fishing site within the Montissippi County Park about a mile and a half east of the project area. There are two state aquatic management areas over a mile away from the proposed route. Because the area is heavily forested, it is unlikely that recreationalists over a mile from the project will be able to view it once constructed.

In addition to residents and recreational users, travelers along nearby roads may also experience visual impacts from the project. Annual average daily traffic counts (AADT) indicate that traffic levels are highest on Interstate 94, with about 43,380 AADT.[85] The project is unlikely to be visible from Interstate 94, thus, the most potential for visual impacts for travelers will be along will be along roads utilized by the applicants and surrounding industry on the east side of the river, including the University of Minnesota SPRF. The University and the applicants have collaborated throughout the design and permitting process.[86]

### MITIGATION

Routing the new transmission lines with existing infrastructure rights-of-way can mitigate potential impacts because the new built feature would be an incremental increase consistent with previous human modification. DNR Alternative 1 would create double-circuited infrastructure and expand an existing right-of-way of 75 feet to 150 feet for a total of 75 new feet of ROW. While most routing options require a minimal amount of new ROW between 1.4 and 2.9 miles, DNR Alternative 3 requires the most ROW clearing at 4.4 miles, whereas the Western Option requires the least at 1.4 miles (Tables 3 and 4).

Impacts can also be mitigated by limiting vegetation clearing to only what is necessary for the safe construction and operation of the HVTL. Commission route permits require permittees to minimize vegetation removal when constructing a HVTL.[87] Adverse impacts can be further mitigated by ensuring that damage to natural landscapes during construction is minimized, and, to the extent that it does not interfere with safe operation of the transmission line, planting lower growing woody vegetation in a transition area near the edge of the right-of-way in wooded areas.

Impacts from the Big Oaks Substation can be minimized by choosing a site where the facility is consistent with the existing landscape, or not immediately adjacent to private property and shielded from view by terrain or existing vegetation. A natural buffer along the river bluff at a higher elevation is expected to provide enough cover to eliminate residents' view of the substation. Installing shielded or downward facing lighting as requested by the DNR in their scoping comments at project facilities would minimize impacts to wildlife, the night sky, and nearby residents.

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[84] Department of Natural Resources (n.d.) *Visual Sensitivity Classifications*, retrieved from: https://www.dnr.state.mn.us/forestry/visual_sensitivity/index.html

[85] Minnesota Department of Transportation. *Traffic Mapping Application.* Retrieved from: https://mndot.maps.arcgis.com/apps/webappviewer/index.html?id=7b3be07daed84e7fa170a91059ce63bb.

[86] Personal communication via virtual meeting between EERA Staff and the University of Minnesota, February 7, 2024.

[87] Draft Route Permit, Section 5.3.10.

Depending on the routing option selected, and where the Big Oaks Substation is ultimately sited, clearing of ROW for DNR Alternative 2 could eliminate 150 feet of width of natural buffer along the river to route the transmission line to the substation. Based on the DNR alignments as they are currently proposed, this could open view to new electrical infrastructure from the project to residents across the Mississippi River who are east of DNR Alternative 2. Thus, the applicants should consider ROW clearing for DNR Alternative 2 closely should that routing option be chosen. For example, the alignment could be moved further north to be situated more within utility owned parcels. DNR Alternatives 1 and 3 along with the Western and Eastern Options will occur through or adjacent to utility owned parcels or non-residential property, thus, this impact is less likely to occur for those options.

Where DNR Alternative 3 routes through new residential properties before reaching the River Crossing, mitigating aesthetic impacts would be difficult. The applicants or residents could uphold vegetation screening, berms, or fencing should the existing landscape lack appropriate screening.

Other potential mitigation measures may include selecting color coatings for the Big Oaks Substation buildings that blend into the landscape, such as brown or green; utilizing a slated privacy fence or other decorative fence; placing structures the maximum feasible distance from roads and residents; and maintaining the surrounding forested landscape to the extent possible.

### Cultural Values

**The ROI for cultural values is the project area. Impacts associated with rural character and sense of place are expected to be dependent on the individual, however, minimal for the proposed project as its entirely sited on property controlled by the applicant. For nearby residents that place high value on rural character and a sense of place, impacts within view such as new infrastructure on private property could lean towards more moderate impacts. These impacts will be localized, short- and long-term, but might diminish over time depending on the individual. Impacts are unavoidable. Over 95 percent of the project utilizes existing infrastructure, thus, impacts to cultural values overall are anticipated to be minimal.**

Cultural values can be described as shared community beliefs or attitudes that define what is collectively important to the group. These values provide a framework for both individual and communal thought and action. The highly visible, industrial look and feel of utility projects can erode the rural feeling that is part of a resident's sense of place. Infrastructure projects believed inconsistent with cultural values can deteriorate community character. Those found consistent with these values can strengthen it. Projects can invoke varying reactions and can, at times, weaken community unity.

Cultural values are also informed by the work and recreational pursuits of residents and by geographical features. The proposed route is generally rural in nature but crosses through several urban/industrial areas including Alexandria, St. Cloud, Becker, and Monticello. Rural portions of the route have an agriculture-based economy. Corn and soybean crop production, livestock operations, and associated industries drive the local agricultural economy. Farming and protecting agriculture, the land, and the ability to continue to farm and support livelihoods through agriculture are strong values in the surrounding area.

Manufacturing, industrial, and service industries (restaurants, hotels, repair shops, power plants, landfill, convenience, and retail stores) are concentrated in the urban areas along the proposed route. St. Cloud is the largest city along the project, recognized for its livability, culture and heritage

management along with community participation and empowerment.[88] St. Cloud is also home to St. Cloud State University, Minnesota's third-largest public university.

Numerous natural resources that are important to the identity of some of the residents along the route, including lakes, rivers, state trails, and Wildlife Management Areas (WMAs) attract local and regional recreational users. Residents and visitors use these areas for various recreational activities such as fishing, hunting, hiking, wildlife viewing, and snowmobiling.

### Potential Impacts

Construction and operation of the project is not anticipated to impact or alter the work life and leisure pursuits of residents or visitors in the project area or affect land use in such a way as to impact the underlying culture or community unity of the area. At the same time, the development of the project may change the character of the area, at least where it is visible. For example, nearby residents to the Mississippi River crossing will be able to see the new transmission infrastructure and may have their view around their property impacted by less vegetation cover. The Big Oaks Substation may also be visible across from the river, eroding a sense of rural character, however the topography is hilly and the exact location of the building is still under design.

The value residents place on the character of the landscape within which they live is subjective, meaning its relative value depends upon the perception and philosophical or psychological responses unique to individuals. Because of this, construction of any routing option for the project might—for some residents—change their perception of the area's character thus potentially eroding their sense of place. This tension between infrastructure projects and rural character creates real tradeoffs.

Impacts are anticipated to be minimal for the project area generally, and moderate for residents nearby to new infrastructure. Nearby residents may feel a rural sense of place where outdoor activities and pursuits are enjoyed, common to the culture of this area. New transmission buildings or features that may be visible from neighboring properties or roadways may affect the rural character of the surrounding area. Over 95 percent of the project utilizes existing infrastructure, thus the majority of impacts to cultural values are anticipated to be minimal.

### Mitigation

The project area has existing energy generation and transmission infrastructure. Most of the routing options are near existing road or HVTL ROWs, which minimizes the aesthetic changes to the landscape. Impacts for the project overall are expected to be minimal, thus no mitigation is proposed. There are no conditions included in the DRP that directly mitigate impacts to cultural values, sense of place, or community unity. Impacts can be minimized by employing mitigation similar to those proposed for aesthetic impacts, such as:

- Placing structures the maximum feasible distance from roads and residents, or in a way that is shielded from view by terrain or existing vegetation;
- Maintaining the surrounding landscape, including vegetation, to the extent possible; and,
- Screening (e.g., planting a border of trees) between the Big Oaks Substation and the Mississippi River.

[88] Berg, Jenny. St. Cloud snags 4 awards at international competition for most livable cities. *St. Cloud Times.* December 13, 2019.

## Environmental Justice

**The ROI for environmental justice includes the counties intersected by the proposed route for the project and DNR Alternatives 1-3. Seven meaningfully greater low-income or minority population reside in these counties, however, only two of them are expected to experience potential impacts as they will be near new construction for extended timeframes. For both EJ communities, impacts are expected to abate after construction, thus they will be localized and temporary. Therefore, disproportionate and adverse impacts to these populations are possible but expected to be minimal.**

Utility infrastructure can adversely impact low-income, minority or tribal populations. Environmental justice is the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."[89] The "fair treatment" goal is not to shift risks among populations, but to identify potential disproportionately high and adverse effects, and identify alternatives that may mitigate these impacts.[90]

Minnesota Statute 216B.1691, subd. 1 (e) was recently updated to reflect the definition of an environmental justice area. There are six census tracts within the county crossed by the proposed route that meet the criteria to be considered an environmental justice area. This means that these census tracts contain one or more of the following populations:

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.

**Table 9: Environmental Justice Census Tracts**

| Census Tract | Residing County |
|---|---|
| 4507.04 | Douglas |
| 115 | Stearns |
| 5.02 | Stearns |
| 113.08 | Stearns |
| 4.01 | Stearns |
| 7907 | Todd |
| 1002.03 | Wright |

The census tracts within counties that are crossed by the project and contain environmental justice areas are listed by county in Table 9. Thus, the environmental justice analysis focuses on these census tracts. Note that census tract 1002.03 wasn't captured in the applicants' route permit application as they used the U.S. Census Bureau to make determinations. While that may be accurate, the MPCA's Environmental Justice Map[91] has a large range for the confidence interval of the data for census tract 1002.03, thus, it may not be an environmental justice area. However, Staff conducted an impacts and mitigation analysis on this census tract to be conservative in assumptions as there is not enough information to rule out census tract 1002.03 as an environmental justice area.

[89] US EPA, Guidance for Incorporating Environmental Justice Concern in EPA's NEPA Compliance Analyses (pdf).
[90] *Ibid.*
[91] MPCA, *Understanding environmental justice in Minnesota*. Retrieved from: https://arcg.is/vqaGa.

### POTENTIAL IMPACTS

The ROI for this analysis includes the counties intersected by the project. The county areas serve as the most accurate representation of the geographical region and general population where the project may potentially give rise to disproportionate adverse impacts, and can be compared with which census tract low income and demographic data can be compared.

Staff conducted a demographic assessment of the affected community to identify low-income and minority populations that might be present. US Census data was used to identify low-income and minority populations. Low-income and minority populations are determined to be present in an area when any of the four criteria outlined in Minnesota Statute 216B.1691, subd. 1 (e) are met.

**Table 10: Environmental Justice Characteristics**

| Area | % Nonwhite | % income ≤200% of poverty level | % limited English proficiency | Indian Country |
|---|---|---|---|---|
| **Minnesota** | 22 | 9.6 | 0.07 | NA |
| **Douglas County** | 5 | 8.5 | 0 | No |
| **Todd County** | 10 | 12 | 0 | No |
| **Sherburne County** | 12 | 6.2 | 0 | No |
| **Stearns County** | 17 | 11.3 | 0.16 | No |
| **Wright County** | 10 | 5.1 | 0 | No |

**Minority population was rounded to the nearest percent and includes all persons who do not self-identify as white alone.*
Source: U.S. Census Bureau, 2022 American Community Survey 1-Year Estimates.
***Limited English proficiency includes households by language*
Source: U.S. Census Bureau, 2015 American Community Survey 5-Year Estimates.

The low-income and minority populations in the counties the project is within, represented by the percentage living in poverty and those not self-identifying as non-Hispanic white alone, were compared with the state of Minnesota to determine if any were greater than 50 percent or 10 percentage points or more. None of the percentages for the counties exceed 50 percent of the Minnesota percentage by 10 percentage points or more, which is the defined threshold of significance for potential environmental justice impacts from the project. The project is not located in Indian Country.

The U.S. Environmental Protection Agency's (EPA) Environmental Justice Screening Tool (EJ Screen)[92] was also used to evaluate the census tracts noted above to determine whether there may be disproportionate adverse human health or environmental effects on these populations. EJ Screen uses 13 EJ indices to identify areas of increased exposure. These indices represent environmental indicators combined with socioeconomic information for that area. The EJ index highlights block groups with the highest intersection of low-income populations, people of color, and a given environmental indicator. Percentile values are given compared to the U.S. average for the same index. The national percentile tells you what percent of the U.S. population has an equal or lower value, meaning less potential for exposure/ risk/ proximity to certain facilities, or a lower percent minority.[93]

[92] Retrieved from: https://www.epa.gov/ejscreen

[93] USEPA, How to Interpret EJScreen Data. Retrieved from: https://www.epa.gov/ejscreen/how-interpret-ejscreen-data#:~:text=Percentiles%20are%20a%20way%20to,and%20nation%2C%20by%20using%20percentiles.

Seven environmental justice or meaningfully greater low-income or minority population areas reside in the project area. However, environmental justice impacts to these areas are anticipated to be minimal. EJ Screen Indices that could have impacts similar to the project include air pollution from construction which encompass diesel particulate matter, particulate matter 2.5, ozone, traffic proximity, and air toxics.

Census tracts near new construction for the project (113.08 near Quarry Substation and 1002.03 near the River Crossings) are the only ones likely to be impacted by the project because stringing a new line on the existing double-circuit capable structures like be very limited in duration at each structure. Those temporary and isolated impacts are expected to be negligible. Thus, census tracts 113.08 and 1002.03 were further analyzed because they will be near locations that will experience extended construction times.

Both of these environmental justice areas could experience increased exposure to air pollution during construction, temporarily exacerbating existing air impacts in these communities. For both EJ communities, impacts are expected to abate after construction, thus they will be localized, temporary, and minimal.

According to EJ Screen, census tract 113.08 near Quarry Substation is in a >60$^{th}$ percentile category for both toxic releases to the air and traffic proximity when compared to the U.S. average. Otherwise, EJ Screen suggests the other relevant environmental hazards for this census tract are exposed a similar amount as the national average. Census tract 1002.03 near the River Crossings, the potential EJ area, is in a <60$^{th}$ percentile category for traffic proximity when compared to the U.S. average. Otherwise, EJ Screen suggests the other relevant environmental hazards for this census tract are exposed a similar amount as the national average.

#### MITIGATION

Seven environmental justice or a meaningfully greater low-income or minority population areas reside in the project area, two of which could experience increased impacts during construction as discussed earlier in this section. However, additional air quality impacts are expected to be localized, temporary, and minimal. Therefore, impacts to these populations from the project are possible, however, they are not expected to be disproportionately high or adverse to human health or the environment in a way that would affect low-income or minority populations. Mitigation is not proposed.

### Land Use and Zoning

**The ROI for land use and zoning is the route width. The impact intensity level is anticipated to be minimal for all routing options. Land use impacts are anticipated to be long-term and localized. Constructing the HVTL will cause minimal changes within the ROW to the underlying land use from forested and rural residential areas to a utility corridor. Regardless of which routing option is pursued, some transmission infrastructure will be placed in Shoreland District for the River Crossing, creating potential conflicts with city or county zoning. The Big Oaks Substation will permanently change the underlying land use from agricultural areas to an industrial use. Changes in the underlying land use are unavoidable, but impacts can be minimized.**

Land use is the characterization of land based on what can be built on it and how the land is used. Zoning is a regulatory tool used by local governments (cities, counties, and some townships) to guide specific land uses within specific geographic areas. Land use is linked with zoning regulations covering Douglas to Sherburne County. Land cover documents how much of a region is covered by forests,

wetlands, impervious surfaces, agriculture, and other land and water types, including wetlands. Construction of transmission line facilities have the potential to impede or alter current and future land use and land cover.

Based on NLCD data, current land use within the project area is mainly cultivated cropland, forested, or pastureland. There are occurrences of open water, low to high development, wetland, and residential land use (Appendix B, Map 9). Property within the proposed route is primarily used for agricultural purposes. The Big Oaks Substation Siting Area is almost entirely agricultural with some hay/pasture and forested areas to the south. All other classifications in the siting area are currently spanned by existing transmission lines setback from the Mississippi River. Table 11 summarizes land cover within the route widths for each routing option.

**Table 11: Land Cover Within Route Widths**

| Land cover type | Xcel West | Xcel East | DNR 1 | DNR 2 | DNR 3 |
|---|---|---|---|---|---|
| Open Water | 9.98 | 22.29 | 34.24 | 19.45 | 30.67 |
| Developed, open space | 1.04 | 2.12 | 6.54 | 4.0 | 23.28 |
| Developed, low intensity | 4.37 | 10.29 | 25.25 | 13.46 | 27.06 |
| Developed, medium intensity | 2.88 | 4.17 | 27.84 | 5.15 | 10.03 |
| Developed, high intensity | -- | 0.22 | 35.53 | 0.97 | 1.85 |
| Barren Land (rock/sand/clay) | -- | 0.46 | 1.33 | -- | 3.46 |
| Deciduous Forest | 59.49 | 149.26 | 199.13 | 44.95 | 115.50 |
| Evergreen Forest | -- | -- | -- | -- | 3.11 |
| Mixed Forest | -- | 0.22 | 0.22 | 1.78 | 12.90 |
| Shrub/scrub | -- | 1.11 | 1.11 | 0.03 | 3.07 |
| Grassland/herbaceous | -- | 14.56 | 15.56 | 1.78 | 15.10 |
| Pasture/hay | 22.97 | 50.63 | 59.21 | 59.46 | 169.02 |
| Cultivated Crops | -- | 8.67 | 19.53 | 83.79 | 311.10 |
| Woody Wetlands | -- | 4.56 | 3.08 | -- | 0.60 |
| Emergent Herbaceous Wetlands | 2.37 | 5.40 | 10.93 | 0.23 | 8.29 |

A route permit from the Commission supersedes local zoning, building, and land use rules.[94] Thus, utility structures are allowed in all zone districts associated with the project at any level of local units of government. Though zoning and land use rules are superseded, the Commission's site permit decision must be guided, in part, by consideration of impacts to local zoning and land use in accordance with the legislative goal to "minimize human settlement and other land use conflicts."[95] Thus, the Commission can and does consider impacts to zoning and land use when considering route permit applications. If

[94] Minnesota Statutes 216E.10, subd. 1.
[95] Minnesota Statutes 216E.03, subd. 7.

granted a CN and route permit, the applicants may use eminent domain, which means they can acquire ROW for the project whether a landowner is a willing participant or not.[96]

The segment of the Mississippi River that crosses the proposed route is designated as a Recreational River under the Wild and Scenic Rivers Act.[97] The River Crossings would be within a State Wild & Scenic River District regardless of the routing option. Rivers designated as recreational rivers are readily accessible by road or railroad, may have some development along their shorelines, and may have undergone some impoundment or diversion in the past. Designation neither prohibits development nor gives the federal government control over private property. Recreation, agricultural practices, residential development, and other uses may continue. Protection of the river is provided through voluntary stewardship by landowners and river users and through regulation and programs of federal, state, local, or tribal governments. The applicants informed Sherburne and Wright counties that it was looking for crossing options that create the least amount of impact to the Mississippi Wild & Scenic River District. Parcels outside of the right-of-way and adjacent to the Mississippi River within the Wild and Scenic River Corridor would remain undeveloped.

The proposed project's zoning on the north side of the river is entirely within the City of Becker's authority (Appendix B, Map 10). The majority of new construction will occur on both sides of the river in the City of Becker to the north and on utility owned parcels to the south. In addition to the State Wild & Scenic River District mentioned previously, the areas underlying both sides of the river are zoned as Shoreland Overlay Districts and agriculture.[98]

Staff reviewed the City of Becker's land use and zoning ordinance. According to the City of Becker, shoreland is, "land located within the following distances from public waters: 1,000 feet from the ordinary high water level of a lake, pond, or flowage; and 300 feet from a river or stream, or the landward extent of a flood plain designated by ordinance on a river or stream, whichever is greater."[99] The same regulations define a floodway as, "The bed of a wetland or lake and the channel of a watercourse and those portions of the adjoining flood plain which are reasonably required to carry or store the regional flood discharge."[100] Staff interpret the areas where transmission structures would be placed in shoreland for the project to also be a floodway.

Regardless of routing option, project transmission foundations and poles would need to be sited inside the City of Becker's Shoreland District as shown in Table 12 to feasibly build the project. A land alteration permit from the local jurisdiction may be expected for any filling, grading, and/or excavating. The project has been designed to minimize land use conflicts in balance with other human and environmental impacts.

[96] Minnesota Statutes 216E.12.

[97] Public Law 90-542; 16 U.S.C. 1271 et seq.

[98] City of Becker Zoning Map, 2024. Retrieved from: https://www.ci.becker.mn.us/DocumentCenter/View/3067/City-of-Becker-Zoning-Map---2024.

[99] City of Becker, *Land Use Regulation (Zoning)*. Chapter 11, Section §11.65, page 129. Retrieved from: https://www.ci.becker.mn.us/DocumentCenter/View/388/Chapter-11-Land-Use-Regulation-Zoning.

[100] City of Becker, *Land Use Regulation (Zoning)*. Chapter 11, Section §11.66, page 153. Retrieved from: https://www.ci.becker.mn.us/DocumentCenter/View/388/Chapter-11-Land-Use-Regulation-Zoning.

### POTENTIAL IMPACTS

Impacts can occur to zoning ordinances, land uses, or land cover due to construction and operation of the project. Table 12 provides pole count estimates in the City of Becker zoning areas for each routing option.

**Table 12: Estimated River Crossing Pole Counts**

| Becker Zoning | Crossing Option | | | | |
|---|---|---|---|---|---|
| | Western Option | Eastern Option | DNR Alternative 1 | DNR Alternative 2 | DNR Alternative 3 |
| Industrial 2 | 2 | 2 | 2 | 2 | 10 |
| Agricultural | 6 | 14 | 13 | 3 | 4 |
| Shoreland District | 2 | 3 | 2 | 1 | 4 |
| Wild & Scenic River | 3 | 9 | 8 | 3 | 11 |

#### *Zoning*

All routing options will cause incremental, long-term impacts to shoreland district zoning. While minimal infrastructure is expected to be placed in the Mississippi River's floodway, they are not expected to obstruct flood flows or increase flood elevations, which would comply with the City of Becker's ordinance.[101] Additionally, electrical utilities in a floodway should be flood proofed or elevated above the regulatory flood protection elevation.[102] As discussed further in the Climate Resilience section of this EA, transmission infrastructure will be designed to withstand major flood events. Regardless, public utilities including overhead electrical transmissions, are deemed an essential service by the ordinance and are allowed as a conditional use within a floodway.[103]

The existence of a power line easement restricts certain activities on a property, which might interfere with the underlying zoning designation by restricting the underlying property owner's development. Easements are conditions in a property title and are independent of zoning. The applicants own or have easements for the majority of property within the proposed ROWs, substations, and siting areas for the proposed project and within the ROW for DNR Alternatives 1-3. Since utilities supersede local regulations, impacts to zoning designations or county ordinances are not expected to occur. Most commonly this type of interference with zoning ordinances/standards occurs in more densely populated urban areas.

#### *Land Use and Cover*

Constructing the HVTLs is not anticipated to wholly transform existing land use and cover. For example, planting agricultural crops or using the right-of-way for grazing land is generally not precluded. However, constructing the HVTLs will permanently change the right-of-way into a transmission corridor, so for areas that are currently forested, the underlying land use will permanently change. Any land that is currently residential that will be used for the project will not displace residents, although the

[101] City of Becker, *Land Use Regulation (Zoning)*. Chapter 11, Section §11.66, 4.23. Retrieved from: https://www.ci.becker.mn.us/DocumentCenter/View/388/Chapter-11-Land-Use-Regulation-Zoning.
[102] City of Becker, *Land Use Regulation (Zoning)*. Chapter 11, Section §11.66, 8.1. Retrieved from: https://www.ci.becker.mn.us/DocumentCenter/View/388/Chapter-11-Land-Use-Regulation-Zoning.
[103] City of Becker, *Land Use Regulation (Zoning)*. Chapter 11, Section §11.66, 4.34. Retrieved from: https://www.ci.becker.mn.us/DocumentCenter/View/388/Chapter-11-Land-Use-Regulation-Zoning.

applicants have the power of eminent domain to place the project on residential property. The Big Oaks Substation will permanently change the underlying land use from mostly agricultural area to industrial. Changes in the underlying land use and cover are unavoidable.

#### MITIGATION

Potential current and future land use impacts can be mitigated by selecting routes and alignments that are compatible, to the extent possible, with current and future land use and zoning. Maintaining and utilizing the existing right-of-way to a greater extent mitigates more potential impacts. Impacts to other parcels can be mitigated through negotiated easement agreements. These agreements are not within the scope of this EA.

All routing options except DNR Alternative 3 require a minimal amount of new ROW between 1.4 and 2.9 miles (Tables 3 and 4). DNR Alternative 3 requires the most at 4.4 miles, but no routing options are expected to significantly change land use or zoning on those properties.

Generally, 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 proposed. The Commission can and will consider the impacts to zoning and land use discussed in this EA when considering route permit applications.

### Noise

**The ROI for noise is the local vicinity (1,600 feet). Distinct noises are associated with construction and operation. Noise created by *construction* activities are anticipated to be minimal for both the proposed project and DNR Alternatives 1-3. Potential impacts are anticipated to be intermittent, short-term, and localized. Impacts are unavoidable but can be minimized. Since *operational* noises are not expected to rise above background levels for any significant time period, potential impacts are expected to be minimal.**

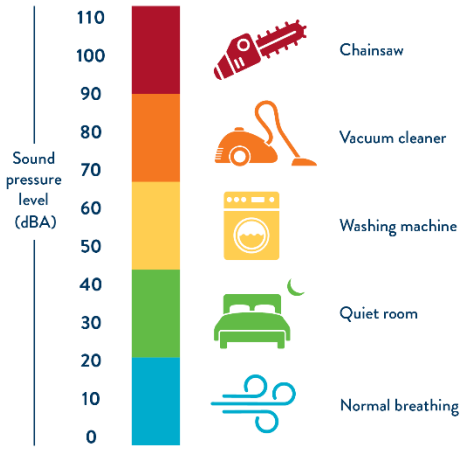
Noise can be defined as any undesired sound.[104] It is measured in units of decibels on a logarithmic scale. The A-weighted scale (dBA) is used to duplicate the sensitivity of the human ear.[105] A three dBA change in sound is barely detectable to average human hearing, whereas a five dBA change is clearly noticeable. A 10 dBA change is perceived as a sound doubling in loudness. Noise perception is dependent on a number of factors including wind speed, wind direction, humidity, and natural and built features between the noise source and the receptor. Figure 4 provides decibel levels for common indoor and outdoor activities.[106]

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

[105] *Ibid.*

[106] Federal Aviation Administration (February 9, 2018) *Fundamentals of Noise and Sound*, retrieved from: https://www.faa.gov/regulations_policies/policy_guidance/noise/basics/.

**Figure 4: Comparative Noise Levels**




Because sounds levels are measured on a logarithmic scale, they are not directly additive. "A doubling of sound energy yields an increase of three decibels."[107] For example, if a sound level of 50 dBA is added to another sound level of 50 dBA, the total sound level is 53 dBA, not 100 dBA. This change in sound level (three dBA) would be barely detectible.

All noises produced by the project must be within state noise standards (Minnesota Rule 7030.0050; Table 13). Noise standards in Minnesota are based on noise area classifications (NACs) that correspond to the location of the listener—referred to as a receptor. These classifications are not necessarily synonymous with zoning classifications. NACs are assigned to areas based on the type of land use activity occurring at that location. Noise standards are expressed as a range of permissible dBA over a one-hour period. $L_{10}$ may be exceeded 10 percent of the time, or six minutes per hour, while $L_{50}$ may be exceeded 50 percent of the time, or 30 minutes per hour. Standards vary between daytime and nighttime hours. There is no limit to the maximum loudness of a noise.

**Table 13: Noise Standards (dBA)**

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

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

Community noise levels are usually closely related to the intensity of human activity. Noise levels are generally considered low when below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. In wilderness areas, ambient noise levels can be below 35 dBA. In small towns or wooded and lightly used residential areas, noise levels are more likely to be around 50 or 60 dBA. Daytime noise

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

levels in rural areas with no significant noise sources might be in the 30 to 40 dBA range.[108] Noise levels increase with passing vehicle or rail traffic; high winds and storms; or use of farm equipment, chainsaws, all-terrain vehicles, boats, or snowmobiles.

### POTENTIAL IMPACTS

Potential noise impacts from the project are associated with both construction and operation. The primary noise receptors within the local vicinity are residences and farmsteads. These receptors are assigned to the most stringent standards, or NAC 1. Along the anticipated alignment, there are 154 residences within 500 feet and one residence within 75 feet (Table 14; Appendix B, Map 11). Although there are some non-utility owned parcels near the proposed route, there are no residences within 500 feet of the new segments of right-of-way for the proposed 345 kV transmission line or any project substation, including the Big Oaks Substation. Two residents are within 500 feet of DNR Alternative 2, seven are within 500 feet of DNR Alternative 3, and no residents are within 500 feet of DNR Alternative 1. Noise receptors could also include individuals working outside in the project vicinity. Ambient noise levels in rural areas such as the those mostly surrounding the project are estimated to be 45 dBA[109] – other areas around the project are expected to have higher ambient noise levels. Thus, using 45 dBA is the most conservative estimate in determining impacts.

**Table 14: Residences Near Anticipated Alignment**

| Proximity to Anticipated Alignment (feet) | Number of Residences | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Existing Transmission line | Alexandria Substation Tap | Riverview Substation Bypass | Quarry Substation Bypass | Big Oaks Substation | River Crossing (Eastern and Western) | DNR Alternative 1 | DNR Alternative 2 | DNR Alternative 3 |
| **<75 feet** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **75-300 feet** | 76 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| **300-500 feet** | 77 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 6 |
| **Total Residences** | 154 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 7 |

Noise standard exceedances need not occur for a negative impact to occur, such as with the disruption caused by rhythmic pounding of foundations posts. For example, "interference with human speech begins at about 60 dBA."[110] 70 dBA interferes with telephone conversations, and 80 dBA interferes with normal conversation.

#### *Construction*

Distinct noise impacts during construction are anticipated to vary between minimal to significant depending on the activity, duration, and equipment being used. Construction noise impacts will be temporary, localized, limited to daytime hours, and intermittent. The noise from construction activities

[108] Federal Highway Administration (June 1, 2018) Techniques for Reviewing Noise Analyses and Associated Noise Reports, Figure 1-1, retrieved from: https://www.fhwa.dot.gov/Environment/noise/resources/.

[109] ANSI/ASA S12.9-2013/Part 3.

[110] U.S. Bureau of Reclamation (June 2008) *Navajo Reservoir RMP/FEA, Appendix E Noise*, retrieved from: https://www.usbr.gov/uc/envdocs/ea/navajo/appdx-E.pdf.

would dissipate with distance and be audible at varying decibels, depending on the distance from the equipment to the receptor. Construction activities are estimated to last 18 to 20 months. Noise would dissipate at a single location as construction crews progress along the project route.

Noise from heavy equipment and increased vehicle traffic will be intermittent and occur during daytime hours. Major noise producing project construction activities include clearing and grading, material delivery, and driving foundations. The majority of construction equipment that could be used on site, such as grading equipment and Bobcats™, are anticipated to generate noise between 72-85 dBA.[111] Heavy equipment generally runs at full power up to 50 percent of the time.[112] Point source sounds, like construction equipment, decrease six dBA for each doubling of distance;[113] therefore, 90 dBA at 50 feet is perceived as a 72 dBA at 400 feet and 60 dBA at 1,600 feet.

### *Transmission Lines, Including Substation Taps*

Construction noise for double-circuiting transmission lines and building new transmission infrastructure has the potential to exceed state noise standards based on conservative estimates at select times intervals and locations. Exceedances would be short-term, likely not continuous enough to violate state noise standards, and confined to daytime hours. Nighttime construction work may be required during outages, the accommodation of customer schedules, or other operational limitations that may cause construction to occur outside of daytime hours or on weekends. The applicants will work with local governments if construction becomes necessary outside of these hours and will be required to maintain compliance with state noise standards.

#### Double-Circuit Stringing

The nearest residence to any project infrastructure that will experience construction noise is within 75 feet of the existing transmission line to be double-circuited near St. Cloud (Appendix B, Map 12). There are six residences within 75-300 feet of a new pole along the existing transmission line to be double-circuited. One residence is within 75-300 feet of a new pole along new ROW that would occur for DNR Alternative 3, two residences 300-500 feet from a new pole along new ROW for DNR Alternative 2, and no residences within 500 feet of the Western and Eastern Options or DNR Alternative 1.

The loudest expected noise from construction of adding the second circuit is expected from the helicopters which will string the new line on the existing poles. The Federal Aviation Administration (FAA) implemented new helicopter noise standards in 2014 which apply to a helicopter's initial design[114] and must comply with U.S. noise standards defined in 14 CFR Part 36, subpart H. The FAA publishes certified noise levels in the advisory circular "Noise Levels for U.S. Certificated and Foreign Aircraft", last updated in November 2001.[115] Effective Perceived Noise Levels (EPNdB) for flyover noise limits from this document range between 88 to 108 EPNdB for certificated helicopters.[116] EPNdB is a measure of the relative noisiness of an individual aircraft pass-by event.

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[111] Federal Highway Administration Construction Noise Handbook, retrieved from: https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook

[112] *Ibid.*

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

[114] Federal Aviation Administration, retrieved from: https://www.federalregister.gov/documents/2014/03/04/2014-04479/stage-3-helicopter-noise-certification-standards.

[115] Federal Aviation Administration, 2001. Noise Levels for U.S. Certificated and Foreign Aircraft, Appendix 10. Retrieved from: https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_36-1H.pdf

[116] *Ibid.*

If helicopter noise for restringing exceeds 65 dBA for over six consecutive minutes, or 60 dBA for over 30 consecutive minutes, there is potential to violate state noise standards at the residence within 75 feet of the existing transmission line. To string the second circuit on the existing double-circuit structures, the helicopters will not be in one location for an extended period. The most time-consuming portion of stringing this second circuit will be clipping the new circuit to the existing structures which will require the helicopter to hover near the existing structure for approximately 15 minutes. The residence that is within 75 feet of the existing centerline is not near one of the existing double-circuit structures. As a result, helicopter noise at this residence during construction is expected to be brief throughout the day as the helicopters may travel back and forth for multiple times during a day between structures and staging yards.

Double-circuit stringing should be relatively temporary in terms of construction; thus, helicopter use would result in less of a significant impact than on the ground construction. It is unlikely other residences would experience a violation of the state noise standard due to point source sounds decreasing by six dBA for each doubling of distance. Direct comparison with A-weighted sound pressure level such as dBA is not possible because EPNdB is a noisiness metric rather than a sound pressure metric.

Other noise standards in Minnesota include the Department of Transportation (MNDoT) which are specific to noise levels on roads, and local noise ordinances. Most local noise ordinances in Minnesota are referred to as nuisance noise ordinances and are dependent on the city or county. Not all local units of government have specific noise ordinances along the project alignment. The applicant would be expected to coordinate helicopter work in time periods allowed by the local jurisdiction's code or to consult with relevant jurisdictions to minimize impacts if time-sensitive work would need to occur outside of established time periods.

#### NEW INFRASTRUCTURE

During construction of new foundation poles, major noise producing activities where new structures would be placed would be associated with clearing and grading, material delivery, auguring foundation holes, setting structures, and stringing conductors. Construction noise for new foundation poles is expected to produce noise for longer periods of time than for double-circuiting existing poles. Crews and activity would be present at a particular location during daytime hours for a few days at a time but on multiple occasions throughout the period between initial right-of-way clearing and final restoration. Intermittent construction noise would occur and is dependent upon the activity. Construction noise associated with heavy equipment can range between 80 and 90 dBA at full power 50 feet from the source.[117] 90 dBA at 50 feet is perceived as a 72 dBA at 400 feet and 60 dBA at 1,600 feet. If heavy equipment noise for constructing new infrastructure exceeds 65 dBA for over six consecutive minutes, or 60 dBA for over 30 consecutive minutes, there is potential to violate state noise standards at the residence within 1,600 feet (e.g. the local vicinity) of the project. The nearest residence at 75 feet is not near any new infrastructure for the project other than double-circuit stringing, which should be relatively temporary in terms of construction.

##### *Substations*

[117] Federal Highway Administration. Construction Noise Handbook, Chapter 9: Construction Equipment Noise Levels and Ranges. Retrieved from: https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm

As shown in Table 14, no residences are within 500 feet of the Alexandria Substation Tap, Riverview Substation Bypass, Quarry Substation Bypass, or Big Oaks Substation. Construction noise for substations has the potential to exceed state noise standards based on conservative estimates at select times intervals and locations. Exceedances would be short-term, likely not continuous enough to violate state noise standards, and confined to daytime hours. Nighttime construction work may be required during outages, the accommodation of customer schedules, or other operational limitations that may cause construction to occur outside of daytime hours or on weekends. The applicants will work with local governments if construction becomes necessary outside of these hours and will be required to maintain compliance with state noise standards.

#### Alexandria Substation Tap

New substation equipment is necessary to accommodate the proposed 345 kV transmission line including new termination structures, circuit breakers, relays and associated control equipment. This will require an expansion of two to four acres from the existing fenced area to accommodate the new substation equipment. As discussed earlier, if heavy equipment noise for constructing new infrastructure exceeds 65 dBA for over six consecutive minutes, or 60 dBA for over 30 consecutive minutes, there is potential to violate state noise standards at a residence within 1,600 feet (e.g. the local vicinity) of the project. Given there are no residences within 500 feet, any residence over 500 feet away could experience between approximately 66 to 71 dBA at the loudest. Construction equipment operating at its loudest for this small of a footprint is unlikely to run for over six consecutive minutes and violate state noise standards.

#### Riverview Substation Bypass

New substation equipment is necessary to install to provide reactive power support. The current fenced area will be expanded by approximately 0.5 acres on property owned by Great River Energy to accommodate this new substation equipment. As discussed earlier, if heavy equipment noise for constructing new infrastructure exceeds 65 dBA for over six consecutive minutes, or 60 dBA for over 30 consecutive minutes, there is potential to violate state noise standards at a residence within 1,600 feet (e.g. the local vicinity) of the project. Given there are no residences within 500 feet, any residence over 500 feet away could experience between approximately 66 to 71 dBA at the loudest. Construction equipment operating at its loudest for this small of a footprint is unlikely to run for over six consecutive minutes and violate state noise standards.

#### Quarry Substation Bypass

New substation equipment is necessary to provide reactive power support at the Quarry Substation. The current fenced area will be expanded by approximately 0.3 acres on Xcel Energy owned property to accommodate this new substation equipment. As discussed earlier, if heavy equipment noise for constructing new infrastructure exceeds 65 dBA for over six consecutive minutes, or 60 dBA for over 30 consecutive minutes, there is potential to violate state noise standards at a residence within 1,600 feet (e.g. the local vicinity) of the project. Given there are no residences within 500 feet, any residence over 500 feet away could experience between approximately 66 to 71 dBA at the loudest. Construction equipment operating at its loudest for this small of a footprint is unlikely to run for over six consecutive minutes and violate state noise standards.

#### Big Oaks Substation

The project requires a new Big Oaks Substation act as 345 kV switching station. The exact location of the substation has not yet been determined, but a 250-acre portion of land owned primarily by Xcel Energy

has been identified as the Big Oaks Substation Siting Area. The applicants are evaluating the Big Oaks Substation Siting Area to confirm adequate space for planned facilities, future transmission line interconnections, and a buffer to minimize immediate encroachment with other existing or new land uses.

The Big Oaks Substation will include eighteen 345 kV circuit breakers configured to accommodate the connection of up to twelve 345 kV transmission lines. Substation equipment necessary to provide reactive power support will also be installed. The Big Oaks Substation will be on a graded and fenced area of approximately 10 acres.

As discussed earlier, if heavy equipment noise for constructing new infrastructure exceeds 65 dBA for over six consecutive minutes, or 60 dBA for over 30 consecutive minutes, there is potential to violate state noise standards at a residence within 1,600 feet (e.g. the local vicinity) of the project. Given there are no residences within 500 feet, any residence over 500 feet away could experience between approximately 66 to 71 dBA at the loudest. The nearest residence to Big Oaks Substation appears to be over 1,600 feet away, thus a violation of state noise standards during construction is unlikely. The applicants confirmed that non-utility owned parcels adjacent to the Big Oaks Substation Siting Area are not residences.

### *Operation*

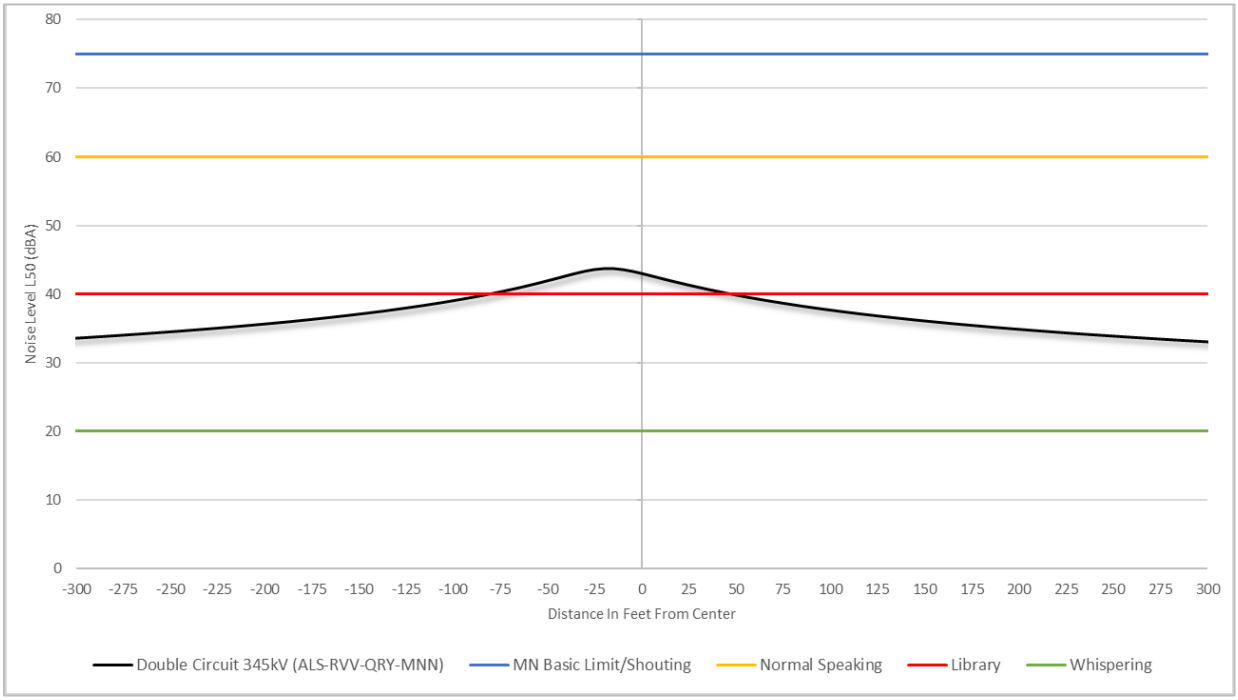
Operational noise for the entire project is expected to meet state noise standards and cause minimal impacts.

#### *Transmission Lines*

Operational noise levels produced by a transmission line are generally less than outdoor background levels and are therefore not usually perceptible. Audible transmission line noise is created by small electrical discharges at specific locations along the surface of the conductor that ionize surrounding air molecules. This phenomenon—common to all power lines—is known as corona and is often described as a “crackling” sound. In general, any imperfection on the surface of the conductor might be a source for corona. Examples include dust and dirt, or nicks and burrs in the equipment. Resulting noise levels are dependent upon voltage level (corona noise increases as voltage increases) and weather conditions. In foggy, damp, or rainy conditions, audible corona noise is common. In light rain, dense fog, snow or other relative moist conditions, corona noise might be higher than rural background levels. In heavy rain, corona noise increases even more, but because background noise increases too, corona noise is undetectable. During dry weather, corona noise is less perceptible.

The applicants state that noise generated by operation of the new double-circuit transmission line would not exceed 45 dBA from the center of the alignment at the nearest resident along the entire project, who is 75 feet away. This analysis is shown as Figure 5 below. Audible noise from transmission lines is primarily related to the electric field, and electric fields are particularly dependent on the voltage of the transmission line.

**Figure 5: Audible Noise Calculated for 345 kV Double-Circuit Line**




*Substations*

Noise contributions from substations are dependent on the layout of buildings and equipment within the fence. Transformer or shunt reactor "humming" is the dominant noise source at substations if such equipment exists. At substations without transformers or shunt reactors, only infrequent noise sources would exist such as the opening and closing of circuit breakers, the operation of an emergency generator, or unexpected maintenance issues. Transformer or smoothing reactor noise is nearly constant whenever the transformer is energized. Variations in transformer noise may occur due to the operation of cooling pumps and fans at higher loading levels.

Noise from indoor equipment is not expected to propagate outside the building. Typical substation design is such that noise produced by these sources does not reach beyond the substation property. In the uncommon cases that space is limited and that cannot be accomplished, noise reduction designs can be applied such as sound walls placed around transformers, or shelter belts planted around substations to reduce the distance the sound can travel. Regularly performing proper maintenance practices on converter transformer components such as the cooling fans and pumps generally abate common noise issues.

### MITIGATION

Section 5.3.6 of the DRP requires the permittee to limit construction and maintenance activities to daytime hours to the extent practicable. The applicants will work with local governments if construction becomes necessary outside of these hours. Construction noise impacts can be reduced through sound control devices on vehicles and equipment, for example, mufflers; and running vehicles and equipment only when necessary.

Prior to the start of construction, the applicants and the selected contractor would create a detailed project-specific Helicopter Use Plan describing all planned usage of helicopters or other aircraft for project construction. The Plan would also include flight routes and altitudes to minimize flight into sensitive areas and to avoid aircraft congestion. The operations area of the helicopters would be limited to the project area, previously disturbed areas near construction sites, staging areas, and ground locations near conductor and/or line pulling, tensioning, and splice sites.

Proper design and construction of the transmission line in accordance with industry standards will ensure that noise impacts are minimized. The best option for helicopter noise mitigation would be for the applicants to work directly with homeowners, especially those nearest to the anticipated alignment, and schedule work for when they would be outside of their homes.

Permittees are required to comply with noise standards established under Minnesota Rule, part 7030.010 to 7030.0080 (Section 5.3.6 DRP). Other mitigation could incorporate screens or berms that muffle noise leaving the project property or include a natural buffer that the applicant could dedicate to upholding at a certain distance agreeable to nearby residences. No additional mitigation is proposed.

### Property Values

**The ROI for property values is the route width. A property's value is influenced by a complex interaction of factors, such as the presence of a HVTL or substation. Most of the project is within existing ROW or on property that is already owned by the applicants. DNR Alternatives 2 and 3 would require new transmission lines on two and eight properties respectively. Reductions in property value could occur, but changes to a specific property's value are difficult to predict. If effects occur, they tend to be small, almost always less than 10 percent, and usually in the range of three to six percent. Because of this uncertainty, impacts are anticipated to be minimal, and dissipate rapidly with distance. Potential impacts to these unique resources can be mitigated.**

Impacts to property values that result from power line construction have been studied for over half a century. These studies have focused primarily on residential, agricultural, and undeveloped properties as opposed to commercial or industrial properties. While the research demonstrates that property value impacts vary, the majority indicates that HVTLs have "no significant impact or a slight negative impact on residential properties."[118]

HVTL impacts on property values can be measured in three ways: sale price, marketing time, and sales volume.[119] These measures are influenced by a complex interaction of factors. Most of these factors are parcel specific, including: condition, size, improvements, acreage and neighborhood characteristics; the proximity to schools, parks and other amenities; and the presence of existing infrastructure, for example, highways, railways, or power lines. In addition to property-specific factors, local and national market trends, as well as interest rates can affect all three measures. Thus, impacts from HVTLs on property values depend upon "many factors, including market condition, location, and personal preference."[120] The presence of a HVTL becomes one of many interacting factors that could affect a specific property value.

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[118] Pitts, Jennifer, and Jackson, Thomas (2007) *Power Lines and Property Values Revisited*, THE APPRAISAL JOURNAL 75(4):323-325, retrieved from: https://www.researchgate.net/publication/316674821_Power_Lines_and_Property_Values_Revisited.

[119] Kinnard, William and Dickey, Sue Ann (April 1995) A Primer on Proximity Impact Research: Residential Values Near High-Voltage Transmission Lines, Real Estate Issues 20(1):23-29.

[120] Pitts and Jackson (2007).

Generally, HVTL impacts on property values are based on individual perceptions relating to "aesthetic concerns about the effect of overhead wires and supporting towers on views [and] concerns about the possible adverse health impacts associated with exposure to [EMFs]."[121] Property use and size also influence potential value-related impacts. Properties used exclusively for residential purposes "are more vulnerable to value impact than agricultural or recreational uses, where a broader set of property attributes become relevant for the purchaser."[122] Smaller properties are generally more vulnerable to value impacts "due to decreased flexibility in the siting of improvements," though, due to topography, access, and related constraints, this can also apply to larger sized parcels.[123] Whether or not an HVTL would encumber future land use,[124] and the "existence of close substitutes unaffected by transmission lines" can increase the likelihood of value impact.[125]

Researchers have used survey-based techniques and statistical analyses to draw conclusions about the relationship between HVTLs and property values. In general, surveys provide useful insights into buyer behavior based on stated preferences or when market data is not available.[126] However, survey research presents inherent disadvantages; for example, respondents might not give realistic or truthful responses.[127] Additionally, conducting a survey regarding the relationship between HVTLs and property values in and of itself might trigger negative responses from respondents.[128]

The results of survey studies are generally consistent, and can be summarized as follows:

- A high proportion of the residents were aware of the HVTLs at the time of purchase.
- Between one-half and three-fourths of the respondents have negative feelings about the HVTLs.
- These negative feelings center on fear of negative effects to aesthetics, health, and property values.
- Of those who have negative feelings about HVTLs, the majority (67 percent to 80 percent) report that the purchase decision and the price they offered to pay were not affected by the HVTLs.[129]

Multiple regression statistical analysis techniques are generally accepted as the current professional and academic standard for evaluating potential property value impacts, as it reflects the actual behavior of property buyers and sellers in terms of recorded sales prices, while controlling for other factors such as

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[121] Roddewig, Richard and Brigden, Charles (2014) *Power Lines and Property Prices*, REAL ESTATE ISSUES 39(2):15-33.

[122] Chalmers, James (2012) Transmission Line Impacts on Rural Property Values, retrieved from: https://eweb.irwaonline.org/eweb/upload/web_mayjune12_Transmission.pdf.

[123] Ibid.

[124] For example Chalmers, James and Voorvaart, Frank (2009) High-Voltage Transmission Lines: Proximity, Visibility, and Encumbrance Effects, The Appraisal Journal 77(3):227-245, retrieved from: http://www.atc-projects.com/wp-content/uploads/2012/11/Chalmers-Appraisal-Journal-Article-Q2-2009-HVTLs-Proximity-Visibility-Encumbrance-Effects.pdf.

[125] Chalmers (2012).

[126] See Jackson, Thomas and Pitts, Jennifer (2010) The Effects of Electric Transmission Lines on Property Values: A Literature Review, Journal of Real Estate Literature 18(2):239-259, retrieved from: http://www.real-analytics.com/Transmission%20Lines%20Lit%20Review.pdf; see also Kinnard and Dickey (1995).

[127] Electric Power Research Institute (November 2003) *Transmission Lines and Property Values: State of the Science*, retrieved from: http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000000001005546.

[128] *See* Electric Power Research Institute (November 2003), page 2-1 (stating "it is the nature of a questionnaire that by asking a question on a topic, the importance of that topic is highlighted").

[129] Chalmers and Voorvaart (2009), page 229-230.

home size.[130] This type of analysis allows researchers to identify "revealed preferences" or what people actually did, in contrast to survey research, which identifies what people say they would do.[131] This type of research requires large data sets; therefore, it is less subjective and more reliable than paired sales studies.[132] The results are often reported as an average change over a number of properties; however, the effect to individual properties can vary—increase or decrease—widely.[133]

The results of these studies can be summarized, generally, as follows: [134]

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

### POTENTIAL IMPACTS

The ROI for property values is the route width. Impacts to property values could occur; however, specific changes to a property's value are difficult to predict. Impacts, if they occur, are expected to decay over time. Property value impacts fall off rapidly with distance; therefore, impacts are anticipated to be localized. On whole, impacts are anticipated to be minimal and dissipate quickly at distances greater than 400 feet from the HVTL. The nearest resident to any proposed project component or the DNR Alternatives 1-3 is approximately 75 feet, however, this residence is near double-circuiting only which is expected to have a negligible impact due to the pole and transmission line that already exist in that area. Impacts to specific properties could vary widely, but are not expected to be more than minimal because most of the project will occur within existing ROW or on property already owned by the applicant. DNR alternatives 2 and 3 would construct new infrastructure on some properties (two and eight respectively) that do not currently have transmission lines, representing the highest potential for impact. Smaller properties are generally more vulnerable to value impacts. Long-term impacts might or might not occur.

**Note**: Every landowner has a unique relationship and sense of value associated with their property. Thus, a landowner's assessment of potential impacts to their property's value is often a deeply personal comparison of the property "before" and "after" a proposed project is constructed. These judgments, however, do not necessarily influence the market value of a property. Rather, appraisers assess a property's value by looking at the property after a project is constructed. Moreover, potential market participants likely see the property independent of the changes brought about by a project; therefore, they do not take the "before" and "after" into account the same way a current landowner might. EERA

[130] Kinnard and Dickey (April 1995), page 25; Chalmers and Voorvaart (2009), page 228.

[131] *See* Kinnard and Dickey (April 1995); *see also* Jackson and Pitts (2010).

[132] Chalmers and Voorvaart (2009) at page 228; Kinnard and Dickey (April 1995) at page 25 (a paired sales study involves an appraiser comparing the value of two similar properties, one of which is not impacted by an HVTL).

[133] Electric Power Research Institute (November 2003).

[134] Chalmers and Voorvaart (2009).

acknowledges this section does not and cannot consider or address the fear and anxiety felt by landowners when facing the potential for negative impacts to their property's value.[135]

#### MITIGATION

Impacts to property values can be mitigated by reducing aesthetic impacts, perceived health risks, and encumbrances to future land use. Routing the HVTL away from residences might reduce aesthetic impacts and perceived health risks. Co-locating the HVTL with existing infrastructure might reduce aesthetic impacts and potential land use conflicts. No mitigation is proposed.

### Recreation

**The ROI for recreation is the local vicinity. Because few recreational resources exist in the project area, potential impacts to these resources are anticipated to be minimal and temporary. Operational impacts will be long-term and primarily associated with visual impacts caused by new built features introduced to the landscape. Given that direct long-term effects are predominantly related to aesthetics, the indirect long-term repercussions on recreation are anticipated to be subjective, meaning that responses will vary based on individual perspectives and experiences. Potential impacts can be minimized.**

Recreational opportunities in and near the proposed route include trails, public lands and parks, bird watching, biking, fishing, camping, hunting, boating, and snowmobiling. Formally managed and regulated lands near the proposed route include WMAs, Wildlife Protection Areas (WPAs), state water trails, and municipal and county parks and trails.

WPAs are lands that were established to conserve migratory bird habitat. The proposed route crosses two Douglas County WPA locations and two Stearns County WPA locations. Both WPAs are on the west end of the project, west of St. Cloud. WPAs are available for hunting during state-designated hunting seasons.

WMAs are part of Minnesota's outdoor recreation system and are established to protect those lands and waters that have a high potential for wildlife production, public hunting, trapping, fishing, and other compatible recreational uses. The proposed route crosses one WMA: the Sauk River WMA.

The DNR manages 35 state water trails covering over 4,500 miles in Minnesota. These trails provide opportunities for canoeing, kayaking, paddleboarding, and camping. The proposed route crosses the Sauk River water trail in four locations. Additionally, each of the proposed River Crossing options would cross the Mississippi water trail one time.

Snowmobile trails are mapped by the DNR and managed locally by each county and their respective snowmobile clubs. There are three snowmobile trails in the proposed route: one each in Douglas, Stearns, and Wright Counties. At the western end of the project, the Douglas Area trails parallel and cross portions of the proposed route. The Stearns County Snowmobile Trails parallel and cross portions

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

of the proposed route between Alexandria and St. Cloud. At the eastern end of the project, the Wright County Trails parallel and cross the proposed route in proximity to the Mississippi River.

The proposed route crosses two Stearns County parks: a small corner of Warner Lake County Park, just west of Clearwater as well as Lake Wobegon Trail near its inception northwest of Sauk Centre. There are several Grassland Bird Conservation Areas, Important Bird Areas, and Waterfowl Production Areas within and near the proposed route that attract birdwatchers. These bird areas are discussed in more detail in the Wildlife and Habitat section of this EA.

There are no DNR Scientific and Natural Areas, Aquatic Management Areas, state parks, municipal parks, or golf courses in or crossed by the proposed route. DNR Forestry acquires and manages parcels of Minnesota's forests and trees for both ecological and economic benefit, rather than DNR State Forests, which are managed for public recreation.[136] There are no federal parks, forests, refuges, or county parks within the local vicinity. Near the River Crossing for all routing options, there are no WMAs, trout or muskie lakes, state trails, public water access, designated wildlife lakes, or state lands.

For DNR's Alternatives, there are no DNR classified lands, such as State Forests, Parks, or Trails; WMAs; or Scientific and Natural Areas within either DNR Alternative 2 or 3. DNR Alternative 1 and the Eastern Option cross one protected area: the Mississippi Island Sherburne State Aquatic Management Area. This area is managed by the DNR and provide angler and management access, protects critical shore land habitat, and provides areas for education and research.[137] DNR Alternative 1 is directly adjacent to Snowmobile Trail 219 for about 1000 feet. DNR Alternatives 2 and 3 could possibly intersect this trail.

#### POTENTIAL IMPACTS

Power lines have the potential to impact recreational activities. Impacts might be negative if the line interferes with the resources that provide these activities, for example, changing the aesthetic of a recreational destination in a way that reduces visitor use. Where the project is double-circuiting on existing transmission lines, recreational opportunities in those areas will be negligibly impacted. In the few areas with new transmission line infrastructure, a power line might increase recreational opportunities, for example, right-of-way clearing might provide increased opportunities for wildlife viewing or hunting.

Alternatively, the most significant new infrastructure for the project will be occurring at the River Crossing, which is an important bird corridor with existing transmission lines. All routing options would introduce new transmission lines and thus more collision hazards for wildlife, which may affect recreational viewing opportunities. All routing options would not require placing structures in the riverbed; all options would also span the river except for DNR Alternative 1 which places one new tangent structure on an island in the river and the Eastern Option which places two new helical pier structures on the same island in the river. Any construction on this island would involve heavy equipment due to the unique access restraints on the island. This construction may impact the nearby Mississippi Island Sherburne State Aquatic Management Area and any recreationalists, especially those who participate in fishing as fish would likely be disturbed by increased noise, vibrations, or possible sedimentation. Recreationalists could also use this area for non-motorized travel, wildlife observation, hunting or trapping. These temporary and localized impacts would subside when construction is complete.

[136] Minn. Stat. 89.001, subd. 4.

[137] MNDNR, Aquatic Management Areas, retrieved from, https://www.dnr.state.mn.us/amas/index.html

Noise impacts from construction are anticipated to be short-term and intermittent. Operational noise is negligible and will not affect recreationalists. Dust associated with construction might indirectly impact recreationalists or natural areas. Temporary and minimal disruptions to use of the snowmobile trails could occur if project construction occurs during the winter months.

Impacts to recreational activities and other scenic views are anticipated to be similar for all routing options since the majority of recreation areas occur along the existing transmission line that is proposed to be double-circuited. For all routing options near the Mississippi River, all proposed facilities would be constructed on lands with no public recreation areas. While the DNR Alternatives are near a snowmobile trail, the route widths are wide enough to avoid when alignment placement is decided.

New built features will be introduced to the landscape, and construction equipment and vehicle traffic will affect aesthetics. If the Eastern or Western Option are chosen, it is not expected that structures will be visible in snowmobile trail recreation areas. DNR Alternative 1 is directly adjacent to Snowmobile Trail 219 for about 1000 feet, which would create the most visual but otherwise non-interfering impacts with the trail. DNR Alternatives 2 and 3 could possibly intersect this trail, which would create less visual impacts and would also have otherwise non-interfering impacts.

Recreationalists using the non-utility owned land in the River Crossing area for hiking or fishing, for example, may see new infrastructure in certain places, however, given the forested nature of the area, visibility is limited with some distance from the project. Recreationalists most likely to be impacted are neighboring properties not owned by the applicants near the River Crossing that use the surrounding area for outdoor activities.

If the new transmission lines, substation expansions, and Big Oaks Substation can be seen, impacts would be incremental as relatively high levels of electrical and transportation infrastructure exists near each project area where new construction is planned. While visual impacts will occur, new HVTLs and substations will not impede recreational activities. The DNR Alternatives 2 and 3 would generally be less hidden from the public and thus could have more recreational impacts, however, these routing options occur mostly along utility-owned land or agricultural homesteads.

#### MITIGATION

Impacts to recreation can be mitigated by selecting routes and alignments that avoid resources utilized for recreational purposes. Various sections of the DRP indirectly address impacts to recreation, such as noise, aesthetics, soils, and others. No impacts to recreation are anticipated during operation of the project; as such, no mitigation is proposed for operational impacts.

Impacts can also be mitigated by reducing impacts to natural landscapes during construction. Maintaining more natural barriers around the project after construction would also mitigate noise. If construction BMPs are employed properly near the snowmobile trail if constructing in winter, and near the Mississippi Island Sherburne State Aquatic Management Area if the Eastern Option or DNR Alternative 1 is chosen, significant permanent impacts are expected to be mitigated. Temporary impacts to the snowmobile trail such as noise could also be avoided if construction in these areas occur outside of the snowmobiling season. Water access to the island could not be conducted through other routes, so temporary disturbance here would occur. The Commission could require time-of-day or time-of-year restrictions for certain construction activities to mitigate impacts to the Aquatic Management Area. No additional mitigation measures are proposed.

## Transportation and Public Services

**The ROI for transportation and public services is the project area. Potential impacts to roads and railroads, emergency services, and other utilities are anticipated to be short-term, intermittent, and localized during construction. Impacts to water (wells and septic systems), pipelines, and airports are not expected to occur. Overall, construction-related impacts are expected to be minimal and are associated with possible traffic delays. An electrical outage during construction is not anticipated. During operation, negligible traffic increases would occur for maintenance. Impacts are unavoidable but can be minimized.**

Public services are services provided by a governmental or regulated private entity for public health, safety, and welfare. These services can include police, fire, hospitals and ambulance, water and wastewater, school districts, utilities, and other public utility infrastructure. local transportation networks include roadways, railroads, airports, and airstrips. Large energy projects can impact public services, such as buried utilities or roads. These impacts are usually temporary, for example, road congestion associated with material deliveries. Impacts can be long-term if they change the area in a way that precludes or limits public services.

### Water and Wastewater

In many rural areas near the project, many residents use private septic systems and/or wells. Douglas and Stearns Counties provide septic system services to rural areas without access to water treatment facilities if they fall within a town, city, or sewer district. In cities and townships around the project such as Alexandria and St. Cloud, municipal water and sewer services are provided. Several domestic and private water wells near the proposed route and DNR Alternative routes are documented in the Minnesota Department of Health (MDH) Minnesota Well Index.

At the River Crossing, there are two Drinking Water Supply Management Areas (DWSMA) near the project area. The Becker DWSMA is approximately 2 miles northeast of the Mississippi (Public Water System ID 1710008) outside of the project area. The Monticello DWSMA is approximately 3 miles south of DNR Alternative 1 (Public Water System ID 1860012). Vulnerability of DWSMAs is discussed in more detail in the Groundwater section of this EA. The ROWs for DNR Alternatives 1 and 3 as proposed would cross several domestic and irrigation wells: Alternative 1 would cross 21 and Alternative 3 would cross two, whereas Alternative 2 would cross none.

### Electric Utilities

Electric utilities are provided by Otter Tail, Alexandria Light and Power, Runestone Electric Association, Melrose Public Utilities, Xcel Energy, Stearns Cooperative Electric Association, Connexus Energy, and Wright Hennepin Electric Cooperative within the project area. Existing distribution and high voltage transmission lines as well as electric infrastructure such as substations exist throughout the area, however, electric infrastructure not associated with the project will not be affected (crossed, tapped, raised, etc.). For construction around these, especially where new foundations and poles are proposed, the applicants will work with utility providers to determine where facilities exist and how to best ensure the proper safety precautions are being met.

Outages may or may not be required during construction of the project for all routing options. The applicants will work with utility providers to determine where facilities exist and how to best ensure the proper safety precautions are being met. The applicants may meet with residents and utility providers to

prevent direct or indirect impacts to their services. Overall, electric utilities are not anticipated to be impacted by the construction and operation of the project.

### PIPELINES

As shown on Appendix B, Map 18, there are several pipeline types that intersect the project area. One crude oil line is west of Rockville, two petroleum product lines are in Alexandria, and one petroleum product pipeline generally follows the proposed route from West Union to Clearwater, Minnesota. Two natural gas pipelines are in/near Alexandria, one in St. Cloud, one near Sauk Centre, and one in Freeport, each of which cross the proposed route.

The nearest pipelines to new construction for the project include a natural gas line approximately 1 mile southeast of Alexandria Substation and a natural gas line within 1 mile east of the Riverview Substation. There are no active or abandoned pipelines in the project area near the River Crossing.

### ROADS

State routing policy indicates a preference for consolidating HVTLs with existing infrastructure, including transportation rights-of-way. Minnesota Statute 216E.03, subdivision 7, directs the Commission to "make specific findings that it has considered locating a route for a [HVTL] 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."

Co-location of transmission lines with existing public roads could limit future roadway expansion or realignments and could interfere with routine maintenance of roadways. The project crosses approximately 101 roads. Of these, 41 represent interstate, state, or county highways. The remaining 60 roads are owned and operated at the township or municipal level. Apart from I-94, MN 23, and MN 29, traffic volumes are relatively low on roads crossed by or running parallel to the proposed route where traffic data is available (Table 15).

Several areas of the project occur nearby road rights-of-way where the proposed route follows a road and structures are placed 10 feet from the road right-of-way. The route parallels I-94 along much of its length, including near Alexandria, Melrose, and between Waite Park and Becker, Minnesota.

Any occupation of state highway right-of-way requires a Utility Permit from MnDOT, per Minn. R. 8810.3100 to 3600. MnDOT's Accommodation Policy provides requirements and guidelines for the installation of utility facilities in and along MnDOT rights-of-way, which the project was developed to meet. The applicants have begun coordinating with MnDOT and will continue to work with MnDOT throughout the route permit process to ensure that the alignment meets MnDOT guidelines.

**Table 15: Annual Average Daily Traffic on Project Roads**[138]

| Road | City | County | Annual Average Daily Traffic (AADT) | Traffic Count Year | Co-located Distance (feet) | Notes |
|---|---|---|---|---|---|---|
| CSAH 11 | S of Freeport | Stearns | 1,000 | 2017 | 24,450 | N of CSAH 30 |

[138] Minnesota Department of Transportation, Annual Average Daily Traffic Mapping Application, retrieved from: https://arcg.is/1nSf5G.

| Road | City | County | Annual Average Daily Traffic (AADT) | Traffic Count Year | Co-located Distance (feet) | Notes |
|---|---|---|---|---|---|---|
| CSAH 2 | N of Rockville | Stearns | 3,850 | 2017 | 7,150 | S of CR 139 (270th Street) |
| CSAH 23 | Alexandria | Douglas | 1,250 | 2018 | 160 | N of US 52 |
| CSAH 30 | S of Freeport | Stearns | 355 | 2017 | 150 | E of CSAH 11 |
| CSAH 50 | W of Rockville | Stearns | 1,700 | 2017 | 170 | NW of CR 160 |
| CSAH 75 | Becker | Wright | 1,600 | 2016 | 18,900 | NW of 120th St NE |
| CSAH 75 | St. Cloud | Stearns | 3260 | 2021 | 2,300 | SE of MSAS 161 |
| I-94 | Alexandria | Douglas | 21,093 | 2021 | 56,950 | AADT impacted by COVID |
| I-94 | Melrose | Stearns | 28,500 | 2017 | 9,900 | SE of MN 4 |
| I-94 | St. Cloud | Stearns | 38,064 | 2021 | 87,400 | AADT impacted by COVID |
| I-94 | St. Cloud | Stearns | 42,000 | 2017 | 87,400 | E of MN 15 |
| MN 23 | Waite Park | Stearns | 17,000 | 2019 | 2,300 | NE of I-94 |
| MN 29 | Alexandria | Douglas | 10,624 | 2021 | 180 | N of CR 87 |
| MN 27 | S of Osakis | Douglas | 3,500 | 2018 | 63,000 | N of I-94 |
| MN 4 | Melrose | Stearns | 830 | 2017 | 165 | S of I-94 |

### RAILROADS

If a transmission line is sited too close to an operating railroad, it could interfere with safe operation of the railroad. The proposed route crosses two active rail lines: the SOO Line Railroad (SOO) that runs through Alexandria from West Glenwood to Thief River Falls, and a Northern Lines Railway (NLR) line that runs from Cold Spring to St. Cloud. The Big Oaks Substation Siting Area and DNR Alternative 1 include a portion of a BNSF Railway line related to the Monticello Nuclear Generating Plant in Becker. The Staples Subdivision of the same railway is half a mile north of DNR Alternative 3.

### AIRPORTS

An airport is defined by the FAA as an area of land or water that is intended to be used for the landing and takeoff of aircraft, and includes its buildings and facilities.[139] The placement of transmission line structures or the stringing of conductors between structures could impact the safe operation of an

[139] 14 CFR. Part 1, §1.1 and Minn. R. 8800.0100, subpart 3.

airport or hinder the maneuverability of aircraft. If close enough, the presence of a steel transmission line structure or wiring could interfere with the operation of air navigation or weather systems. Conductors can also present a risk to pilots. Transmission line structure placement must take setback distance necessary for safe flight into account based on aircraft take-off and landing glide slopes.

HVTLs can present safety concerns to airports and aircraft. To assure safety, both the FAA and MnDOT office of Aeronautics have established guidelines for locating structures near airports. The FAA has height restrictions for development near public airports and guidelines for placement of buildings and other structures near high frequency omnidirectional range navigation systems. MnDOT has zoning areas around public airports that restrict the area where buildings and other structures can be placed.

A FAA notice and approval is required for structures 200 feet above ground level as defined in CFR Chapter 77.9. The applicants must submit notice of construction beforehand to the FAA if applicable. The FAA would then screen project structures for proximity to airports. The applicant states that the new transmission line structures proposed for the project will be less than 199' tall, specifically, those 130 feet tall will be 6,206 feet away from a VOR to avoid interference, those 140 feet in height must be 6,683 feet away, and those 175 feet in height must be 8,354 feet away.

Furthermore, certain objects such as steel pole transmission line structures have the potential to conflict with the operation of airport navigational aids and weather observation station facilities. Specifically, these facilities include Very High Frequency Omnidirectional Radio Range (VOR) air navigation systems and Automated Weather Observation Stations. This is regulated by a FAA Order that specifies the distance setback requirements for trees, buildings, and metallic structures as well as obstruction criteria for transmission lines.[140] These regulations specify that overhead transmission line structures with conductors should be beyond 1,200 feet of the VOR antenna to avoid communication interference.

There are no operating public-use airports or heliports in the project area, one private-use airport and one private heliport. Both private-use areas occur along the existing infrastructure. The Seven Hills Airport (5MN4) occupies eight acres west of Clearwater, Minnesota with one runway and 0.3 miles south of the existing route's permanent right-of-way. CentraCare Health Hospital in Melrose, Minnesota has a helipad for medical emergencies and is 0.2 miles north of the existing route's permanent right-of-way. The nearest public airport is Chandler Field in Alexandria approximately 1.06 miles north of the proposed route.

#### EMERGENCY SERVICES

Power line construction and operation can potentially impact emergency services by interfering with the ability to communicate during an emergency or respond to an emergency. The Allied Radio Matrix for Emergency Response (ARMER) system is used across Minnesota.[141] Broadcast frequencies range from 851 MHz to 859 MHz; therefore, the ARMER system will not be impacted.

In the project area, Douglas, Todd, Stearns, Sherburne, and Wright Counties provide sheriff departments and the cities of Alexandria, Melrose, Waite Parke, St. Cloud, and Becker have local police departments. Alexandria, Freeport, Waite Parke, St. Cloud, Clearwater, and Becker all have paid fire departments that service the surrounding cities and townships. Melrose, Rockville, and Monticello have volunteer fire

[140] FAA Order 6820.10 "VOR, VOR/DME, and VORTAC Siting Criteria."

[141] Minnesota Department of Public Safety, retrieved from: https://dps.mn.gov/divisions/ecn/programs/armer/Pages/default.aspx

departments. The Central Minnesota EMS Region Ambulance Service and the Gold Cross Ambulance Service of St. Cloud provide response services to cities and townships surrounding St. Cloud including Rockville, Waite Park, Clearwater, Becker, and Monticello. The North Ambulance Service of Douglas County provides response services to Alexandria and other surrounding cities and townships including Melrose and Freeport. Emergency medical response is also available from local hospitals, such as the Douglas County Hospital System in Alexandria and the CentraCare and St. Cloud Hospital Systems, both in the City of St. Cloud. Smaller medical clinics or medical centers in the area include CentraCare in and around the cities of Melrose, Freeport, Clearwater, and Becker, and Stellis Health for the Monticello area.

Regardless of the selected route, project construction is not anticipated to affect emergency services because emergency response will be prioritized over construction activities to the greatest extent possible. Moreover, any temporary lane restrictions or slow-moving traffic that might affect emergency response services would be coordinated with local jurisdictions to ensure that safe alternative access is available for police, sheriff, fire, ambulance, and other rescue vehicles. Thus, impacts to emergency services are anticipated to be negligible, and will be mitigated.

#### POTENTIAL IMPACTS

Impacts to public services because of the project are anticipated to be minimal. Impacts that do occur are anticipated to be temporary. Potential impacts to public utilities do not vary between project components and would be most likely to occur during ground disturbance activities for construction and maintenance. Delivery of project materials might cause minor traffic delays. Additionally, delays might be caused by construction worker traffic or slow-moving construction equipment.

##### *Water and Wastewater*

The applicants will utilize available resources and databases such as the Minnesota Well Index and county ordinances regarding setbacks for septic systems along the route to understand where wells and private septic systems have the potential to be impacted by the project so that they can be avoided.

The DNR regulates water appropriation activities that exceed 10,000 gallons per day or a total of one million gallons per year under Minn. R. 6115.0620. Neither a dewatering permit nor water appropriations permit are anticipated to be required during construction or operation of the project including the Big Oaks Substation. If geotechnical analyses determine that temporary dewatering or water appropriations would be required, the applicants will coordinate with the DNR to obtain the necessary permits.

The Big Oaks Substation will not require any facilities that connect to city water. A new water supply well for any part of the project or a water appropriation permit are not required (except if a temporary construction dewatering permit is required), thus well interference or other impacts are not expected.

##### *Electric Utilities*

Outages may or may not be required during construction of the project for all routing options. The applicants will work with utility providers to determine where facilities exist and how to best ensure the proper safety precautions are being met. The applicants may meet with residents and utility providers to prevent direct or indirect impacts to their services. Overall, electric utilities are not anticipated to be impacted by the construction and operation of the project. No long-term impacts to utilities will occur because of the project.

*Pipelines*

Although unlikely, damage to existing pipelines could occur during grading activities. The applicants will utilize the Gopher State One-Call system to locate and mark all existing underground utilities prior to construction to avoid impacts on pipelines. There are companies with pipelines that cross the proposed route, such as Magellan Pipeline, that require evaluation of project plan and profiles to address potential alternate current impacts or other impacts as an integrity engineer determines before any activity can occur. Encroachment agreements with pipelines are generally required for all encroachments, including construction vehicles and equipment on or within pipeline easements.

*Roads*

During construction, workers and trucks delivering construction material and equipment will use the existing state, county, and township road system to access the project. Delivery of project materials might cause minor traffic delays. Slow-moving construction vehicles may also cause delays on smaller roads. Line construction and maintenance at crossing locations could also cause temporary delays if maintenance vehicles are present. These delays should be minimal for the relatively short construction delivery period and traffic volumes would return to normal conditions after construction activities are completed in a single location.

Traffic during peak construction of the transmission line could be up to 50 trips per day for trucks, cars, and/or other types of employee vehicles, 10 for heavy duty trucks, and 10 for miscellaneous trucks, a tractor, and cranes. Peak traffic for construction of the Big Oaks Substation will be during grading activities and crushed rock delivery, consisting of up to 20 semi-trucks per day. As shown in Table 15, since average daily traffic in the project area are well below design capacity, this increased traffic may be perceptible to area residents, but the worst-case increase in volume during peak construction is not expected to affect traffic function.

The applicants and their contractors will work with applicable county ordinances should oversize/overweight load permits be required for the construction of the project. The oversize/overweight permit allows for truck, trailer, and load combinations that exceed the maximum dimensions and weight specified in state law to operate on county roads.

Use of heavy equipment during construction may damage existing road surfaces, and local roadways could experience temporary road and/or lane closures. These closures may occur during construction to ensure safety of the construction crews and the traveling public. Construction activities will be closely coordinated with County, City, and Township staff if any closures are determined necessary. In addition, at crossings, roads or lands may be temporarily closed when stringing electrical conductors between support structures. These closures could range from minutes to hours based on the width of the road and the complexity of the crossing. Once an aerial crossing is completed, the road(s) will be reopened to allow normal traffic flow. Temporary closings are not expected to have significant impacts on transportation because of the generally rural nature of the area and subsequent low traffic levels on most roads.

No changes to existing roads will be required for Big Oaks substation construction. A substation access road will be built within the Big Oaks Substation Siting Area off Sherburne Avenue, which runs along the eastern edge of the siting area. In accordance with applicable county and city ordinances, authorization for driveway or private road access to any parcel or lot from any public roadway will be obtained from the appropriate road authority. No impacts to roads are anticipated during operation; negligible traffic increases would occur for maintenance.

The Minnesota State Transportation Improvement Program[142] and St. Cloud Area Planning Organization Transportation Improvement Program[143] for 2023-2026 were reviewed to assess any planned road projects within the project area. There is one funded roadway project within the proposed route which is planned to extend Beaver Island Trail from the St. Cloud city limits to Stearns County Road 143 just west of Clearwater. Construction is funded for 2023. A portion of Beaver Island Trail will be next to CSAH 75 where the proposed route will cross it. This area of the project consists of stringing a second 345 kV circuit on existing transmission structures, thus these existing structures would already be considered in the planning for this improvement project.

*Railroads*

Traffic backups may occur where railroads intersect near project construction areas, but impacts would be minimal and temporary. Impacts to railroads are not anticipated from construction and operation of the project. The applicants will obtain all necessary railroad crossing permits from SOO, NLR, and BNSF for crossing their rail lines. The applicants will also coordinate with the appropriate railroad personnel during construction to schedule electrical conductor stringing over the rail line for worker and rail line safety.

*Air Safety*

Crop-dusting operations servicing fields crossed by existing transmission lines will have already accommodated the presence of a transmission line. The applicants will mail notice of the application filing to aerial applicators registered with the Minnesota Agricultural Aircraft Association in the project area.

FAA regulation is not expected for the project. The applicants state that detailed transmission line design has not been completed, however, all transmission line structures will be less than 199' tall. Thus, further FAA coordination is not required, and impact to airports are not anticipated.

*Emergency Services*

The applicants will work with the appropriate authorities for emergency services and utility providers to determine where facilities exist and how to best ensure the proper safety precautions are being met. The applicants may meet with residents and utility providers to prevent direct or indirect impacts to their services. Overall, public services and facilities are not anticipated to be impacted by the construction and operation of the project.

**MITIGATION**

*Water and Wastewater*

A well construction permit from MDH will be required if a well is installed for the Big Oaks Substation. A septic system permit is required from the applicable County or the MPCA prior to installation of a septic system. Neither of these activities are expected due to the project, thus no mitigation is proposed.

*Electric and Public Utilities*

Impacts from electrical outages can be minimized by informing customers of the outage well in advance. Additionally, necessary transmission outages must be coordinated through MISO. Outages may or may not be required during construction of the project for all routing options. The applicants will work with

[142] State of Minnesota State Transportation Improvement Program (STIP): 2023-2026. September 30, 2023.

[143] Saint Cloud Area Planning Organization. Transportation Improvement Program: FY 2023-2026. September 8, 2022.

utility providers to determine where facilities exist and how to best ensure the proper safety precautions are being met. The applicants may meet with residents and utility providers to prevent direct or indirect impacts to their services.

Section 5.3.4 of the DRP require the permittee to minimize disruptions to public utilities. The location of underground utilities can be identified using the Gopher State One Call system before and during construction to fully understand existing infrastructure. Underground utility locations will be marked prior to construction. The applicants can coordinate with the applicable utility to develop an approach to reroute or otherwise protect the utility if applicable.

*Pipelines*

If crossing an underground utility is required, the applicants will use BMPs to protect existing infrastructure while using heavy equipment during construction (e.g., construction matting). The applicants will utilize the Gopher State One-Call system to locate and mark all existing underground utilities prior to construction to avoid impacts on pipelines. The applicants can work with applicable pipeline companies by sharing project plans before construction occurs.

*Roads*

To minimize overall impacts, the applicants will limit vehicle traffic to the project right-of-way and existing access points to the extent feasible. After the completion of construction, the applicants will also confirm that township, city, and county roads used for purposes of access during construction are returned to either the condition they were in or better before right-of-way clearing began. The applicants will meet with MnDOT, township road supervisors, city road personnel, and/or county highway departments as necessary to address any issues that arise during construction with roadways, to ensure the roads are adequately restored after construction is complete.

Although there is one funded roadway project within the proposed route that plans to extend Beaver Island Trail, this portion of the project only includes double-circuiting on existing structures, and the Beaver Island Trail construction is planned to be complete in 2023 before this project would begin.

Section 5.3.14 of the DRP requires permittees to inform road authorities of the routes that will be used during construction and acquire necessary permits and approvals for oversize and overweight loads. Permitted fencing and vegetative screening cannot interfere with road maintenance activities, and the least number of access roads shall be constructed.

The following practices can mitigate potential impacts:

- Pilot vehicles can accompany movement of heavy equipment (transformer).
- Deliveries can be timed to avoid traffic congestion and dangerous situations on the roadway.
- Traffic control barriers and warning devices can be used as necessary.
- Temporary guard structures should be used to support the conductor above vehicle traffic when stringing conductors over the roadway (or rail traffic when stringing conductors over a railway).

*Railroads*

Impacts to railroads are not anticipated as a result of construction and operation of the project. The applicants will obtain all necessary railroad crossing permits from SOO, NLR, and BNSF for crossing their rail lines. The applicants will also coordinate with the appropriate railroad personnel during construction

to schedule electrical conductor stringing over the rail line for the safety of construction personnel and rail line operations.

*Air Safety*

Crop-dusting operations servicing fields crossed by existing transmission lines will have already accommodated the presence of a transmission line. The applicants will mail notice of the application filing to aerial applicators registered with the Minnesota Agricultural Aircraft Association in the project area.

No impacts to airports or airstrips, including the Seven Hills Airport, are anticipated as a result of the project. The applicants will coordinate with the FAA and MnDOT to address any project-related concerns for aviation activities as the project progresses, if necessary. Transmission line structures will also be less than 199' tall. No mitigation is proposed.

*Emergency Services*

The applicants will also work with the appropriate authorities (including emergency services) and utility providers to determine where facilities exist and how to best ensure the proper safety precautions are being met. The applicants may meet with residents and utility providers to prevent direct or indirect impacts to their services. Overall, public services and facilities are not anticipated to be impacted by the construction and operation of the project.

## Socioeconomics

**The ROI for socioeconomics is the applicable counties. Economic factors related to construction and operation of the project are anticipated to be short-term and positive, but minimal, for all routing options. Positive impacts may come from increased expenditures at local businesses during construction, the potential for some materials to be purchased locally, and the use of local labor. Because potential impacts are positive, no mitigation is proposed.**

### Population

The project runs along Douglas to Sherburne County, also encompassing Stearns, Todd, and Wright Counties. St. Cloud is the largest city along the project. Socioeconomic factors analyzed include population, income, poverty, and employment. U.S. Census data was obtained from the 2020 census at the community and township level to characterize the area along the proposed route. These datasets were compared to county and state data (Table 16).

The project area is part of Economic Development Regions 4 (Douglas County), 5 (Todd County), and 7W (Sherburne, Stearns, and Wright Counties) as defined by the Department of Employment and Economic Development (DEED).[144] DEED updates regional profiles regularly with Regions 4 and 5 last updated in December 2022 and Region 7W in November 2023. Regions 4 and 5 with Douglas and Todd County included were described as mostly rural, whereas Region 7W with the rest of the project is the fastest growing of the 13 economic development regions in the state, and is now the third largest in total population.[145] Within Region 7W, Stearns County is the highest ranked agriculture county in the state accounting for 20% of the farms. Douglas County was considered micropolitan (a population area with

[144] Department of Employment and Economic Development, Regional Profile of Economic Development Regions 4, 5, and 7W. Retrieved from: https://apps.deed.state.mn.us/assets/lmi/areamap/edr.shtml.

[145] DEED Regional Profile. Economic Development Region 7W: Central, 2023. Retrieved from: https://mn.gov/deed/assets/031124_Region7W_tcm1045-133247.pdf

10,000 to 50,000 residents)[146] whereas Todd County was considered the most rural with slight population gains.[147]

**Table 16: Population and Economic Profile**

| Location | Total Population | Percent Minority Population* | Median Household Income | Percent Low Income |
|---|---|---|---|---|
| Minnesota | 5,706,494 | 22 | $82,338 | 9.6 |
| Douglas County | 39,006 | 5 | $72,472 | 8.5 |
| Todd County | 24,109 | 10 | $63,216 | 12 |
| Sherburne County | 97,183 | 12 | $96,889 | 6.2 |
| Stearns County | 158,292 | 17 | $71,880 | 11.3 |
| Wright County | 141,337 | 10 | $93,602 | 5.1 |

**Minority population was rounded to the nearest percent and includes all persons who do not self-identify as white alone.*
Source: U.S. Census Bureau, 2022 American Community Survey 1-Year Estimates.

### Labor Force

The largest employment industry in the project area is the educational, health and social services industry. The second largest industry in terms of employment is manufacturing with retail trade as the third.

For Region 4 and 7W, increasingly tight labor markets and a growing scarcity of workers is now recognized as one of the region's most significant barriers to future economic growth. Douglas County is the second largest employment center in the region with 10.7% of the jobs. For Region 5, the labor force from 2010 to 2020 shrank by an average 112 workers per year and is projected to keep doing so in the future.

Region 7W saw a rebound in labor force growth in 2022, similar to the state and nation. Sherburne and Wright Counties have significant labor outflows to the Twin Cities metro area and St. Cloud, whereas the Region 7W as a whole has a net outflow of workers, being commuter counties. Stearns County is the largest county and employment center in the region and the seventh largest in the state, accounting for about half the region's jobs with a net import of workers.

Approximately 100 to 150 workers among multiple construction crews will be required for the project regardless of the routing option for 18 to 20 months. This workforce includes vegetation maintenance crews, transmission line and substation construction workers, safety supervisors, environmental support, and other on- and off-site support staff.

### Potential Impacts

The project is not expected to disrupt local communities or businesses. Minimal positive economic impacts include short-term increased expenditures, for example, food and fuel, at local businesses

[146] DEED Regional Profile. Economic Development Region 4, 2022. Retrieved from: https://mn.gov/deed/assets/2022_EDR4_RP_tcm1045-133254.pdf
[147] DEED Regional Profile. Economic Development Region 5, 2022. Retrieved from: https://mn.gov/deed/assets/2022_EDR5_RP_tcm1045-133255.pdf

during construction which would generate local sales tax. The small economic benefit is largely attributed to the earnings and expenditures of the project relative to the regional economy of St. Cloud, the major center of economic activity in the project area.

Long-term societal benefits of the project would include incremental increases in revenues from utility property taxes. Adverse impacts are not anticipated.

#### MITIGATION

Socioeconomic impacts are anticipated to be positive. The applicants could procure labor from local employment resources. Minn. Stat. 216E.03, subd. 10 (c) requires recipients of site permits from the Commission, including the recipient's construction contractors and subcontractors, pay no less than the prevailing wage rate. Construction materials such as fill, gravel, rock, concrete, rebar, fuel, and miscellaneous electrical equipment could be purchased from local vendors where practicable. No additional mitigation is proposed.

## Human Health and Safety

Construction and operation of a high voltage transmission line has the potential to impact human health and safety.

### Electric and Magnetic Fields

**The ROI for EMF is the proposed route width. Impacts to human health from possible exposure to EMFs are not anticipated. The HVTL will be constructed to maintain proper safety clearances. Project infrastructure that emits EMF will not be accessible to the public. EMFs associated with the project are below Commission permit requirements, and state and international guidelines. Potential impacts will be long-term and localized. These unavoidable impacts will be minimal and can be mitigated.**

Electric and magnetic fields (EMFs) are invisible forces resulting from the presence of electricity. They occur naturally and are caused by weather or the geomagnetic field. They are also caused by all electrical devices wherever people use electricity. EMFs are characterized and distinguished by their frequency, that is, the rate at which the field changes direction each second. Electrical lines in the United States have a frequency of 60 cycles per second or 60 hertz, which is extremely low frequency EMF (ELF-EMF).

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

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

Figure 6 visually demonstrates the difference in electric and magnetic fields; Table 17 provides examples of electric and magnetic fields associated with common household items. The World Health Organization explains, "The strongest electric fields that are ordinarily encountered in the environment exist beneath high voltage transmission lines. In contrast, the strongest magnetic fields are normally found very close to motors and other electrical appliances, as well as in specialized equipment such as magnetic resonance scanners used for medical imaging."[148]

**Table 17: Electric and Magnetic Field Strength of Common Household Objects**[149]

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

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

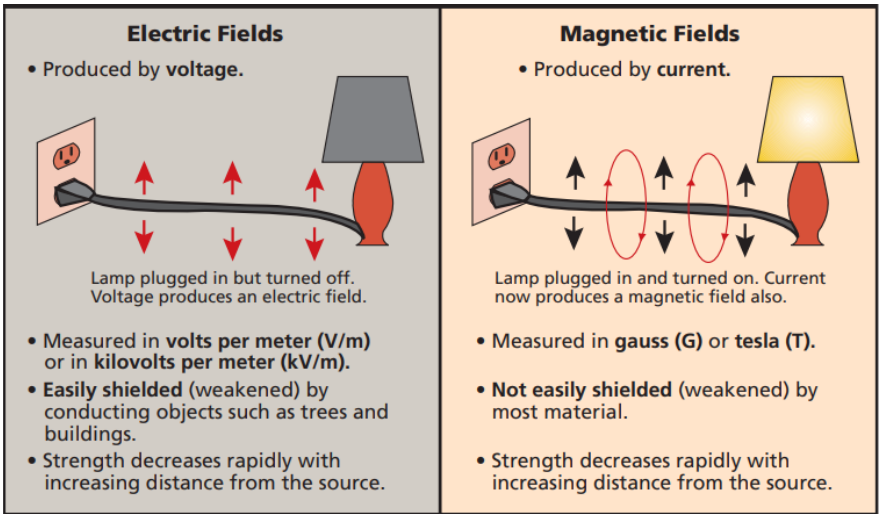


**Figure 6: Electric and Magnetic Field Comparison**

### HEALTH STUDIES

In the late-1970s, epidemiological studies indicated a weak association between childhood leukemia and ELF-EMF levels.[150] The National Institute of Environmental Health Sciences explains, "Epidemiologists observe

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

[149] *Ibid.*

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

and compare groups of people who have had or have not had certain diseases and exposures to see if the risk of disease is different between the exposed and unexposed groups, but does not control the exposure and cannot experimentally control all the factors that might affect the risk of disease."[151]

Ever since, researchers have examined possible links between ELF-EMF exposure and health effects through epidemiological, animal, clinical, and cellular studies. To date, "no mechanism by which ELF-EMFs or radiofrequency radiation could cause cancer has been identified. Unlike high-energy (ionizing) radiation, EMFs in the non-ionizing part of the electromagnetic spectrum cannot damage DNA or cells directly," that is, the ELF-EMF that is emitted from HVTLs does not have the energy to ionize molecules or to heat them.[152] Nevertheless, they are fields of energy and thus have the potential to produce effects.

The National Institute of Environmental Health Sciences concludes, "The few studies that have been conducted on adults show no evidence of a link between EMF exposure and adult cancers, such as leukemia, brain cancer, and breast cancer."[153] The World Health Organization similarly concludes, "Overall there is no evidence that exposure to ELF magnetic fields alone causes tumors. The evidence that ELF magnetic field exposure can enhance tumor development in combination with carcinogens is inadequate."[154]

The Minnesota State Interagency Working Group on EMF Issues, comprised of staff from state agencies, boards, and the Commission, was tasked to study issues related to EMF. The group found that, "A number of scientific panels convened by national and international health agencies and the U.S. Congress have reviewed the research carried out to date. Most concluded that there is insufficient evidence to prove an association between EMF and health effects; however, many of them also concluded that there is insufficient evidence to prove that EMF exposure is safe."[155]

In 2002, the Interagency Working Group published *A White Paper on Electric and Magnetic Field Policy and Mitigation Options*, and concluded the following:

> Some epidemiological results do show a weak but consistent association between childhood leukemia and increasing exposure to EMF… However, epidemiological studies alone are considered insufficient for concluding that a cause and effect relationship exists, and the association must be supported by data from laboratory studies. Existing laboratory studies have not substantiated this relationship… nor have scientists been able to understand the biological mechanism of how EMF could cause adverse effects. In addition, epidemiological studies of various other diseases, in both children and adults, have failed to show any consistent pattern of harm from EMF.

[151] *Ibid.*

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

[153] National Institute of Environmental Health Sciences. *Electric and Magnetic Fields*, (2018). http://www.niehs.nih.gov/health/topics/agents/emf/index.cfm.

[154] World Health Organization. *Extremely Low Frequency Fields*. (2007).

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

The MDH concludes that the current body of evidence is insufficient to establish a cause and effect relationship between EMF and adverse health effects. However, as with many other environmental health issues, the possibility of a health risk cannot be dismissed.[156]

### Regulations and Guidelines

Currently, there are no federal regulations regarding allowable ELF-EMF produced by power lines in the United States; however, state governments have developed state-specific regulations. For example, Florida limits electric fields to 2.0 kV/m and magnetic fields to 150 mG at the edge of the right-of-way for 161 kV transmission lines.[157] International organizations have also adopted standards for exposure to electric and magnetic fields (Table 18).

The Commission limits the maximum electric field under high voltage transmission lines in Minnesota to 8.0 kV/m.[158] It has not adopted a standard for magnetic fields, and the State of Minnesota currently has no regulations pertaining to magnetic field exposure. Florida, Massachusetts, and New York have established standards for magnetic field exposure.[159]

**Table 18: International Electric and Magnetic Field Guidelines**

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

**For persons with cardiac pacemakers or other medical electronic devices*

### Potential Impacts

#### *Electric Fields*

Potential impacts are anticipated to be negligible and are not expected to negatively affect human health. Impacts will be long-term and localized but can be minimized. The primary sources of EMF from the generating facility will include the transmission lines, transformers, and equipment in the Big Oaks Substation.

Electric fields are dependent on the voltage of the HVTL. The estimated maximum electric field strength provided by the applicants for their project's double-circuit 345 kV transmission line is shown in Table 19. The maximum electric field, measured at one meter (3.28 feet) above ground, associated with the

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156 *Ibid*., page 36.

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

158 *E.g.*, Department of Commerce (May 14, 2018) *Potential Human and Environmental Impacts of the Freeborn Wind Transmission Line Project,* retrieved from: https://mn.gov/eera/web/project-file?legacyPath=/opt/documents/34748/1%20Text%20Figures%20Tables.pdf, page 13.

159 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).

project is 4.39 kV/m. The strength of electric fields diminishes rapidly as the distance from the conductor increases.

**Table 19: Calculated Electric Fields**

| Structure Type | Circuits Present | Maximum Voltage | Electric Field (kV/m) Maximum Overall | Distance from Transmission Line (feet) |
|---|---|---|---|---|
| 345 kV/345 kV Double-Circuit Monopole | Alexandria (ALS) – Riverview (RVV); ALS – Big Oaks | 362 kV | 4.1 | 25 |
| 345 kV/345 kV Double-Circuit Monopole | RVV – Quarry (QRY); ALS – Big Oaks | 362 kV | 4.39 | 25 |
| 345 kV/345 kV Double-Circuit Monopole | QRY – Monticello (MNN); ALS – Big Oaks | 362 kV | 3.82 | 25 |
| 345 kV Single-Circuit Monopole | ALS – Big Oaks | 362 kV | 3.61 | 25 |
| 345 kV Single-Circuit H-Frame River Crossing | ALS – Big Oaks | 362 kV | 2.3 | 50 |

Electric field strengths decrease with distance. Maximum conductor voltage was defined by the applicants as the nominal voltage plus five percent. Even at electric field level maximums demonstrated in Table 19, for the project's levels will be consistent with the Commission's limit (less than 8.0 kV/m). Additionally, the nearest resident to any project infrastructure, in this case the existing line to be double-circuited, is about 75 feet. This resident would not be exposed to the maximum electric field associated with the project and would be exposed to electric fields under the Commission's limit. Thus, potential health impacts from these electric field levels are anticipated to be negligible.

*Magnetic Fields*

The intensity of the magnetic field associated with a transmission line is proportional to the amount of current flowing through the line's conductors, and rapidly decreases with the distance from the conductors. The actual magnetic fields when the project is placed in service will vary as the current flow on the line changes throughout the day.

The applicants calculated magnetic fields for two estimated typical system conditions during the project's first year in service (2026) as outlined in the bullets below and demonstrated in Table 20. The magnetic field values for the two scenarios were calculated at a point where the conductor is closest to the ground.

- **1:** System Peak Energy Demand (estimated loading of 580 MVA) represents the current flow on the line during the peak hour of system-wide energy demand.
- **2:** System Average Energy Demand (estimated loading of 185 MVA) represents the current flow on the line during a non-peak time of the year.

**Table 20: Projected Magnetic Fields**

| Structure Type | Circuits Present | System Condition | Current (Amps) | Magnetic Field (mG) Maximum Overall | Distance from Transmission Line (feet) |
|---|---|---|---|---|---|
| | ALS – RVV; | 1 (Peak) | 970 | 109 | 0 |

| | | | | | |
|---|---|---|---|---|---|
| 345 kV/345 kV Double-Circuit Monopole | ALS – Big Oaks | 2 (Average) | 310 | 35 | 0 |
| 345 kV/345 kV Double-Circuit Monopole | RVV – QRY; ALS – Big Oaks | 1 (Peak) | 970 | 119 | 0 |
| | | 2 (Average) | 310 | 38 | 0 |
| 345 kV/345 kV Double-Circuit Monopole | QRY – MNN; ALS – Big Oaks | 1 (Peak) | 970 | 109 | 0 |
| | | 2 (Average) | 310 | 35 | 0 |
| 345 kV Single-Circuit Monopole | ALS – Big Oaks | 1 (Peak) | 970 | 86 | 0 |
| | | 2 (Average) | 310 | 27 | 0 |
| 345 kV Single-Circuit H-Frame River Crossing | ALS – Big Oaks | 1 (Peak) | 970 | 82 | 0 |
| | | 2 (Average) | 310 | 26 | 0 |

*Big Oaks Substation*

According to the National Institute of Environmental Health Sciences:

> In general, the strongest EMF around the outside of a substation comes from the power lines entering and leaving the substation. The strength of the EMF from equipment within the substations, such as transformers, reactors, and capacitor banks, decreases rapidly with increasing distance. Beyond the substation fence or wall, the EMF produced by the substation equipment is typically indistinguishable from background levels.[160]

EMF for the Big Oaks Substation were not calculated; however, potential impacts are not anticipated because power lines entering and leaving substations generally have the strongest EMF. The maximum EMF for the project was discussed above. Values demonstrated for the project are below the standards identified in Table 18: International Electric and Magnetic Field Guidelines.

Based on Table 20 for project EMF, the strongest electric and magnetic fields would be associated with the 345 kV line. The project is below the limit outside the Big Oaks Substation, and the Big Oaks Substation is on a grounded grid. Magnetic fields associated with the project's substations are anticipated to be similar to other existing 345 kV substations in Minnesota.

### MITIGATION

No health impacts from EMF are anticipated; however, the Commission has adopted a prudent avoidance approach regarding high voltage transmission lines. If warranted, the Commission considers, and may require, mitigation strategies to minimize EMF exposure levels. Consistent with this approach, basic mitigation measures are prudent. EMF diminishes with distance from a conductor; therefore, EMF exposure levels can be minimized by routing power lines away from residences and other locations where citizens congregate to the extent practicable.

The HVTL will be constructed to maintain proper safety clearances, etc. The Big Oaks Substation and other project infrastructure will not be accessible to the public; thus, people are not expected to get close enough to experience maximum calculated EMF levels. The nearest resident to the project at 75 feet would not be exposed to the maximum electric field associated with the project and would be exposed to electric fields under the Commission's limit. No additional mitigation is proposed.

[160] National Institute of Environmental Health Sciences (2002), page 37 of pdf.

### Implantable Medical Devices

**The ROI for implantable medical devices is the anticipated route width. Magnetic fields produced by HVTLs are not high enough to interfere with these devices; however, electric fields have a potential to interfere. Electric field strengths associated with the project are below the 5.0 kV/m interaction level for modern, bipolar pacemakers, but might interact with older, unipolar pacemakers. Electric fields are easily shielded. Potential impacts are expected to be minimal across all routing options. Impacts to human health are not anticipated. Potential impacts, if they occur, would be short-term, intermittent, and localized and can be mitigated.**

EMF could interfere with implantable electromechanical medical devices, such as cardiac pacemakers, implantable cardioverter defibrillators, neurostimulators, and insulin pumps. Most research on electromagnetic interference and medical devices relates to pacemakers. Manufacturers' recommended threshold for magnetic fields is 1,000 mG.[161] Laboratory tests indicate that interference from magnetic fields in pacemakers is not observed until 2,000 mG – a field strength much greater than that associated with transmission lines.[162] As a result, research has since focused on electric field impacts to medical devices rather than magnetic fields.

Electric fields can interfere with a pacemaker's ability to sense normal electrical activity in the heart. In the unlikely event a pacemaker is impacted, the effect is typically a temporary asynchronous pacing (commonly referred to as reversion mode or fixed rate pacing). The pacemaker returns to its normal operation when the person moves away from the source of the interference.

Modern pacemaker technology has greatly reduced the EMF interference potential; however, as explained by the Electric Power Research Institute, the risk is not completely eliminated: "While the present-day units are better shielded against electromagnetic interference than their earlier counterparts, sensitivity to electric field exposure is inevitable."[163] Interference in unipolar pacemakers that results in asynchronous pacing may occur with electric fields ranging from 1.2 to 1.7 kV/m; however, other units are unaffected at 8.0 kV/m.[164] In general, electric interference must be at levels above 5.0 kV/m to interfere with modern, bipolar pacemaker behavior.[165] Some models appear unaffected at 20 kV/m.[166]

There are no schools, nursing or boarding homes, or churches within the local vicinity of any route segment. One hospital, CentraCare Health, is within the local vicinity but outside the route width in the City of Melrose. There are also four childcare centers in the local vicinity. The nearest sensitive receptor to the project transmission lines is a childcare center in Monticello which is about 1,200 feet away. As shown in Table 19, the strongest calculated electric fields are 50 feet away from the center of the transmission line at the farthest. The strongest calculated electric fields for the project are still under the

[161] Public Service Commission of Wisconsin (July 2013) *Environmental Impacts of Transmission Lines*, retrieved from: https://psc.wi.gov/Documents/Brochures/Enviromental%20Impacts%20TL.pdf.

[162] Electric Power Research Institute (1997) *Susceptibility of Implanted Pacemakers and Defibrillators to Interference by Power-Frequency Electric and Magnetic Fields*, retrieved from: https://www.epri.com/research/products/TR-108893, page 8-1.

[163] Ibid.

[164] Ibid., page 7-9.

[165] Pinski, Sergio L. and Trohman, Richard G. (2002) Interference in Implanted Cardiac Devices, Part 1, Journal of Pacing and Clinical Electrophysiology (25) 9:1,367-1,381, retrieved from: http://www.sarasota anesthesia.com/reading/literature/Interference%20AICD%20Review%20Part%201.pdf.

[166] Electric Power Research Institute (1997), page 8-2.

5.0 kV/m value that could cause interference. Electric field strengths decrease with distance. The route permit application demonstrated that the maximum levels would dissipate to 0.05 kV/m about 300 feet away. Thus, the childcare center 1,200 feet away is not expected to experience impacts to implantable medical devices.

#### POTENTIAL IMPACTS

Negligible impacts would occur during construction. Construction equipment typically generates low levels of EMF, usually by the occasional use of electric devices. Potential electromagnetic interference to workers with implantable devices is expected to be known by the individual using the device because the public is not allowed in the work area. Any effects from electric devices during construction would be infrequent and are expected to be within same range of typical EMF levels described in Table 20.

For the project's 345 kV transmission lines, maximum electric field levels were calculated as 4.39 kV/m. The route permit application demonstrated in the same calculations that the maximum levels would dissipate to 0.05 kV/m about 300 feet away. Maximum levels would dissipate to 0.46 kV/m at the edge of the ROW, or 75 feet away. Even at EMF level maximums, these electric field levels are consistent with the Commission's electric field limit (less than 8.0 kV/m). Field strengths associated with the project are also below the 5.0 kV/m interaction level at the edge of the right-of-way for modern, bipolar pacemakers, but might interact with older, unipolar pacemakers. Impacts to unipolar pacemakers could occur directly underneath the HVTL; these impacts are anticipated to be minimal.

#### MITIGATION

Impacts to implantable medical devices and persons using these devices might occur, but it is not expected. Patients are informed of potential problems associated with electromagnetic interference and their device. The device changes their behavior considerably. Transmission lines and substations are only one of many sources of electromagnetic interference. Affirmative and proven mitigation is established by simply moving away, as the Public Service Commission of Wisconsin explains, "Moving away from a source is a standard response to the effects of exposure…. Patients can shield themselves from [electromagnetic interference] with a car, a building, or the enclosed cab of a truck."[167] Additional mitigation is not proposed.

### Public Health and Safety

**The ROI for public health and safety is the route width. Like any construction project, there are risks that include potential injury from falls, equipment and vehicle use, electrical accidents, and the like. Public risks involve electrocution. This risk is lower for high voltage lines because the conductor is higher from the ground. Electrocution risks could also result from unauthorized entry into the project area. Potential impacts are anticipated to be minimal. Impacts would be short- and long-term and can be minimized.**

During operation there are occupational risks similar to those associated with construction. Construction crews must comply with local, state, and federal regulations when installing the project. This includes standard construction-related health and safety practices such as safety orientation and training as well as routine safety meetings.

[167] Public Service Commission of Wisconsin (July 2013) *Environmental Impacts of Transmission Lines*, retrieved from: https://efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=936061727.

The most recent injuries and fatalities data available is from the North American Industry Classification System Code No. 237130 *Power and Communication Line and Related Structures Construction,* which shows that in 2019 there were 2,250 reported nonfatal occupational injuries and illnesses involving days away from work.[168] Of these, about four percent were considered traumatic. In 2019, 26 fatal injuries occurred to workers in this industry, most associated with transportation (roadway accident or being struck by a vehicle).[169] In all industries, 166 fatal injuries occurred from either direct or indirect electrocution – the data did not specify whether these fatalities were a result from an overhead power line.[170]

Emergency services in the project area are available such as local law enforcement, the fire department, and first responders. These services are generally within ten miles of the project area.

### Potential Impacts

The presence of workers will depend on the anticipated schedule for construction and future operation, maintenance, and repair of the project. Worker safety issues are primarily associated with construction, and like any construction project, there are risks. The inflow of temporary construction personnel could increase demand for emergency and public health services. On the job injuries of construction workers requiring assistance due to slips, trips or falls, equipment use, or electrocution can create a demand for emergency, public health, or safety services that would not exist if the project were not built. During operation and maintenance occupational risks like those associated with construction exist, but to a lesser degree. Potential impacts to emergency services are anticipated to be negligible during construction, as described in the Transportation and Public Services section of this EA.

Construction might disturb existing environmental hazards on-site, for example, contaminated soils. A review of *What's in My Neighborhood*[171], maintained by MPCA, indicates that there are many environmental sites tagged by the database in the project area. Environmental sites in the database cover a wide variety of activities such as state permitting, emergency management, pollution prevention projects, and more. The majority of environmental sites in the project area are simply business that have permits with the state such as hazardous waste generators, feedlots, or stormwater permittees. Staff reviewed each of these sites in the project area and flagged concern entities that could be near construction areas. No underground tanks or active remediation or leak sites that could be affected by construction were found. Other sites are not expected to interact with project construction.

Public risks with the project involve electrocution. Electrocution risks could result from unauthorized entry into the project area or infrastructure such as the Big Oaks Substation. However, as detailed by the Public Service Commission of Wisconsin, "The most significant risk of injury from any power line is the danger of electrical contact between an object on the ground and an energized conductor."[172] When working near power lines and using heavy equipment, for example, an electrical contact can occur,

[168] U.S. Bureau of Labor Statistics (2019) TABLE R1. Number of nonfatal occupational injuries and illnesses involving days away from work by industry and selected natures of injury or illness, private industry, retrieved from https://www.bls.gov/iif/oshwc/osh/case/cd_r1_2019.htm#iif_cd_r1p.f.2.

[169] U.S. Bureau of Labor Statistics (2019) *TABLE A-1. Fatal occupational injuries by industry and event or exposure, all United States, 2019*, retrieved from: https://www.bls.gov/iif/oshwc/cfoi/cftb0331.htm#cfoi_at_a1.f.4.

[170] U.S. Bureau of Labor Statistics (2019) *Graphics for Economic News Release: Fatal occupational injuries by event*, retrieved from: https://www.bls.gov/charts/census-of-fatal-occupational-injuries/fatal-occupational-injuries-by-event-drilldown.htm.

[171] Minnesota Pollution Control Agency, What's in My Neighborhood Databased. Retrieved from: https://www.pca.state.mn.us/about-mpca/whats-in-my-neighborhood.

[172] Public Service Commission of Wisconsin (July 2013) *Environmental Impacts of Transmission Lines*, retrieved from: https://psc.wi.gov/Documents/Brochures/Enviromental%20Impacts%20TL.pdf, page 20.

"even if direct physical contact is not made, because electricity can arc across an air gap."[173] This risk is higher in low-voltage lines, such as distribution lines, because the conductor is lower to the ground. This risk is lower for high voltage lines because the conductor is higher from the ground.

#### MITIGATION

The project will be designed and constructed in compliance with applicable electric codes. Electrical inspections will ensure proper installation of all components, and the project will undergo routine inspection. Electrical work will be completed by trained technicians. Fencing around substations will deter public access, and signage will provide appropriate public warnings. The project will also be designed in compliance with local, state, and NESC requirements regarding clearance to ground, crossing utilities, and buildings as well as strength of materials and right-of-way widths.[174] Safeguards will be implemented for construction and operation of the project transmission lines, Big Oaks Substation, and other project infrastructure. Construction and/or contract crews will comply with local, state, and NESC standards regarding installation of facilities and standard construction practices.

Construction and operation will follow the applicants' established safety procedures and industry safety procedures including clear signage during construction activities. The proposed transmission line will be equipped with protective devices (circuit breakers and relays in substations where transmission lines terminate) to safeguard the public in the event of an accident, or if the structure or conductor falls to the ground. The protective equipment will de-energize the transmission line if such an event occurs. The HVTL will also be constructed with one or two grounded shield wires placed along the top of the structures, above the conductors. This protects the transmission line from a lightning strike. As described by the Public Service Commission of Wisconsin, "As a general precaution, no one should be on an object or in contact with an object that is taller than 15 to 17 feet while under a high-voltage electric line."[175]

In addition, the substation facilities will be properly fenced and accessible only by authorized personnel. Circuit breakers and relays at substations 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 as well as protect other equipment and the extended power system from damaging currents and more extensive outages. Any electrical facility that 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.

The project would be required to comply with the Occupational Safety and Health Administration standards, which (1) provide regulations for safety in the workplace, (2) regulate construction safety, and (3) require a Hazard Communication Plan to identify and inventory all hazardous materials for which material safety data sheets would be maintained.

### Stray Voltage

**The ROI for stray voltage is the route width. Potential impacts to residences or farming operations from neutral-to-earth stray voltage are not anticipated. HVTLs do not produce this type of stray voltage because HVTLs do not directly connect to businesses, residences, or farms. Neutral-to-earth**

[173] *Ibid.*

[174] Draft Route Permit, Section 5.5.1.

[175] Public Service Commission of Wisconsin (July 2013) Environmental Impacts of Transmission Lines, retrieved from: https://psc.wi.gov/Documents/Brochures/Enviromental%20Impacts%20TL.pdf, page 20.

**stray voltage is most associated with local distribution lines and electrical wiring within the affected building. Induced voltage is the result of an electric field from the HVTL extending to nearby conductive objects. Constructing the project to NESC standards and Commission route permit requirements mitigate this concern. Therefore, potential impacts from stray voltage are anticipated to be minimal for all routing options. Potential impacts can be mitigated.**

In general terms, stray voltage is defined as "voltage caused by an electric current in the earth, or in groundwater, resulting from the grounding of electrical equipment or an electrical distribution system."[176] Stray voltage encompasses two phenomena: neutral-to-earth voltage (NEV) and induced voltage.

*Neutral-to-Earth Voltage*

Neutral-to-earth voltage is a type of stray voltage that can occur where distribution lines enter structures. As detailed by the Wisconsin Public Service Corporation, "Electrical systems—farm systems and utility distribution systems—are grounded to the earth to ensure safety and reliability…. Inevitably, some current flows through the earth at each point where the electrical system is grounded and a small voltage develops."[177] This extraneous voltage appears on metal surfaces in buildings, barns, and other structures.

NEV is typically experienced by livestock that contact one or more metal objects on a farm, for example, feeders, waterers, or stalls. Metal objects on a farm are grounded to earth through electrical connections. Livestock, by virtue of standing on the ground, are also grounded to earth. If an animal touches two points at different voltages (one at neutral voltage and the other near true ground),[178] a small current will flow through the livestock to the ground because the animal completes the electrical circuit.[179]

Despite metal objects and livestock both being grounded to the earth, many factors affect the effectiveness of their respective ground, that is, a good or poor ground. In metal objects these include wire size and length, quality of connections, number and resistance of ground rods, and electrical current being grounded.[180] Likewise, numerous factors also determine the extent to which livestock are grounded, for example, if the animal is standing on wet or dry ground.[181] Stray voltage results from this difference in the effectiveness of grounding and on the resulting electrical currents. It can exist at any farm, house, or business that uses electricity, independent of a nearby transmission line.

If NEV is prevalent in an agricultural operation as it can affect livestock health. This concern has primarily been raised on dairy farms because of its potential to affect milk production and quality. NEV is by and large an issue associated with distribution lines and electrical service at a residence or on a farm. Transmission lines do not create NEV stray voltage as they do not directly connect to businesses, residences, or farms.

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[176] Edison Electric Institute (April 2005) *Glossary of Electric Industry Terms*, Washington, DC: Edison Electric Institute (2005).

[177] Wisconsin Public Service Corporation (2011) *Answers to Your Stray Voltage Questions: Backed by Research*, retrieved from: http://www.wisconsinpublicservice.com/business/pdf/farm_voltage.pdf, page 1.

[178] North Dakota State University Agricultural Engineering Department (1986) *Extension Publication #108: Stray Voltage*.

[179] Michigan Agricultural Electric Council (October 2008) *Stray Voltage: Questions and Answers*, retrieved from: http://maec.msu.edu/Stray%20Voltage%20Brochure%202008.pdf.

[180] North Dakota State University Agricultural Engineering Department (1986).

[181] *Ibid.*

*Induced Voltage*

The electric field from a transmission line can extend to nearby conductive objects, for example, farm equipment, and induce a voltage upon them. This phenomenon is dependent on many factors, including the shape, size, orientation, capacitance, and location of the object. If these conductive objects are insulated or semi-insulated from the ground and a person touches them, a small current will pass through the person's body to the ground. This may be accompanied by a spark discharge and mild shock like what can occur when an individual walks across a carpet and touches a grounded object or another person.

The primary concern with induced voltage is not the voltage, but rather the current that flows through a person to the ground when touching the object. To ensure safety in the proximity of transmission lines, the NESC requires that any discharge be less than five milliamperes. In addition, the Commission's electric field limit of 8 kV/m is designed to prevent serious shock hazards due to induced voltage.[182] Proper grounding of metal objects under and adjacent to HVTLs is the best method of avoiding these shocks.

Transmission lines may cause additional current to flow on distribution lines where these lines parallel. When distribution lines are properly wired and grounded, these additional currents are not significant. However, if distribution lines are not properly wired and grounded, these additional currents could create induced voltage impacts.

#### POTENTIAL IMPACTS

The proposed HVTL does not interconnect to businesses or residences within any routing option and does not change local electrical service. As a result, impacts to residences or farming operations from NEV are not anticipated. The project might induce a voltage on insulated metal objects within the final right-of-way; however, the Commission requires that transmission lines be constructed and operated to meet NESC standards as well as the Commission's own electric field limit of 8 kV/m reducing these impacts.[183] As a result, impacts due to induced voltage are not anticipated to occur.

#### MITIGATION

The DRP requires the project meet electrical performance standards. Any person with questions about a new or existing metal structures can contact the applicant for further information about proper grounding requirements.[184] Thus, no additional mitigation is proposed.

## Land-based Economies

Transmission lines can impact land-based economies by precluding or limiting land use for other purposes.

### Agriculture

**The ROI for agriculture is the route width. Potential impacts to agricultural producers are anticipated to be minimal across all routing options. HVTLs generally do not interfere with future farming or grazing operations. Potential on-the-ground impacts from placement of structures in fields or substation expansions can be mitigated. Short- and long-term financial impacts, such as crop losses, can be mitigated through easement agreements.**

[182] Draft Route Permit, Section 5.4.2.
[183] Draft Route Permit, Section 5.4.2.
[184] Route Permit Application, 6.3.2.6, page 70.

**All routing options will convert a minimal amount of prime farmland and agricultural land to an industrial use, however, DNR Alternative 2 would have the least impacts and DNR Alternative 3 would have the most. Removal of agricultural land is not expected to negatively affect the general farm community within the route width. Once construction is complete, agricultural production within the right-of-way will resume. These localized impacts will be of a small size and affect prime farmland—a unique resource that is common in the project area. Impacts can be mitigated. Conversion of agricultural land from expanding the substations can be mitigated by purchase or easement agreements.**

The predominant land cover type in the proposed route is cultivated cropland, and 25 percent of the soils are defined as prime farmland. The most recent data from U.S. Department of Agriculture (USDA) indicates that the average farm size in the counties crossed by the project is 217.6 acres, smaller than the 371 acre average for all of Minnesota farms (Table 21).[185] Crop sales account for a larger percentage of total market value of agricultural products compared to livestock sales in Douglas, Sherburne, and Wright Counties. In Todd and Stearns Counties, livestock sales account for the majority of total market value of agricultural products compared to crop sales.

**Table 21: Agricultural Statistics of Project Counties[186]**

| Location | Number of Farms | Average Farm Size (acres) | Land in Farms (acres) | Crop Sales | Livestock Sales |
|---|---|---|---|---|---|
| Minnesota | 68,822 | 371 | 25.5 million acres (45.8% of state) | $10 billion (55.4%) | $8 billion (44.6%) |
| Douglas | 960 | 274 | 263,265 (65% of county) | $74 Million (73.9%) | $26 million (26.1%) |
| Todd | 1,604 | 208 | 333,408 (55% of county) | $56 million (31.6%) | $122 million (68.4%) |
| Stearns | 2,951 | 221 | 650,821 (73% of county) | $179 million (23.9%) | $568 million (76.1%) |
| Sherburne | 501 | 205 | 102,544 (37% of county) | $75 million (83.9%) | $14 million (16.1%) |
| Wright | 1,338 | 180 | 240,651 (57% of county) | $112 million (57.5%) | $83 million (42.5%) |

The USDA Natural Resources Conservation Service (NRCS) identifies farmland soils based on three categories, which are subject to protection under the Farmland Protection Policy Act. These categories include prime farmland, prime farmland when drained, and farmland of statewide importance.

[185] U.S. Department of Agriculture. *Chapter 2, Table 1 - County Summary Highlights, 2017 Census of Agriculture*. Retrieved from: https://www.nass.usda.gov/Quick_Stats/CDQT/chapter/2/table/1/state/MN/county/041/year/2017.

[186] *Ibid.*

- **Prime farmland** is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses.
- **Prime farmland when drained** includes soils that have the potential to be prime farmland but require drainage or hydrologic alteration to achieve high productivity.
- **Farmland of statewide importance** are lands other than prime farmland that are used for production of specific high-value food and fiber crops. Farmland of statewide importance is similar to prime farmland but with minor shortcomings such as greater slopes or less ability to store soil moisture.

Approximately 25 percent (939 acres) of the proposed route is mapped as prime farmland, 10 percent (366 acres) as prime farmland if drained, and 12 percent (476 acres) as farmland of statewide importance. At the River Crossings, the Western Option includes approximately 0.4 acres of prime farmland, whereas the Eastern Option includes 3.8 acres of prime farmland. DNR Alternative 1 includes approximately 2.1 acres of prime farmland, and DNR Alternative 3 includes approximately 20.4 acres of prime farmland and 14.5 acres of farmland of statewide importance. DNR Alternative 2 has none.

Based on the MDA's *DriftWatch* map, there are no certified organic producers or beehives within the route width of the project.[187] *DriftWatch* is a voluntary communication tool that enables crop producers, beekeepers, and pesticide applicators to work together to protect specialty crops and apiaries through mapping. One beehive is within the route width of DNR Alternative 3 between Clementa Avenue NW and Barton Avenue NW. The DNR's route width is 1,500 feet and thus the alignment and associated 150 foot ROW can be situated a suitable distance away from this property.

#### POTENTIAL IMPACTS

Temporary construction impacts on agricultural land are consistent across project components and could include soil compaction and rutting, accelerated soil erosion, crop disturbance, disruption to normal farming activities, and introduction of noxious weeds to soil surface. Construction would occur throughout the year, with an effort made to schedule construction during frozen ground conditions. During the winter, impacts are not anticipated to affect agricultural activities as crop fields are unplanted and the ground is frozen.

Both crop and livestock activities would be able to continue around project facilities after construction. The applicants state that alignments were developed to minimize farmland impacts, however, permanent impacts to farmland would occur where structures are placed in cultivated fields. It should be noted that a majority of the structures for the project are already in place and the stringing of the second line will not have additional impacts on agriculture.

As shown in bold in Table 22, the number of acres of farmland potentially impacted by the project would be minimal for all routing options, but DNR Alternative 2 would have the least impacts to prime farmland and DNR Alternative 3 would have the most. Impacts to prime farmland to accommodate expansion of the Alexandria and Riverview Substations are estimated at 115 and 575 square feet, respectively. Removal of the small amount of prime farmland, prime farmland if drained, and farmland of statewide importance is not expected to negatively affect the general farm community within the route width and would result in an overall negligible loss. Once construction is complete, agricultural

[187] Minnesota Department of Agriculture (n.d.), *Welcome to DriftWatch*. Retrieved from: https://mn.driftwatch.org/.

production within the right-of-way will resume. Lost farming revenues can be offset by easement agreements.

**Table 22: Prime Farmland Designations**

| Project Feature | Prime Farmland (acres) | Prime Farmland if Drained (acres) | Farmland of Statewide Importance (acres) |
|---|---|---|---|
| Existing Transmission Line Second Circuit | 496.1 | 281.6 | 390.8 |
| Alexandria Substation Tap | 2.2 | 0.7 | 1.0 |
| Riverview Substation Bypass | 7.0 | 1.0 | 0.1 |
| Quarry Substation Bypass | 0 | 1.5 | 1.3 |
| Big Oaks Substation | 0 | 0 | 2.1 |
| **Western Option** | **0.4** | **0** | **0** |
| **Eastern Option** | **3.8** | **0** | **0** |
| **DNR Alternative 1** | **2.1** | **0** | **0** |
| **DNR Alternative 2** | **0** | **0** | **0** |
| **DNR Alternative 3** | **17.9** | **2.5** | **14.5** |

Structures in fields act as barriers and can hinder efficient operation of large machinery. Both crop and livestock activities would be able to continue around project facilities after construction, but at an increased difficulty to the farmer. Structure configuration can influence the degree of permanent impacts. Where a transmission line follows a road, structures are placed approximately 10 feet into the field from the road right-of-way and are therefore counted as impacting farmland. Where routes follow property lines, a monopole would be constructed on the property line and therefore is not counted as an impact.

Table 23 summarizes the amount of cropland that could be impacted within the right-of-way by the construction and operation of new structures. The number of new structures that would be placed in fields varies depending on substation locations. Permanent impacts include the areas that will be taken out of production at the structure locations or the footprint of the Big Oaks Substation. These project components will contribute to a marginal increase in impervious surface area and a subsequent loss of rainwater infiltration relative to their locations. Temporary impacts from clearing and grading within the right-of-way or Big Oaks Substation Siting Area, such as crop damages and soil compaction, may occur during construction activities.

**Table 23: Impacts on Cropland in ROW**

| Resource | Alexandria Tap | Existing Transmission Line Second Circuit | Riverview Bypass | Quarry Substation Bypass | Mississippi River Western Option | Mississippi River Eastern Option | Big Oaks Substation | Route Width |
|---|---|---|---|---|---|---|---|---|
| Route Length (miles) | 0.21 | 103.82 | 0.45 | 0.16 | 0.70 | 3.43 | N/A | N/A |
| Right-of-way (acres) | 3.96 | 1887.72 | 5.88 | 2.88 | 12.70 | 62.30 | 249.81 | 3824.71 |
| Cropland in right-of-way (acres) | 4.31 | 915.93 | 4.42 | 0.35 | 0 | 0.52 | 176.85 | 1348.94 |
| New Structures in Fields | 1 | 33 | 2 | 0 | 0 | 1 | N/A | N/A |

Potential impacts to organic farm operations exist from construction and ongoing maintenance of a transmission line. These impacts are primarily associated with vegetation clearing and revegetation practices. The organic crop production standards require that no prohibited substance be applied to organic farmland for at least three years before the harvest of an organic crop.[188] Issues such as herbicide or pesticide drift from maintaining rights-of-way are not expected to interfere as the application is limited in extent and no certified organic farms are within the route width. Due to the large route width of DNR Alternative 3, impacts to the one beekeeper within should be easily avoided.

DNR Alternative 1 approaches the University of Minnesota's Sand Plain Research Farm (SPRF) just south of 157th Street Southeast. The SPRF is a primary site for agricultural research in areas such as irrigation and nutrient management used by students for experiential learning to obtain their graduate degrees. During the scoping comment period, the University of Minnesota commented that DNR Alternative 1 would severely impact SPRF research operations by cutting through the main building that is currently under construction. A supporting irrigation well and sanitary drain fields under construction are just outside of the existing transmission line setbacks. The University of Minnesota commented that adding DNR Alternative 1 would encroach within this well's setback limits, and the right-of-way may interfere with the drain fields' operations.

### MITIGATION

The applicants would implement measures to reduce compaction, soil erosion, and sedimentation and would compensate producers for crops damaged during construction and future year crop loss due to soil compaction. Areas damaged during construction will be restored and put back into production after completion of construction activities. Construction, restoration, and maintenance activities would follow an approved AIMP. A draft AIMP and a draft VMP were submitted in the route permit application and will continue to be reviewed by relevant state agencies.

[188] USDA Agricultural Marketing Service (n.d.) *Organic.* Retrieved from: https://www.ams.usda.gov/grades-standards/organic-standards.

Impacts to agricultural lands and operations can be avoided or minimized by prudent routing and placement of structures within the selected route. This includes selecting routes and structure placements that avoid agricultural fields; follow existing infrastructure or property lines; or parallel field lines. Underbuilding or paralleling immediately adjacent to existing ROWs mitigates impacts more so than following at a distance. The applicants state that structures would be placed approximately 1,000 feet apart in agricultural fields to minimize the number of structures on farmland. If chosen, DNR Alternative 1 should be routed to avoid the impacts to the University of Minnesota's SPRF as much as possible.

Impacts can also be minimized through appropriate construction and remediation practices. Developing specific construction, restoration, and operation plans with the nearby beekeeper as applicable could reduce potential for inadvertent bee mortality from accidental chemical drift due to ROW maintenance.

In addition, the following measures can mitigate impacts to agricultural soils and production:

- Limiting movement of crews and equipment to the ROW to the greatest extent possible.
- Identify agricultural drain tile in consultation with landowners prior to earth disturbing activities.
- Scheduling construction during periods when agricultural activities will be minimally affected.
- Repairing ruts that are hazardous to agricultural operations.
- Alleviating soil compaction.
- Promptly repairing or replacing fences, gates, and similar improvements that are removed or damaged.
- Constructing the project during winter months can reduce potential for soil rutting and compaction, crop losses, and spread of invasive species.

### Mining

**The ROI for mining is the route width. There are no existing mines in the route width of any routing option, and one sand and gravel supplier within DNR Alternative 3's route width. Impacts to underground mineral resources near the route width are expected to be minimal for all routing options. The construction of electrical utility facilities would likely interfere with any future geophysical surveys because the surveying technology cannot accurately assess what is underground when HVTLs are above the survey location. Project infrastructure will not be cited above aggregate or mining sources.**

Mineral resources are resources that have a concentration or occurrence of natural, solid, inorganic, or fossilized organic material in such form, quantity, grade, and quality that it has reasonable prospects for commercial extraction. Minerals of economic significance that are mined or found in Minnesota can be divided into two broad classes: metallic minerals, and industrial minerals. Metallic minerals are further divided into ferrous minerals, which contain mainly iron, and nonferrous minerals, which do not contain iron but have other metals such as copper. Aggregate sources in Minnesota also include sand and gravel pits, crushed stone, and rock quarries. Aggregate resources are essential to Minnesota's infrastructure and economy construction aggregate materials are relied on as the key ingredients in our roads, bridges, buildings, and more.

The *Aggregate Source Information System*[189] maintained by MnDOT as well as the DNR's aggregate mapping geospatial data[190] revealed no existing mining operations or aggregate resources within the route width of the proposed project or DNR Alternatives 1-3. A desktop aerial review completed by staff near the River Crossing revealed one active gravel pit directly west of the Mississippi River on Appleton Avenue: Martin Mariella Monticello Gravel Pit. This company is a sand and gravel supplier and its parcel appears to be slightly within the east side DNR Alternative 3's route width before crossing the river (Appendix B, Map 2A). It is unclear if this supplier is actively mining in this location.

#### POTENTIAL IMPACTS

Existing mines could be negatively impacted by high voltage transmission lines if sited on or routed through land used for mineral production/extraction by interfering with access to minerals or the ability to remove them. Mining does not comprise a major industry in the project area. Only Stearns County is mapped by the DNR having crushed stone and granite mines.[191]

Impacts to lands with metallic mineral potential in the project area are anticipated to be minimal. There are no active mines in the route width along the project for any routing option, and one sand and gravel supplier within DNR Alternative 3's route width. If DNR Alternative 3 is chosen, it is expected this alignment and ROW could easily be sited outside of this sand and gravel pit's parcel, thus eliminating impacts even if the supplier is actively mining in this location.

The construction of electrical utility facilities would likely interfere with any future geophysical surveys because the surveying technology cannot accurately assess what is underground when HVTLs are above the survey location. Project infrastructure will not be cited above aggregate or mining sources.

#### MITIGATION

Impacts to mining resources will be avoided if the project is constructed within the route width of the proposed project or DNR Alternative 1 or 2. Within the flexible route width of DNR Alternative 3, impacts to mining resources will be avoided if the alignment and associated ROW is constructed outside of the sand and gravel pit's parcel. This prudent routing and placement of structures do not necessitate mitigation, such as through structure design that allows for extraction while maintaining safe operation of the line.

## Archeological and Historic Resources

**The ROI for archaeological and historic resources is the project area. 79 previously inventoried historic/architectural properties may be within a half mile of the proposed alignment, one within the proposed route, three in the Big Oaks Substation Siting Area, and none within the route widths of DNR Alternatives 1-3. SHPO determined that an archaeological survey of areas of new ground disturbance is appropriate for this project due to the presence of unevaluated sites and concurred that areas where the ground surface will not be disturbed do not need to be surveyed. The applicants will complete investigation and evaluation of these sites during a field survey in the summer of 2024 before construction. Thus, further coordination with SHPO will occur and the**

[189] Department of Transportation, Aggregate Source Information System Map, updated January 4, 2023. *Aggregate Sources: Viewing with Google Earth™*, retrieved from: https://www.dot.state.mn.us/materials/asis_GE.html.

[190] DNR Aggregate Resource Mapping Program, updated February 3, 2023. Minnesota Geospatial Commons, retrieved from: https://gisdata.mn.gov/dataset/geos-aggregate-mapping.

[191] Minnesota Department of Natural Resources. Mineral Industries of Minnesota: including regions of known but undeveloped resources. 2016. Retrieved from: https://www.dnr.state.mn.us/lands_minerals/mining.html.

**project is expected to be able to be designed to avoid any historic or architectural properties. Since impacts to archeological and historic resources are not anticipated, mitigation is not proposed.**

Archeological resources are locations where objects or other evidence of archaeological interest exist, and can include aboriginal mounds and earthworks, ancient burial grounds, prehistoric ruins, or historical remains.[192] Sites not included in state agency datasets may include locations known to Minnesota Indian Tribes to have cultural importance. Coordination with THPOs prevents impacts from the project to known traditional cultural properties. Historic resources are sites, buildings, structures, or other antiquities of state or national significance.[193]

### Potential Impacts

Transmission lines and substations can potentially impact archeological and historic resources. Project construction can disrupt, remove, or damage archeological resources. The long-term presence of a transmission line or substation near historic resources has the potential to impair or decrease their value.

Impacts to cultural resources have the potential to occur in areas where new construction is proposed, which have been identified as the 67 to 78 locations where new structures will be built for the project, including the Alexandria Substation tap and expansion, the Riverview Substation bypass and expansion, the Quarry Substation bypass, the Mississippi River crossing alignment, and the new Big Oaks Substation footprint.

The applicant gathered information on known archaeological and historic resources in October and November 2023 from SHPO and the Minnesota Office of the State Archaeologist (OSA). Responses received from agencies on their review of the project are discussed below and included as Appendix E. The applicants hired a third-party to conduct a *Phase Ia Literature Review Report* for the project in August of 2023. This review covers the parcels within a half mile of the proposed alignment, which includes all routing alternatives. SHPO responded to the report on December 8, 2023, having reviewed the information as technical assistance only, not pursuant to the responsibilities under the Minnesota Historic Sites Act (Minn. Stat. 138.665-666) and the Minnesota Field Archaeology Act (Minn. Stat. 138.40).

The applicants stated that SHPO regulations will be addressed by completing a Phase I archaeological reconnaissance for the portions of the project where new ground disturbance will occur during the summer of 2024. This field work will also include documentation of the three listed/eligible historic architectural resources specifically mentioned in SHPO's letter. The additional documentation requested by SHPO has not been acquired or submitted yet because it depends on the results of the field surveys to be completed during the summer of 2024. The applicants committed to submitting this documentation to SHPO before the end of the fall of 2024.

SHPO confirmed the applicants' assertion that one historic property currently listed in the National Register of Historic Places (NRHP) is within the project area. This property is the Saint Mary Help of Christians Church and Rectory [SN-SAT-00001 and SN-SAT-00002] in Saint Augusta, Stearns County.

[192] *See* Minn. Stat. 138.31, subd. 14.
[193] *See* Minn. Stat. 138.51.

Although the designated historic property is not within the proposed route, SHPO stated that it will be important to clarify and assess the nature of potential effects from the project within a reasonable viewshed or setting of this historic property.

SHPO also noted two historic/architectural properties previously determined eligible for listing in the NRHP: Burgen Lake Rest Area [DL-HUD-00010]; and St. Cloud, Mankato & Austin Railroad [SN-SJT-00003]. SHPO stated that supporting documentation for SHPO review and comment would be required to confirm that the project will not result in any anticipated effects to these NRHP eligible properties.

The Phase Ia report indicated the presence of 79 previously inventoried historic/architectural properties that may be within a half mile of the proposed alignment because they have not been subject to intensive level survey and evaluation. SHPO stated that depending on the eventual regulatory requirements for the project, these 79 properties, which have the potential to be affected by the project, may also require updated survey documentation.

The applicants have begun coordinating with the USACE for permitting of the project and assume the USACE will serve as the lead federal agency pursuant to Section 106 of the National Historic Preservation Act. They will coordinate with the USACE on the area of potential effects from the project to determine whether any of these properties need to be investigated. However, as the project consists primarily of stringing a second circuit onto existing infrastructure, they do not anticipate that the project will adversely affect any of these properties. However, one resource eligible for the NRHP is noted within the proposed route (SN-SJT-003) by the Quarry Substation Bypass. There is existing infrastructure that crosses the resource in this area, and since no new construction is anticipated within the vicinity of it, the project is not expected to affect SN-SJT-003. The applicants have committed to not performing work in the area of SN-SJT-003.[194]

SHPO determined that an archaeological survey of areas of new ground disturbance is appropriate for this project due to the presence of unevaluated sites. SHPO concurred that areas where the ground surface will not be disturbed do not need to be surveyed. The unevaluated archaeological sites for NRHP eligibility in SHPO records (21DLf, 21SH0036, 21SH0068, and 21SN0169) "appear to be within the proposed project footprint." SHPO asked that an evaluation of these archaeological sites or a description of how impacts to these sites will be avoided by the project be provided. Another archaeological site, 21WR0136, was mentioned as previously determined eligible for listing in the NRHP within the project footprint. SHPO additionally requested a description of how this site will be avoided by the project. The applicants will complete investigation and evaluation of these sites during the summer 2024 field survey.

For DNR Alternatives 1-3, the nearest archaeological and historic resources are WR-SCK-010, approximately 1,630 feet away from the DNR Alternative 3 centerline, and WR-MCT-004, just outside DNR Alternative 1's route width on the opposite side of I94 from the project. Thus, there are no archaeological and historic resources within the DNR Alternatives' route widths.

### Mitigation

Prudent routing can avoid impacts to archaeological and historic resources. This is the preferred mitigation. Section 5.3.15 of the DRP addresses archeological resources. If previously unidentified archaeological sites are found during construction, the applicant would be required to stop construction

[194] Personal communication from the applicants with Department of Commerce EERA via email May 10, 2024.

and contact SHPO to determine how best to proceed.[195] Ground disturbing activity would stop and local law enforcement would be notified should human remains be discovered.[196]

SHPO determined that an archaeological survey of areas of new ground disturbance is appropriate for this project due to the presence of unevaluated sites. The applicants plan to complete a Phase I archaeological reconnaissance for the portions of the project where new ground disturbance is necessary for project construction and maintenance. SHPO concurred that areas where the ground surface will not be disturbed do not need to be surveyed. The applicants will complete investigation and evaluation of these sites during a field survey in the summer of 2024 before construction. Thus, further coordination with SHPO will occur and the project is expected to be able to be designed to avoid any historic or architectural properties.

## Natural Resources

Electric infrastructure such as transmission lines impact the natural environment. Impacts are dependent upon many factors, such as how the project is designed, constructed, and maintained. Other factors such as the environmental setting influence potential impacts.

### Air Quality

**The ROI for air quality is the project area. Distinct impacts to air quality during construction such as fugitive dust and exhaust would be intermittent, localized, short-term, and minimal. Impacts are associated with fugitive dust and exhaust and can be mitigated. Long-term impacts to air quality will also be minimal and are associated with the creation of ozone and nitrous oxide emissions along the HVTL. These localized emissions will be below state and federal standards. Impacts are unavoidable and do not affect a unique resource.**

Air quality is a measure of how pollution-free the ambient air is and how healthy it is for humans, other animals, and plants. Emissions of air pollutants will occur during construction and operation of new infrastructure for the project. Overall air quality in Minnesota has improved over the last 20 years, but current levels of air pollution are alleged to still contribute to health impacts.[197] Air quality in the project area is relatively better than more populated areas of the state such as the Twin Cities metro region.

According to MPCA models, air pollution in the project area's census tracts are generally in the lowest 50% of all air scores in Minnesota closer to Becker and follow a general downward trend to the lowest 10% of all air scores as the project approaches Alexandria.[198] Outlier census tracts with higher air scores are in areas around St. Cloud, the worst of which is in the highest 10% of all air scores in census tract 4.01, block group 1 with chromium emissions above health benchmarks.[199] This part of the project is near Quarry Substation, west of State Highway 23 – however, the census tract is captured by the proposed route rather than the Quarry Substation which is in census tract 113.08, block group 1 with no pollutants above health benchmarks.

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[195] Draft Route Permit, Section 5.3.14.

[196] *Ibid.*

[197] Pollution Control Agency. The State of Minnesota's Air Quality, Report to the Legislature January 2023. Retrieved from: https://www.pca.state.mn.us/sites/default/files/lraq-1sy23.pdf.

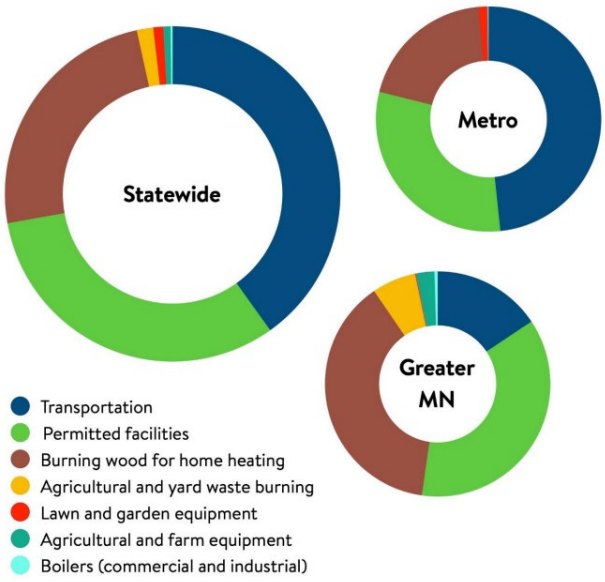
[198] Minnesota Pollution Control Agency (n.d.) *MNrisks: Pollutant Priorities*, retrieved from: https://www.pca.state.mn.us/air/mnrisks-pollutant-priorities (Where a health benchmark is a concentration level in the air that is unlikely to result in health effects after a lifetime of exposure; a concentration to benchmark ratio less than one is below the health benchmark).

[199] *Ibid.*

As described by the MPCA, "Regulation and voluntary actions have reduced air pollution over time. Most reductions have come from permitted facilities and electrical generation. Daily fine particle concentrations have increased in recent years due to wildfire smoke. To achieve further improvements in air quality, transportation and neighborhood air sources will need to reduce their emissions. Minnesota meets all current federal standards, but… air pollution levels remain elevated in many areas of concern for environmental justice compared to state averages,"[200] (Figure 7).

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 (O3), particulate matter (PM10/PM2.5), sulfur dioxide (SO2), nitrogen dioxide (NO2), and carbon monoxide (CO). The AQI is used to categorize the air quality of a region as one of five levels: good, moderate, unhealthy for sensitive groups, unhealthy, or very unhealthy. The nearest air quality monitor to the project is in St. Cloud, Minnesota. Air quality in the area has been considered "good" between 246 and 336 days of the year from 2020-2022. During the same time period, the number of days classified as moderate was between 30 and 66. Air quality was considered unhealthy for sensitive groups for three days in 2021 only, two days as unhealthy in 2021 only, and one day as very unhealthy in 2021 only.[201]

**Figure 7: Air Pollution Sources by Type**




## POTENTIAL IMPACTS

### *Construction*

Minimal intermittent air emissions are expected during construction of the project. Air emissions associated with construction are highly dependent upon weather conditions and the specific activity occurring. For example, traveling to a construction site on a dry gravel road will result in more fugitive dust than traveling the same road when wet.

[200] *Ibid.*

[201] MPCA. *Annual AQI Days by Reporting Region*, retrieved from: https://public.tableau.com/app/profile/mpca.data.services/viz/MinnesotaAirQualityIndex_0/AQIExternal

All projects that involve movement of soil, or exposure of erodible surfaces, generate some type of fugitive dust emissions.[202] Construction activities will generate fugitive dust from travel on unpaved roads, grading, foundation excavation, and setting structures. Some of these activities such as clearing vegetation may create exposed areas susceptible to wind erosion. Most of the fugitive dust emissions associated with the project are expected to be along gravel roads during worker and material transport.

Fugitive dust is a particulate air pollutant. As explained by the EPA, "The impact of a fugitive dust source on air pollution depends on the quantity and drift potential of the dust particles injected into the atmosphere. In addition to large dust particles that settle out near the source (often creating a local nuisance problem), considerable amounts of fine particles also are emitted and dispersed over much greater distances from the source."[203]

Motorized equipment will emit exhaust. This includes construction equipment and vehicles travelling to and from the project. Exhaust emissions, primarily from diesel equipment, would vary according to the phase of construction. Any adverse impacts are anticipated to be localized, minimal, and temporary.

The proposed project would generally use paved roads to access construction areas along the alignment until the River Crossing. All routing options there would require accessing construction zones through vegetated areas, more so for the applicants' river crossing options. The DNR alternatives 2 and 3 would utilize more existing roads, but also agricultural fields.

Access roads to be built for the project may be temporarily or permanently made of dirt or gravel. The number of at least temporary access roads would increase for DNR Alternatives 2 and 3. Without mitigation, travel in agricultural fields, through vegetation, and especially on dirt or gravel access roads would generate greater amounts of fugitive dust than paved roads, the former more so than the latter, increasing negative impacts to air quality.

### *Operation*

During operation, power lines produce ozone and nitrous oxide through the corona effect—the ionization of air molecules surrounding the conductor. Ozone production from a conductor is proportional to temperature and sunlight and inversely proportional to humidity. Nitrogen oxides can react to form ground-level ozone. Ozone is one of the most impactful pollutants in Minnesota and can contribute to health issues even as the State continues to meet all current federal standards. Ozone and nitrous oxide are reactive compounds that contribute to smog and can have adverse impacts on human respiratory systems.[204] Accordingly, these compounds are regulated and have permissible concentration limits. The State of Minnesota has an ozone standard of 0.07 parts per million (ppm) through an 8-hour averaging time[205] which conforms to the federal ozone standard.[206]

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[202] U.S. Environmental Protection Agency (January 1995) *Compilation of Air Pollutant Emissions Factors: Western Surface Coal Mining*, retrieved from: https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors at section 11.9

[203] U.S. Environmental Protection Agency (January 1995) *Compilation of Air Pollutant Emissions Factors: Miscellaneous Sources*, retrieved from: https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors at section 13.2.

[204] https://www.epa.gov/criteria-air-pollutants

[205] Minn. R. 7009.0800, https://www.revisor.mn.gov/rules/?id=7009.0080.

[206] The Clean Air Act, 40 CFR part 50, https://www.epa.gov/criteria-air-pollutants/naaqs-table

Nitrous oxide is regulated indirectly through the state and federal standards for nitrogen dioxide ($NO_2$). Nitrogen oxides are a criteria pollutant under the Clean Air Act, and the standards for them are set by using $NO_2$ as the indicator of the larger group of nitrogen oxides.[207] Ozone and nitrous oxide emissions are anticipated to be well below these limits. Impacts are unavoidable and do not affect a unique resource. Air emissions associated with maintenance of the HVTL are, like construction emissions, dependent upon weather conditions and the specific activity occurring. Air quality impacts would be about the same regardless of the routing option pursued.

#### MITIGATION

Exhaust emissions can be minimized by keeping vehicles and equipment in good working order, not running equipment unless necessary, and minimizing the number of driving trips. Additionally, utilizing existing power sources, for example, grid supplied-power, or cleaner fuel generators and vehicles rather than diesel-powered generators and vehicles, wherever practical could reduce emissions.

Watering exposed surfaces, utilizing chemical stabilization, covering disturbed areas, covering open-bodied haul trucks, and reducing speed limits on-site are all standard construction practices. The applicant could commit to using dust mitigation and control measures that do not contain chloride. The draft Vegetation Management Plan (VMP) provided as Appendix G in the route permit application identifies construction best management practices related to soils and vegetation that will help mitigate fugitive dust emissions.

Several sections of the DRP indirectly mitigate impacts to air quality, including sections related to soils, vegetation removal, restoration, and pollution and hazardous wastes. Direct impacts to soils can cause indirect impacts to air quality through erosion. Section 5.3.8 Soil Erosion and Sediment Control of the DRP requires permittees to "implement reasonable measures to minimize erosion." This includes protecting exposed soils by promptly planting and seeding, using erosion control blankets, protecting soil stockpiles, and controlling vehicle tracking. The applicant has also committed to utilizing wildlife friendly erosion control measures during construction, which includes no plastic mesh netting.[208]

### Greenhouse Gases and Climate Change

**The overall project is anticipated to help the state's carbon reduction goals. Total GHG emissions for project construction are estimated to be approximately 2,396 tons of carbon dioxide (CO2). Operational impacts from the formation of nitrous oxide and release of sulfur hexafluoride are minimal. The project as a whole will reduce CO2 emissions by reducing congestion on the electrical grid enabling greater use of existing renewable generation and supporting the development of new renewable generation. Potential impacts due to both construction and operational GHG emissions are anticipated to be minimal and positive.**

Greenhouse gases (GHG) are gaseous emissions that trap heat in the atmosphere and contribute to climate change. These emissions occur from natural processes and human activities. The most common GHGs emitted from human activities include carbon dioxide, methane, and nitrous oxide.

[207] Environmental Protection Agency. Retrieved from: https://www.epa.gov/no2-pollution/setting-and-reviewing-standards-control-no2-pollution

[208] *Ibid.*

### Potential Impacts

Deforestation is a source of carbon dioxide to the atmosphere, as trees and forest land act as a carbon sink, absorbing carbon dioxide from the atmosphere and storing it. Removing forests releases most of the stored carbon stock, either through burning or decay. In addition, deforestation eliminates future carbon dioxide capture. Some clearing of forested land would be required for the project regardless of routing option. Some vegetation recovery will be a part of the project after construction, but a one for one replacement plan has not been committed to, resulting in a net loss.

Construction activities will result in short-term increases in GHG emissions because of the combustion of fossil fuels in construction equipment and vehicles. Sulfur hexafluoride (SF6), a potent GHG, will be used at the Big Oaks Substation. SF6 is a common gas used in high voltage circuit breakers to extinguish arcs formed when the circuit breaker opens. Small releases will occur as part of regular breaker operation and maintenance. SF6 will be sealed during regular circumstances with no active emissions.

Total GHG emissions for the proposed project's construction are estimated to be approximately 225 tons of carbon dioxide equivalent ($CO_2e$) for greenfield construction over eight weeks, including the Big Oaks Substation and River Crossing (with negligible differences across routing options) and 1,481 tons of $CO_2e$ for installation of the second circuit over 44 weeks as shown in Appendix F.

Total emissions for the state of Minnesota in 2020 were approximately 137 million tons.[209] Transportation remains one of the highest contributors to the total at about 35 million tons.[210] GHG emissions for project construction are anticipated to be an insignificant amount relative to the state's overall annual transportation emissions. Potential impacts due to construction GHG emissions are anticipated to be minimal.

Once operational, the project will generate considerably less GHG emissions than construction. Operational emissions include processes such as lighting, monitoring equipment, utilized electricity, and maintenance/employee vehicle usage. Emissions resulting from routine operation and maintenance of the transmission line and substation will largely be from the combustion of gasoline or diesel in maintenance equipment and vehicle use. The applicants estimated this to amount to 14 tons of $CO_2e$ a year. Operation of the project is expected to reduce GHG emissions overall, resulting in a net benefit. This is because the project reduces CO2 emissions by reducing congestion on the system that enables greater use of existing renewable generation and supports the development of new renewable generation. Potential impacts due to operational GHG emissions are anticipated to be minimal.

### Mitigation

Currently, there are no Minnesota-specific thresholds of significance for determining impacts of GHG emissions from an individual project on global climate change. In the absence of such a threshold, Minnesota Rule 4410.4300, Subpart 15, Part B, establishes a mandatory category requiring preparation of an EAW for stationary source facilities generating 100,000 tons of GHGs per year. The purpose of an EAW is to assess whether a proposed project has the potential to result in significant environmental effects, which aids in determining whether an Environmental Impact Statement is needed. Regarding GHG emissions, state regulations establish 100,000 tons per year as the threshold to prepare an EAW to aid in determining if potential significant environmental effects might exist. A reasonable conclusion is

[209] Minnesota Pollution Control Agency, *Greenhouse Gas Emissions Data*. Retrieved from: https://public.tableau.com/app/profile/mpca.data.services/viz/GHGemissioninventory/GHGsummarystory.
[210] *Ibid.*

that a project with GHG emissions below 100,000 tons per year does not have the potential to result in significant GHG effects.

Equipment containing SF6 is designed to avoid atmospheric emissions. Performing routine inspections and preventative maintenance as well as following manufacturer specifications for replacing SF6 containing equipment can mitigate the risk of unexpected emissions from aging equipment. The applicant is expected to monitor for equipment leaks for reporting to the EPA and to prioritize maintenance and replacement of any leaking equipment.

### Climate Resilience

**Construction emissions will have a short- term negligible increase in greenhouse gases that contribute to climate change. The project's design incorporates elements that minimize impacts from the increase in extreme weather events such as increased flooding, storms, and heat wave events that are expected to accompany a warming climate. Impacts are expected to be minimal as the project increases reliability and thus is expected to beneficially impact climate change.**

Climate change refers to any significant change in measures of climate lasting for an extended period. Greenhouse gases emissions occur from natural processes and human activities which trap heat in the atmosphere and contribute to climate change. The most common GHGs emitted from human activities include carbon dioxide, methane, and nitrous oxide.

In 2020, the electricity sector was the second largest source of Minnesota GHG emissions at 15.8 million tons of 137 million tons, or 11.5%.[211] GHG from electricity generation have decreased by about 60% in Minnesota since 2005 due to a shift in generation to lower- and non-emitting sources and an increase in end-use energy efficiency.[212]

The EPA The EPA Climate Resilience Evaluation and Awareness Tool anticipates an increase in 100-year storm intensity of 2.6 to 14 percent in 2035 and 5 to 27 percent in 2060 for the project area.[213] The EPA Streamflow Projections Map anticipates a change in average streamflow of the Mississippi River in Clearwater, MN by a ratio of 1.15 (90$^{th}$ percentile) under wetter projections and a ratio of 0.79 (10$^{th}$ percentile) under drier projections in 2071 to 2100 compared to baseline historical flow from 1976 to 2005.[214]

Using the DNR Climate Trends website[215] to retrieve data from 1895-2024 for Douglas, Todd, Stearns, Sherburne, and Wright Counties (as representative geographic units of the project area) showed a mean precipitation of 26.15 inches annually. This model estimated a 0.42 inch increase in precipitation per decade. Therefore, the annual rainfall is estimated to increase by 1.26 inches over a 30 year span of the project's operation.

[211] Minnesota Pollution Control Agency, Greenhouse gas emissions data. Retrieved from: https://public.tableau.com/app/profile/mpca.data.services/viz/GHGemissioninventory/GHGsummarystory
[212] *Ibid.*
[213] U.S. Environmental Protection Agency. CREAT Climate Change Scenarios Projection Map. Retrieved from: https://epa.maps.arcgis.com/apps/MapSeries/index.html?appid=3805293158d54846a29f750d63c6890e&platform#map.
[214] U.S. Environmental Protection Agency, Streamflow Projections Map: Creating Resilient Water Utilities. Retrieved from: https://epa.maps.arcgis.com/apps/MapSeries/index.html?appid=48dcf8ca136a49a29 8a60e31422d58f0.
[215] Minnesota DNR, Minnesota Climate Trends. Retrieved from: https://arcgis.dnr.state.mn.us/ewr/climatetrends/

From the same climate data set and geographic unit, the annual mean temperature from 1895-2024 was 41.36°F with an annual mean temperature increase of 0.26°F per decade. Thus, the mean annual temperature is expected to increase by 0.78°F over a 30 year span of the project's operation.

Regarding the Mississippi River where most of the project's potential impact could take place, the DNR's Climate Change and Renewable Energy report states, "Aquatic systems, particularly those with altered hydrology, are vulnerable to temperature extremes and to high-intensity or high-magnitude precipitation events. Changes to hydrologic regimes are affecting stream flow and water quality (turbidity, pollutants, water temperature), which in turn affect biological diversity. Aquatic systems may be further impacted if dry periods result in increased human demands for water."[216]

The area near the Mississippi River was analyzed for additional risks related to flooding. Using FEMA's national flood hazard layer, it was identified that this area is a designated floodway on the northeastern side of the river. There could be additional risk for the structure placement in this area as a result of increased flooding from climate change.

Transmission infrastructure has few mechanical elements and is built to withstand weather extremes that are normally encountered. Apart from outages due to severe weather such as tornadoes and heavy ice storms, transmission lines rarely fail. When this happens, transmission lines are automatically taken out of service by protective relaying equipment when a fault is sensed on the line. Such interruptions are usually only momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure is more than 99%.

#### POTENTIAL IMPACTS

A warming climate might cause increased flooding, storm, and heat wave events. These events, especially an increased number and intensity of storms, could increase risks to transmission lines and substations. More extreme storms also mean more frequent heavy rainfall events, which could lead to increased soil erosion. 500-year flood events are also expected to be more common due to these more frequent and extreme storms. This will be especially important in the area around the Mississippi River, where there is flood hazard risk nearby. Heat wave events could change demands on the electrical transmission and generation systems, especially as more indoor space is equipped with cooling systems. Because this is a reliability project, it will improve the electrical transmission system making it more resilient and reducing potential for peak overloads during heat wave events.

Related to the structural resiliency of the project's infrastructure to climate change, unplanned outages of transmission facilities can happen for a variety of reasons. These include mechanical failures or severe weather such as heavy ice, wind, and lightning. In the event an unplanned outage of any facility along the project occurs, the applicants state that they have the necessary infrastructure and crews in place to respond quickly and safely to return these facilities to service.

Construction activities for the project will result in short-term increases in GHG emissions from the combustion of fossil fuels in construction equipment and vehicles, as detailed and analyzed in the GHG Emission section of this EA.

[216] Minnesota DNR, Climate and Renewable Energy Steering Team. *Climate Change and Renewable Energy: Management Foundations,* (August 2011). Retrieved from: https://files.dnr.state.mn.us/aboutdnr/reports/conservationagenda/crest-ccref.pdf

Tree and vegetation loss from construction of the River Crossings reduces related climate resiliency benefits, leading to more intense runoff during storms or flooding (thus increasing erosion and reducing water retention), increased heat extremes, and potential reductions in air quality. Removal of or impacts to wetlands due to construction eliminates the ability for the land to retain and absorb stormwater, leading to more intense stormwater runoff and nutrient loading.

The Mississippi River is considered a Wild and Scenic River District that supports wildlife. Increased stream temperatures that accompany climate change and nearby tree clearing could change the ecosystem of the river for flora or fauna that depend on certain temperatures. Although most routing options span the river entirely, all routing options would nonetheless have clearance requirements for that ROW span requiring removal of high growing vegetation or tree cover that provides shade along the alignment. As the alignment nears the river's banks, however, vegetation tends to be more low growing and less likely to need to be cleared for the ROW. DNR Alternative 3 would result in the most ROW clearing with 4.4 new miles (Tables 3 and 4).

#### MITIGATION

Increased chance of severe weather and heat wave events from a warming climate require adequate planning and preparation. Maintenance and repair plans should anticipate future changes to climate. For example, more robust permanent construction stormwater management might be needed at the new Big Oaks Substation to address the possibility of more frequent extreme storm events. Project transmission infrastructure will generally be designed to withstand extreme weather events, including high winds.

The applicant states that the project area is within portions of the Federal Emergency Management Administration (FEMA) 100-year and 500-year floodplains, which puts the transmission lines at an increased risk of being impacted by climate change. To reduce potential impacts, the project will be designed to withstand extreme weather events, including flooding.

Mitigation to reduce emissions during construction is discussed in the GHG emissions section of this EA. Vegetation clearing that will be a part of the project is ultimately expected to be partially offset by the vegetation management required after construction. This vegetation is unlikely to store as much GHG as the forested areas otherwise would have, but nonetheless will increase the carbon storage capacity of the land. Maintaining as much canopy and vegetative shading over the Mississippi River as it currently exists would mitigate potential temperature impacts to the water.

The Big Oaks Substation will require grading and leveling for construction access and activities and therefore will have localized impacts on topography and drainage patterns. The applicants state that new access roads will be strategically placed to avoid drainage systems where possible. Ground disturbance will be minimized where practical, and disturbed ground will be restabilized after construction. Several CSW Permit requirements as discussed in the Soils and Topography section of this EA address special requirements during construction of the project to prevent environmental impacts.

Slopes of variable grades are present throughout the proposed route. 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 and drainage patterns of the area.

Heavy rainfall events could lead to increased soil erosion. There are several wetlands within and nearby the project area, which serve to alleviate flooding for heavy rainfall or flooding events. The project does include a permanent stormwater retention pond for the Big Oaks Substation within the siting area to account for the additional stormwater that will be generated from increased impervious surface around 10 acres. In conjunction with the expected increase in precipitation from climate change, stormwater runoff and associated impacts around the Big Oaks Substation will increase.

Efforts will assist in managing impacts from increased storm intensity and frequency but may not fully mitigate the anticipated effects from climate change.

### Groundwater

**The ROI for groundwater is the route width. Potential impacts to domestic water supplies are not expected, because wellhead protection areas within the route width will either not be exposed to new project infrastructure or are within drinking water supply management areas with low vulnerability to human caused contaminants. Subsurface activity would likely penetrate shallow water tables; however, subsurface disturbance is expected to be above well-depth used for potable water. The applicant states that wells and private septic systems will be located and avoided during construction. Potential impacts for all routing options are anticipated to be minimal. Impacts will be short, localized, and can be mitigated in part.**

The project area is mostly within the Central and Arrowhead-shallow bedrock Groundwater Provinces. The former is defined by the DNR as having common occurrences of surficial and buried sand and gravel aquifers where the underlying shale, sandstone, igneous, and metamorphic bedrock have typically limited aquifers.[217] The Arrowhead-shallow bedrock Groundwater Province is defined the by the DNR as mostly exposed or shallow Precambrian bedrock, which have limited aquifers.

Springs and other karst features are not present in the project area. Depth to groundwater is shallower in the mapped hydric soils and areas delineated as wetland, and deeper in the non-hydric soil units. The depth to the water table varies widely along the route, from zero feet where wetlands will be spanned to over 50 feet in places such as Clearwater, MN. [218] Around the River Crossings, depth to water generally ranges from 10 to 50 feet, except for the DNR Alternative 3 which is mostly zero to 10 feet on the west side of the Mississippi River.

Pollution Sensitivity of Near-Surface Materials is generally “high” for most of the route, but ranges down to “low” in places.[219] The sensitivity to pollution of near-surface materials is an estimate of the time it takes for water to travel through the unsaturated zone to reach the water table, which for the purposes of the model was assumed to be 10 feet below the land surface.[220] This means that along the route, the general expectation of have “high” pollution sensitivity means contaminants from the land surface could reach groundwater in hours to a week.[221] While this indicates precaution should be taken for construction in these areas, there will mostly be no ground disturbance along the line proposed to be

[217] Department of Natural Resources, *Minnesota groundwater provinces 2021*, Retrieved from: https://www.dnr.state.mn.us/waters/groundwater_section/mapping/provinces.html.

[218] Department of Natural Resources Geospatial Data, retrieved from: https://mnatlas.org/resources/?id=k_0279.

[219] Department of Natural Resources Geospatial Data, retrieved from: https://mnatlas.org/resources/?id=k_0148.

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

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

double-circuited since new structures won't be placed. Near the River Crossings, all options are also rated as "high", likely due to their proximity to the Mississippi River. DNR Alternative 3 is largely on an area rated "moderate". These models do not provide the detail necessary for regulation or other activities but are useful for region-wide assessments.

The MDH maintains the Minnesota Well Index (MWI), which provides basic information (e.g., location, depth, geology, construction, and static water level) for wells and borings drilled in Minnesota.[222] The MWI identifies many domestic, private, monitoring, and other well types within the proposed route. The applicants state that the MWI will be utilized to understand where wells and private septic systems have the potential to be impacted by the project so that they can be avoided during construction. Thus, impacts to wells are not expected.

There are six wellhead protection areas (WPAs) within the route width that the alignment is proposed to cross, none of which are near the River Crossings. A WPA is an area surrounding public water supply wells that contribute groundwater to the well.[223] In these areas, contamination on the land surface or in water can affect the drinking water supply. Many of these WPAs also contain a drinking water supply management area (DWSMA) in the same area. A DWSMA is an area containing the WPA but outlined by clear boundaries, like roads or property lines. The DWSMA is managed in a wellhead protection plan, usually by a city.

DWSMAs are rated for vulnerability, or how likely it is that contamination in the DWSMA can reach the public water supply intake.[224] For example, Melrose's DWSMA vulnerability is rated as high and moderate where the alignment crosses, but no new infrastructure is needed for the project in this area. Some of the WPAs are near new project infrastructure which would require ground disturbing construction that could interfere with WPAs or DWSMAs. These include where the alignment crosses the following WPAs named after the cities they're in: New Munich (up to five new poles and the Riverview Substation bypass and expansion) and Saint Joseph (three new poles). New Munich's DWSMA vulnerability is rated as low and very low in this area. Saint Joseph's WPA is not collocated with a DWSMA along the alignment.

The applicants will not need to connect to city water for the project or install a domestic sized well for the Big Oaks Substation. This type of well is not expected to appropriate more water than a typical residence and would need to comply with applicable MDH permitting regulations. Thus, water appropriation for the project is not expected to affect wells in the area outside of the route width, and in fact the area should have an overall decrease.

#### POTENTIAL IMPACTS

Potential impacts to groundwater can occur directly or indirectly. Direct impacts are generally associated with construction, for example, construction may require "drilling to depths that can penetrate shallow water tables or open access channels to deeper aquifers."[225] Localized impacts, should they occur, would be intermittent, but have the potential to occur over the long-term. Indirect

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

[223] Minnesota Statutes, section 103I. 005, subdivision 24.

[224] MDH, *Source Water Protection Web Map Viewer*. Retrieved from: https://www.health.state.mn.us/communities/environment/water/swp/mapviewer.html

[225] Maryland Department of Natural Resources, *Impacts of Power Generation and Transmission: Water Resources*. Retrieved from: http://pprp.info/ceir17/HTML/Chapter4-2-2.html.

impacts could occur through spills or leaks of petroleum fluids or other contaminants that could ultimately contaminate groundwater. Impacts can be mitigated.

Up to eight new transmission pole foundations could be installed in WPAs and DWSMAs. Transmission pole foundations for all routing options that will be drilled into the ground may be up to 60 feet deep, ranging to 20 feet depending on soil conditions. An angle or dead-end structure may require a foundation up to 12 feet in diameter. All foundation materials will be non-hazardous, preventing leaching of hazardous waste into groundwater. Structures might come into direct contact with groundwater because portions of the project area have a depth to groundwater less than 60 feet, but mostly zero to twenty feet in the relevant locations. Prior to construction, geotechnical investigations will be completed to help identify shallow depth to groundwater resource areas, which may require special foundation designs. Even if a contaminant from the project were to reach a WPA or DWSMA in these areas, the vulnerability is rated as low or very low, meaning it is unlikely the contamination can reach the public water supply intake. Thus, impacts are ultimately expected to be minimal.

Because of the shallow depth to groundwater in some areas of the project, dewatering may be required during construction. If dewatering exceeds 10,000 gallons of water per day, a DNR water appropriation permit will be required.[226] Project structures as proposed are generally a suitable distance from areas of sloping which are near large drainage features, except for foundations in shoreland district that will be required to span the Mississippi River. Although subsurface activity might disturb shallow groundwater resources, the disturbance area would be above well-depth used for potable water.

The River Crossing area is generally rated as “high” for pollution sensitivity of near surface materials for all routing options, which means contaminants from the land surface could reach groundwater in hours to a week. While the applicants will be required to meet permit requirements for water appropriation through the DNR and construction stormwater through the MPCA, extra precaution should be taken in these areas to avoid impacts.

Impacts to surface waters can lead to indirect impacts to groundwater. For example, construction activities can directly or indirectly lead to increased turbidity of surface waters through sedimentation. These contaminated surface waters might then flow to groundwater. Contamination is not limited to sediment, as any surface water pollutant, such as oil, can reach groundwater. Surface water impacts are discussed more in the Surface Water section of this EA.

The applicants have largely avoided or spanned wetlands in their project design, with several nearby or within the route width. All routing options would have a similar impact due to grading and changed drainage patterns to water and soils. All routing options require the new Big Oaks Substation, which will add ten acres of impervious surface and may impact nearby wetlands’ ability to handle runoff. All routing options would slightly reduce the land’s ability to filter runoff from increased impervious surfaces. However, this impact is expected to be minimal as nearby wetlands are small and the increased impervious surface is not expected to change drainage patterns in the area substantially.

#### MITIGATION

Indirect impacts to groundwater can be mitigated by avoiding or minimizing impacts to surface waters. Direct impacts to groundwater, such as from construction dewatering, should be directed away from

[226] DNR, Water Use Permits. Retrieved from: https://www.dnr.state.mn.us/waters/watermgmt_section/appropriations/permits.html

wetlands and done in a manner to prevent erosion, that is, using an appropriately sized dewatering containment system that is carefully monitored.

Because the project will disturb more than one acre, the applicant must obtain a CSW Permit from the MPCA. The CSW Permit will identify BMPs for erosion prevention and sediment control. As part of the CSW Permit, the applicant will also develop a SWPPP that describes construction activity, temporary and permanent erosion and sediment controls, BMPs, and permanent stormwater management that will be implemented during construction through the life of the project. Implementation of the protocols outlined in the SWPPP will minimize the potential for soil erosion and detail stormwater management methods during construction and operation of the facility. Section 5.3.8 of DRP require permittees to obtain an MPCA CSW Permit and implement the BMPs within for erosion prevention and sediment control.

The CSW Permit will have additional regulations and BMPs for the project near the River Crossing because this segment of the river is a designated special water.[227] This designation results from the Scenic or Recreational River Segment and Restricted Water label assigned to this stretch of the river as described in Section 23 the CSW Permit.[228] An example may include maintain a permanent buffer zone of 100 linear feet unless encroachment is necessary to complete construction. In that case, redundant BMPs are required to minimize impacts. Generally, projects discharging to this type of special water must immediately initiate stabilization of exposed soil areas and reduce impacts by use of additional or redundant BMPs.[229]

Any new wells require notification to MDH and would be constructed by a well borer licensed by MDH. If an unknown well is discovered, the applicant will coordinate with the landowner and follow MDH regulations such as capping and abandoning the well in place.

Grading for the project is designed to maintain existing drainage patterns to the extent feasible, minimizing water quality concerns due to the low percentage of disconnected impervious surfaces. Grading is discussed in more detail in the Soils and Topography section of this EA. As a result, sheet flow runoff is more likely to filter through vegetation into the soil prior to discharging to nearby wetlands or surface waters, thus is less likely to impact groundwater quality. The bluff's elevation on the east side of the Mississippi River increases after runoff would leave the Big Oaks Substation before decreasing into the river again, thus vegetation filtration is expected to be more pronounced in this area.

### Soils and Topography

**The ROI for soils is the anticipated route width. Common soil impacts include rutting, compaction, and erosion during construction. Potential impacts will be short-term, localized, and minimal. Construction may have erosion impacts where steep side slopes are excavated to provide a flat construction surface, however, final project design should be able to avoid these areas. Approximately 10 acres of soil may be permanently impacted by the proposed construction of the Big Oaks Substation. Impacts can be minimized.**

Overall, soils are essential natural resources that support various aspects of human life, the environment, and the economy. Understanding their properties, functions, and management is

[227] MPCA, Construction Stormwater Special Waters Search. Retrieved from: https://arcg.is/1irjmz0.
[228] Minn. R. 6105.0060.
[229] MPCA, Construction Stormwater Special Waters Search. Retrieved from: https://arcg.is/1irjmz0.

important to determine potential project environmental impacts. Soil is a mix of living and non-living material. Soil health is defined as, "the continued capacity of soil to function as a vital living ecosystem that sustains plants, animals, and humans," by the USDA NRCS.[230] Healthy soil provides a multitude of benefits: clean air and water, bountiful crops and forests, productive grazing lands, diverse wildlife, and beautiful landscapes. Soil performs five essential functions:

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

Soils in the proposed route are predominantly loams and sandy loams in the uplands and clay and organic soils in the lowlands, often associated with wetlands. Many soil types exist within the route width, the highest percentages being around 10 for both the Dorset-Two Inlets complex and the Hubbard loamy sand, both generally with non-steep slopes. Information on these example soil types is presented in Table 24.

**Table 24: Example Soil Type Characteristics in Route Width**

| Characteristics | Hubbard loamy sand | Arvilla sandy loam | Seelyeville muck | Waukon loam | Gonvick loam |
|---|---|---|---|---|---|
| **Farmland Classification** | Not prime farmland | Prime farmland or Farmland of statewide importance | Not prime farmland | Prime farmland or Farmland of statewide importance | All areas are prime farmland |
| **Slope** | 1 to 6 percent | 0 to 12 percent | 0 to 1 percent | 2 to 12 percent | 1 to 4 percent |
| **Depth to water table** | More than 80 inches | More than 80 inches | At surface | More than 80 inches | 20 inches |
| **Drainage class** | Excessively drained | Somewhat excessively drained soils | Very poorly drained | Well drained | Moderately well drained |
| **Landform** | Hillslopes, stream terraces, flats | Level to moderately steep outwash plains, beach areas of glacial lakes, and terraces of glacial stream valleys | Glacial and flood plains, valley trains, glacial moraines. | Level to steep convex slopes on glacial moraines | Slopes on glacial moraines |
| **Frequency of flooding or ponding** | None | None | None | None | None |

The Big Oaks Substation is entirely within the Isan-Hubbard-Duelm (s3496) soil association. Several soil types comprise the Big Oaks Substation Siting Area, with only 10 of those 250 acres to be used for construction. The Hubbard-Mosford complex, Mississippi River Valley takes up about 58 percent of this area, with the Stonelake-Nebish complex accounting for the next most at about 16 percent. Both soil types are characterized by flatter slopes, non-prime farmland, with excessive drainage.

[230] U.S. Department of Agriculture, Natural Resource Conservation Service. *Soil Health*. Retrieved from: https://www.nrcs.usda.gov/conservation-basics/natural-resource-concerns/soils/soil-health

The Mississippi River crossings contain a few different soil types. DNR Alternative 1 and 3 are mostly composed on the Sandberg loamy sand up to 30 percent. DNR Alternative 2 and 3 soils are up to 25 percent Stokelake-Nebish complex. DNR Alternative 3 contains soil that is up to 25 percent Sandberg-Arvilla complex.

### Potential Impacts

Few acres of soil along the double-circuit restringing construction will be impacted. Most substation expansions or line taps similarly will not affect much area – the largest potential for impact is at the River Crossings and the Big Oaks Substation. Approximately 10 acres of soil may have permanent impacts from the proposed construction of the Big Oaks Substation. Apart from structure locations, most impacts will be temporary.

Soil compaction and rutting could occur from movement of construction vehicles along the right-of-way and near project substations. Installing structures requires removing and handling soils, which, along with vegetation clearing and grading, will expose soils to wind and water erosion. Fine textured soils are especially susceptible. Topsoil could be lost to improper handling or erosion, especially at larger sites such as the Big Oaks Substation. Groundcover protecting soils should be left undisturbed whenever practical.

Impacts on soils are dependent, to some extent, on the conditions of the soil surface at the time of construction. Construction activities that occur on wet soils tend to have longer lasting impacts, regardless of the soil type. Should high rainfall events occur during construction or prior to establishment of permanent vegetation, significant sedimentation may occur.

Steep slopes of 12 percent or more and erosion prone soils should be described and shown on the site plan or on a separate grading plan.[231] Future project designs and grading plans should identify steep areas so that impacts can be minimized. Construction may have significant impacts where side slopes are excavated to provide a flat construction surface. Construction should generally be able to avoid siting infrastructure in these areas given the large project area.

Steep slopes and other problem soil types should be able to be avoided within the 250-acre Big Oaks Substation Siting Area, where approximately 10 acres will be graded during construction. More grading may be required to construct an access road. Nevertheless, the substation and access road will be constructed at grade to the extent possible, and disturbed areas outside the substation footprint and access road will be repaired and restored to blend with the natural terrain. Roads, driveways, or parking areas will be setback from the Mississippi River away from bluff and shore zones. Appropriate permanent stormwater management measures will address drainage from the newly established impervious areas. All designs for the substation will follow current American Society of Civil Engineers standards and any other applicable rules or regulations.

The River Crossings inherently are near steep slopes due to the riverbanks of the Mississippi. Impacts to the riverbanks, bluffs, and the floodway will largely be avoided because the proposed transmission lines will span the river for most routing options. The exceptions are DNR Alternative 1 which places one new tangent structure on an island in the river and the Eastern Option which places two new helical pier structures on the same island in the river. All routing options place a minimal amount of infrastructure in

[231] EQB Guidelines Preparing Environmental Assessment Worksheets, 2013.

the floodway, which could pose ongoing challenges for stability; however, the applicants state these structures will be designed to withstand floods as described in the Climate Resilience section of this EA.

Pole structure stability is best among options that place the least number of structures in the floodway. DNR Alternative 2 places only one structure in the floodway, which is shortly followed by the other options, with DNR Alternative 3 having the most structures in the floodway at four (Table 12). The applicants have also stated that DNR Alternative 3 would place structures very near the river bluff on the east side of the Mississippi River with limited safe working area due to the existing 345 kV lines (Appendix B, Map 4C). The proximity of potentially steep slopes among any of the routing options, especially for DNR Alternative 3, could increase the size and depth of structure foundations required, increasing impacts.

Although infrastructure already exists for transmission lines on the island the DNR Alternative 1 and Eastern Option would be utilizing, adding structures would increase the right-of-way and result in increased impacts to soil in comparison to the other crossing options. This soil also has a high potential to impact the Mississippi River if not properly handled. Impacts for all routing options are expected to be minimal, with the tradeoff in impacts between soils and steep slopes along the bluffs being relatively balanced among all routing options.

*Topography*

Transmission line structures will be installed at existing grade. Should grading occur it will be restricted to establishing a flat, safe workspace in and around the structure—major topographical changes to the landscape would not occur. Once the structure is set the topography will be repaired and restored to allow natural drainage patterns to persist and to blend with the natural terrain. The applicants should not place fill or excavated material in a manner that creates an unstable slope or in a bluff impact zone.

Minimal impacts to topography, such as the creation of abrupt elevation changes or modifications to natural drainage patterns, may occur near the River Crossing where steep slopes with erosion prone soils could exist. The required SWPPP BMPs will assist in stabilizing slopes and managing runoff and erosion during construction near the River Crossing to ensure the existing drainage pattern remains afterwards, minimizing impacts from topography and soil/erosion that could indirectly impact other resources such as the Mississippi. The VMP will also assist in appropriate revegetation after construction to establish adequate herbaceous or low shrub cover to avoid erosion.

### MITIGATION

Some site features that may exist near the River Crossing such as highly erodible soils, steep slopes, and sensitive receiving waters will require special attention to avoid adverse environmental effects. The MPCA has identified increased BMPs that are required to be used in areas discharging to and within one mile of designated Special or Impaired Waters. These are applicable to all routing options as drainage for the River Crossing runs into the Mississippi River, this stretch considered a special water. [232] The BMPs will be included as Appendix A of the Construction Stormwater General Permit as applicable.

Additional regulations during construction and regulated in the CSW permit were discussed in the Groundwater section of this EA. This may include maintain a permanent buffer zone of 100 linear feet unless encroachment is necessary to complete construction. In that case, redundant BMPs are required

[232] MPCA Construction Stormwater Special Waters Search, retrieved form: https://mpca.maps.arcgis.com/apps/webappviewer/index.html?id=e03ef170fa3e41f6be92f9fafec100cc.

to minimize impacts. Generally, projects discharging to this type of special water must immediately initiate stabilization of exposed soil areas and reduce impacts by use of additional or redundant BMPs.[233] Depending on the final location of the Big Oaks Substation, the applicants may be required to provide a temporary sediment basin for common drainage locations that serve an area with five or more acres disturbed at one time.

The use of BMPs and standard construction practices can protect topsoil and minimize the potential for soil erosion. These practices include temporary and permanent topsoil stabilization measures in accordance with the project's CSW Permit; restoring disturbed areas to pre-construction conditions to the extent practicable; minimizing erosion by implementing environmental control measures, such as, temporary and permanent seeding, mulching, filter strips, erosion blankets, and sod stabilization. The applicants committed to various BMPs that will be identified in the project's SWPPP, including the use of silt fences, bio logs, erosion control blankets with embedded seeds, and other sound water and soil conservation practices to minimize soil erosion, protect topsoil, and protect adjacent water resources. The applicants stated that disturbed soil will be restored to previous conditions or better.

Several sections of the DRP address soil-related impacts such as those outlined above. Common mitigation methods employed to minimize soil erosion include:

- Promptly seeding to establish temporary or permanent vegetative cover on exposed soil.
- Using mulch to form a temporary and protective cover on exposed soils. Mulch can help retain moisture in the soil to promote vegetative growth, reduce evaporation, insulate the soil, and reduce erosion. A common mulch material used is certified weed free hay or straw.
- Erecting or using sediment control fences that are intended to slow water flow, filter runoff, and promote the settling of sediment out of runoff via ponding behind the sediment fence.
- Using erosion control blankets and turf reinforcement mats that are typically single or multiple layer sheets made of natural and/or synthetic materials that provide structural stability to bare surfaces and slopes.
- Separating topsoil and subsoil and covering stockpiled soils.
- Returning locations where grading or temporary access is required to their original contours and elevation to the greatest extent possible.
- Permanent stormwater controls to control runoff at the substation.

Additional mitigations may include using only new timber matts, equipment washing in and out of wetland areas, and seasonal construction restrictions to protect wildlife around the Mississippi River. If schedules or weather do not allow for work on firm ground, wood or plastic mats or corduroy roads will be used as necessary to prevent erosion. Additionally, winter construction can reduce potential impacts such as rutting and compaction because soils are frozen. The applicants state that when possible, construction will be scheduled during frozen ground conditions. Further, when construction during winter is not possible and conditions require, the applicants will use construction mats where wetlands and other sensitive areas would be impacted. Winter construction makes handling topsoil more difficult. Mitigation associated with grading during frozen ground conditions include applying heating mats to warm the soil or using soil rippers to break frozen soil particles into more manageable sizes before grading.

[233] MPCA, Construction Stormwater Special Waters Search. Retrieved from: https://arcg.is/1irjmz0.

## Floodplains

**The ROI for floodplains is the local vicinity. There is potential for the project be impacted by or to cause direct impacts to floodplains around the River Crossing. Potential impacts to floodplains are anticipated to be minimal for all routing options, which will place new transmission line infrastructure in Mississippi River floodways. Potential impacts can be minimized.**

In their natural state, floodplains provide temporary water storage during flooding events, which prevents damage by detaining debris, sediment, water, and ice. FEMA delineates floodplains and determines flood risks in areas susceptible to flooding. At the state level, the DNR oversees the administration of the state floodplain management program by promoting and ensuring sound land use development in floodplain areas to promote the health and safety of the public, minimize loss of life, and reduce economic losses caused by flood damages. The DNR also oversees the national flood insurance program for the state of Minnesota. Floodplains are usually regulated at the local level as well.

Floodplains are low-lying areas that are susceptible to periodic inundation due to heavy rains or snowmelt, and are usually adjacent to rivers, streams, and lakes. In flat areas, the floodplain can extend more than a mile from the flooding source. Floodplains can also be the normally dry areas adjacent to wetlands, small ponds, or other low areas that cannot drain as quickly as the rain falls.

The proposed route is within FEMA designated 100-year and 500-year floodplains (Table 25). Most of these are within the area of the project that will be double-circuiting a new transmission line on existing structures without new construction. In these areas, further impacts to floodplains would not occur. FEMA designated 100-year floodplain areas are associated with major rivers along the proposed route such as the Mississippi River.

**Table 25: Total Floodplain Acres in Proposed Route**

| FEMA Floodplain Layer | Acres within the Proposed Route |
|---|---|
| Floodway | 535.59 |
| 100 Year floodplain (Zone A and AE) | 72.31 |
| 500 Year floodplain (Zone X) | 50.09 |

FEMA lists the flood risk index for the project area as “relatively low” compared to the rest of the U.S., partially based on very high community resilience.[234] This means Sherburne County is prepared for anticipated natural hazards, can readily adapt to changing conditions, and is expected to withstand and recover rapidly from disruptions.

The majority of new construction will occur on both sides of the river in the City of Becker to the north and on utility owned parcels to the south. The areas underlying both sides of the river are zoned as Shoreland Overlay Districts (Appendix B, Map 10).[235]

[234] FEMA, *National Risk Index*. Retrieved from: https://hazards.fema.gov/nri/map.

[235] City of Becker Zoning Map. Retrieved from: https://www.ci.becker.mn.us/DocumentCenter/View/3067/City-of-Becker-Zoning-Map---2024

### Potential Impacts

The project will span rivers and other resources where an existing transmission line already exists. In these areas, further impact to the function of floodplains, such as height or course, will not occur. New construction will be required to cross the Mississippi River regardless of which routing option is chosen. The project may require transmission line structures be placed within FEMA-designated 100-year or 500-year floodplains as shown in Table 12 and repeated below. This includes the placement of one to four pole structures within the floodway of the Mississippi River, posing ongoing challenges for pole stability. The floodplain would be temporarily disturbed from construction site access and the placement of construction access.

**Table 26: Repeat of Table 12**

| Shoreland District Pole Placements for Each Crossing Option | | | | |
|---|---|---|---|---|
| Western Option | Eastern Option | DNR Alternative 1 | DNR Alternative 2 | DNR Alternative 3 |
| 2 | 3 | 2 | 1 | 4 |

Permanent impacts could occur if a new structure is installed within a floodplain, the most pronounced effect potentially along the Mississippi River. However, the placement of transmission line structures in floodplains is not anticipated to alter the flood storage capacity of the floodplain based on the minimal size of individual transmission line structures.

Increased impervious surface of around 10 acres for the new Big Oaks Substation will increase stormwater runoff, which could increase erosion or sedimentation to the Mississippi River, which in the process could impact floodplains.

### Mitigation

Tree and vegetation loss from construction of the River Crossings reduces related climate resiliency benefits, leading to more intense runoff during storms or flooding (thus increasing erosion and reducing water retention). The applicants state that the transmission line structures would be designed to be capable of accommodating increased flood elevations that could result from climate change.

Although the Big Oaks Substation will not require a permanent stormwater permit, per the CSW permit, projects must be designed so that stormwater discharged after construction does not violate state water quality standards. Additionally, the project does include a permanent stormwater retention pond within the Big Oaks Substation Siting Area to account for the additional stormwater that will be generated. The applicants state that new roads, driveways, or parking areas will be setback from Mississippi River bluff and shore zones. All of these measures would address drainage from new impervious areas which would increase stormwater runoff, and thus indirectly minimize impacts to the Mississippi River floodplain. No further mitigation is proposed.

## Surface Water

**The ROI for surface water is the local vicinity. Direct impacts to the Mississippi River cannot be avoided by the project. Potential impacts to surface waters are anticipated to be minimal for all routing options, which will clear one additional right-of-way, or expand existing right-of-way in the**

**case of DNR Alternative 1, over a segment of the Mississippi River that is already impaired. Potential impacts can be mitigated.**

The proposed route is in the Mississippi Headwaters major watershed (HUC-4; 0701). There are four HUC-8 sub watersheds within the route: the Platte-Spunk (07010201), Sauk (07010202), Long Prairie (07010106), and Clearwater Elk (07010203) watersheds. Surface water resources in the Mississippi Headwaters major watershed meet water quality standards for conventional pollutants, however, these waters experience increased pressure from development and subsequent loss of shoreline and aquatic habitat.[236]

Certain waters in Minnesota are classified as public waters under Minnesota Statute 103G.005. Public waters include wetlands, water basins, and watercourses of significant recreational or natural resource value in Minnesota. A public waters designation means that DNR has regulatory jurisdiction over the water.[237] According to the DNR Public Waters Inventory (PWI) dataset, there are 40 PWI watercourses within the proposed route including six public ditches, 22 public watercourses, and 15 basins (Table 27). The PWI waterbodies are regulated by the DNR and have a minimum 50-foot perennial vegetative buffer requirement, whereas the PWI ditches have a 16.5-foot designated buffer requirement.

Utilities are required to obtain a license to cross state lands and waters. All routing options construct new transmission line infrastructure to cross the Mississippi River, the watercourse with the highest potential to be impacted by the project. The Mississippi River has been designated by the DNR to be infested with the invasive zebra mussel species along this segment,[238] another major threat to this watershed where competition causes a loss in biodiversity.[239]

**Table 27: Watercourse Types Within Proposed Route**

| PWI Type | Length or Area in Proposed Route |
|---|---|
| Public Water Watercourse | 6.4 miles |
| Public Ditch/Altered Natural Watercourse | 0.3 miles |
| Public Water Basin | 16.6 acres |
| Public Water Wetland | 28.2 acres |

Minnesota water quality standards protect lakes, rivers, streams, and wetlands by defining how much of a pollutant (bacteria, nutrients, turbidity, mercury, etc.) can be in the water before it is no longer drinkable, swimmable, fishable, or useable in other, designated ways. An impaired water fails to meet one or more water quality standards. The MPCA updates this list every two years, the most recent being the proposed 2024. Based on that list, there are several impaired watercourses within the proposed

[236] Minnesota PCA, *Mississippi River – Headwaters*. Retrieved from: https://www.pca.state.mn.us/watershed-information/mississippi-river-headwaters.

[237] Public waters are defined in Minnesota Statute 103G.005, subdivision 15.

[238] Minnesota DNR, *Infested Waters List* (May 2, 2024). Retrieved from: https://www.dnr.state.mn.us/invasives/ais/infested.html.

[239] Minnesota PCA, *Mississippi River – Headwaters*. Retrieved from: https://www.pca.state.mn.us/watershed-information/mississippi-river-headwaters.

route as outlined in Table 28.[240] Total Maximum Daily Load plans, or TMDLs, have been approved by the EPA for impairments as listed in Table 28.[241]

**Table 28: Impaired Watercourses Within Proposed Route**

| AU ID | Name | Impairment | TMDL Plan Approved | TMDL Plan Needed |
|---|---|---|---|---|
| 07010203-729 | Mississippi River | Fecal coliform; Hg-F; PCB-F | Hg-F | Fecal coliform; PCB-F |
| 07010203-557 | Silver Creek | E. coli; Fish Bioassessments; Invertebrate Bioassessments | E. coli | Fish Bioassessments and Invertebrate Bioassessments |
| 07010203-511 | Clearwater River | Dissolved Oxygen; Fish Bioassessments | Dissolved Oxygen | Fish Bioassessments |
| 07010203-639 | Johnson Creek (Meyer Creek) | E. coli; Fish Bioassessments | E. coli | Fish Bioassessments |
| 07010203-724 | Robinson Hill Creek | E. coli | E. coli | NA |
| 07010202-501 | Sauk River | Hg-F; Nutrients; PCB-F | Hg-F; Nutrients | PCB-F |
| 07010202-507 | Sauk River | Hg-F; Fish Bioassessments; Invertebrate Bioassessments | Hg-F | Fish Bioassessments and Invertebrate Bioassessments |
| 07010202-554 | Unnamed creek | Invertebrate Bioassessments | NA | Invertebrate Bioassessments |
| 07010202-660 | Unnamed creek | Fish Bioassessments and Invertebrate Bioassessments | NA | Fish Bioassessments and Invertebrate Bioassessments |
| 07010202-662 | Unnamed creek | Fish Bioassessments | NA | Fish Bioassessments |
| 07010202-729 | Getchell Creek (County Ditch 26) | Dissolved Oxygen; E. coli; Fish Bioassessments; Invertebrate Bioassessments | NA | Dissolved Oxygen; E. coli; Fish Bioassessments; Invertebrate Bioassessments |
| 86-0183-00 | Fish Lake | Nutrients | Nutrients | NA |
| 86-0168-00 | Locke Lake | Fish Bioassessments and nutrients | Nutrients | Fish Bioassessments |
| 73-0208-00 | Uhlenkolts Lake | Nutrients | Nutrients | NA |
| 07010202-654 | Unnamed creek | Fish Bioassessments and Invertebrate Bioassessments | NA | Fish Bioassessments and Invertebrate Bioassessments |
| 07010202-503 | Ashley Creek | Dissolved Oxygen; E. coli; Fish Bioassessments; Invertebrate Bioassessments | E. coli | Dissolved Oxygen; Fish Bioassessments; Invertebrate Bioassessments |

[240] Minnesota Pollution Control Agency, *Impaired Waters: Draft 2024*. Retrieved from: https://mpca.maps.arcgis.com/apps/webappviewer/index.html?id=fcfc5a12d2fd4b16bc95bb535d09ae82.
[241] *Ibid.*

There is one designated trout stream that crosses the proposed route: Robinson Hill Creek (AUID: 07010203-724) in Township 123N, Range 28W, Section 6, which is also impaired. The anticipated alignment crosses Robinson Hill Creek twice, once in Section 4 and once in Section 6 in the same township and range. Only the stretch of Robinson Hill Creek within Section 4 is a designated trout stream.

### POTENTIAL IMPACTS

Potential impacts to surface water related to the project for all routing options include soil disturbance from construction, stormwater runoff, dewatering of foundation borings, and transmission lines crossing the Mississippi River, an impaired Wild and Scenic River. While the impaired and designated trout stream, Robinson Hill Creek, is within the proposed route, this stretch would only be double-circuited on existing structures with no new foundations or poles proposed nearby. Construction equipment will not be required to cross the trout stream.

Construction equipment use, repair, and maintenance involves fluids that may leak or spill with the potential to reach surface water. If equipment crosses a watercourse or inadvertently enters a waterbody, direct impacts such as bottom disturbance or petroleum-based products washing into the water would occur.

Stormwater runoff from construction areas can cause direct impacts to surface waters by discharging sediment into the waterbody and damaging riparian vegetation along the shore. Soils will be disturbed by clearing trees and vegetation, access road construction, and site grading for project components. Disturbed soils near the Mississippi River for the River Crossing have the highest potential to cause impacts to surface waters. One of the major threats to the Mississippi Headwaters major watershed is increased nutrient, contaminant, and sedimentation loading from stormwater runoff from development and other non-point sources.[242]

Indirect impacts to surface waters due to grading and increased impervious surface may occur from the Big Oaks Substation that may alter existing drainage patterns to the Mississippi River. The applicants state that new access roads will be strategically placed to avoid drainage systems where possible. At the nearest possible point within the siting area in the northwest corner, the new substation could be built approximately 640 feet from the river. Elevation in this area starts lower than the bluff's elevation before dropping to the river; thus, most runoff is expected to infiltrate before reaching the river.

If dewatering is necessary, water removed could contain sediments or pollutants that might be introduced into surface waters. The applicant does not expect needing a dewatering permit for construction. Water leaking from this equipment can nevertheless cause similar impacts to surface waters. If dewatering exceeds 10,000 gallons a day, a DNR Water Appropriations Permit will be required. The CSW Permit will regulate water discharge regardless, especially in the case of the Mississippi River, and those permit requirements were discussed under the Groundwater and Soils and Topography section of this EA.

[242] Minnesota PCA, *Mississippi River – Headwaters*. Retrieved from: https://www.pca.state.mn.us/watershed-information/mississippi-river-headwaters.

*Transmission*

Direct impacts to the Mississippi River cannot be avoided by the project, primarily derived from tree clearing for the new transmission line right-of-way. Potential impacts to surface waters are anticipated to be minimal for all routing options which will clear one additional right-of-way or expand an existing right-of-way over a water that is already impaired. There are no plans to locate structures within waterbodies, however, DNR Alternative 1 would place one new tangent structure on an island in the Mississippi River and the Eastern Option two new helical pier structures on the same island in the river. The applicants state that structures will be assembled on upland areas before they are brought to the site for installation.

Construction activities near surface waters could cause riparian vegetation disturbance and surface erosion. These activities can speed water flow and expose previously undisturbed soils, increasing erosion and the potential for sediment to reach surface waters. Disturbed soils will generally be limited to the area immediately adjacent to structure locations; however, areas outside these locations might also be disturbed, for example, moving construction equipment within the ROW.

Presently, in the project area, there are five crossings of the Mississippi River by transmission lines (Appendix B, Map 2A). Three of these are east of the Monticello Nuclear Generating Plant and are unlikely to be affected by or changed due to the project. The remaining crossing utilizes the same island that both the DNR Alternative 1 and the Eastern Option would use. This crossing maintains 75 feet of existing ROW that is already cleared. This ROW would be expanded by 75 feet for DNR Alternative 1, whereas the Eastern Option would establish new ROW adjacent to the existing ROW.

*Substations*

The Big Oaks Substation does not contain any PWI waters within its 250-acre siting area. No sanitation systems or a septic tank are associated with the new Big Oaks Substation. Elevation around the siting area generally starts lower than the bluff's elevation before dropping to the river; thus, most runoff is expected to infiltrate before reaching the river.

The applicants state that according to the PWI database, there are not watercourses that would be directly impacted from substation work proposed by the project at Riverview, Quarry, or Alexandria substations.

**MITIGATION**

As provided by Minnesota Rules 6135.1100, subpart 4, item B: Crossings on or under the beds of streams designated by the commissioner of the DNR as trout waters shall be avoided unless there is no feasible alternative. When unavoidable, maximum efforts shall be taken to minimize damage to trout habitat.

Construction projects that disturb one or more acres of land require a general CSW Permit from the MPCA. This permit is issued to construction site owners and their operators to prevent stormwater pollution entering surface water during and after construction. The CSW Permit requires use of best management practices; development of a SWPPP; and adequate stormwater treatment capacity once the project is complete. Projects must be designed so that stormwater discharged after construction does not violate state water quality standards. Specifically, projects with net increases of one acre or more to impervious surface must be designed to treat water volumes of one inch multiplied by the net increase in impervious surface. Since this segment of the river is a recreational river segment, the applicants must comply with additional items in the CSW Permit, specifically 23.9, 23.10 and 23.1. These

requirements include immediate stabilization and a temporary sediment basin, among other things.[243]**Error! Hyperlink reference not valid.Error! Hyperlink reference not valid.**

Standard construction management practices, including, but not limited to containment of excavated soils, protection of exposed soils, stabilization of restored soils, and controlling fugitive dust would minimize the potential for eroded soils to reach surface waters. Other mitigation measures include using BMPs to reduce the potential for erosion and sedimentation. Commission route permits require that soil excavated from riparian areas not be placed back into the riparian area. Temporary bridges can be used to span watercourses, if necessary, to avoid driving vehicles in a stream bed. Construction and maintenance during frozen ground conditions would minimize impacts to surface waters.

The applicants will perform equipment fueling and other maintenance away from environmentally sensitive and wet areas to ensure that waste does not enter waterways. Watercourses will not be crossed by construction equipment unless necessary, the crossing will be permitted as applicable, and the appropriate local state and federal agencies will be consulted. Where watercourses must be crossed to string new conductors and shield wires, workers may walk across, use boats, or drive equipment across ice in the winter.

The applicants are required to obtain Section 401 certification from the MPCA because the project has the potential to discharge to waters regulated under the Clean Water Act in Waters of the United States. The MPCA will review the project under Section 401 to ensure that it will comply with state water quality standards.

The applicants stated in their draft VMP that they will clear vegetation 10 feet or higher within 500 feet of a transmission line foundation and pole.[244] Use of the wire/border zone vegetation clearing method could help to stabilize the ROW by allowing certain low growing woody vegetation and trees to persist along the outside edges of the ROW. This results in different types and heights of vegetation based on whether the vegetation is directly underneath the conductor (wire zone) or elsewhere in the right-of-way (border zone). This type of vegetation management could be required in the DRP as a special condition near the Mississippi River.

> **Wire Zone:** Area directly underneath the conductors, including potential conductor sway. Vegetation in this zone consists of low-growing forbs and grasses.
>
> **Border Zone:** Area that begins at the outside edge of the wire zone and extends to the edge of the right-of-way. This zone may contain additional low-growing woody plants and trees.

The wire/border zone method appears consistent with the Becker County's Shoreland Ordinance.[245] The ordinance restricts the removal of natural vegetation unless it is done in a manner that will prevent increased erosion. Additionally, removal of natural vegetation within bluff impact zones and on steep slopes that drain toward a river is not allowed. While staff acknowledges this is clearly not feasible at all locations within the right-of-way, it might be feasible within the border zone.

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[243] MPCA, *General Construction Stormwater Permit*, 2023. Retrieved from: https://www.pca.state.mn.us/sites/default/files/wq-strm2-81a.pdf.

[244] Route Permit Application, Appendix G. Draft Vegetation Management Plan. Retrieved from: https://apps.commerce.state.mn.us/web/project-file/12537.

[245] Becker County, *Zoning Ordinance*. Section 7 Vegetation Alteration. Retrieved from: https://www.co.becker.mn.us/dept/planning_zoning/PDFs/ordinance/Ordinance_All(12072023).pdf

## Wetlands

**The ROI for wetlands is the route width. Wetlands will be spanned to the greatest extent possible for all routing options. Tall growing vegetation has already been cleared for the existing ROW to be double-circuited where 16 new pole structures are proposed for placement in a wetland regardless of routing option. Vegetation in these areas is expected to regenerate around the structure within a matter of years. The applicants estimate their current design would permanently impact 115 square feet per new structure, thus up to 0.042 acres. Substations would avoid wetlands except for up to 0.23 acres within the proposed expansion area for the Alexandria Substation.**

**Potential wetland impacts are expected to vary based on the routing option but be minimal overall. While these variations at the River Crossing range by 11 (Western Option) to 70 acres (DNR Alternative 1) of wetlands within the route width, each option has flexibility with alignment placement to avoid many acres of these wetlands. Wetland conversion impacts of 0.045 acres is only anticipated if the Eastern Option is chosen. Total permanent impacts amount to up to 0.32 acres. Due to flexibility in alignment placement, future wetland delineations, and spanning of riverine wetlands, impacts are anticipated to be short-term, minimal, and localized, especially when compared to the total wetland acres of counties crossed by the project. Impacts will affect a unique, but common resource. Impacts can be mitigated or minimized.**

Wetlands are areas with hydric (wetland) soils, hydrophilic (water-loving) vegetation, and wetland hydrology (inundated or saturated during much of the growing season). Wetland types include marshes, swamps, bogs, and fens. Wetlands vary widely due to differences in soils, topography, climate, hydrology, water chemistry, vegetation, season, and other factors.[246] Minnesota has 12.2 million acres of wetlands, the second most in the lower 48 states.[247] The proposed route is within the Midwest and Northcentral Northeast regions according to the USACE's regional wetland designations.

Wetlands are important to the health of waterways and communities that are downstream. Wetlands can be one source of hydrology in downstream watercourses and water bodies, detain floodwaters, recharge groundwater supplies, remove pollution, serve as a "natural filter" by trapping and absorbing sedimentation, and provide fish and wildlife habitat. Forty-three percent of threatened or endangered species in the U.S. live in or depend on wetlands.[248]

Wetland health also has economic impact because of their key role in fishing, hunting, agriculture, and recreation. These large infrastructure projects could temporarily or permanently impact wetlands if these features cannot be avoided through project design. During construction, temporary disturbance of soils and vegetative cover could cause sediment to reach wetlands which could affect wetland functionality.

Certain wetlands are federally protected under Section 404 of the Clean Water Act. "Section 404 requires a permit before dredged or fill material may be discharged into waters of the United States," including wetlands.[249] This permit is administered by USACE and the applicants state that the majority of

[246] USEPA. 2022. *What is a Wetland* https://www.epa.gov/wetlands/what-wetland

[247] Minnesota Wetland Inventory: User Guide and Summary Statistics (state.mn.us)

[248] Retrieved from: https://www.dnr.state.mn.us/wetlands/index.html

[249] Environmental Protection Agency (June 17, 2020) *Section 404 of the Clean Water Act: Section 404 Permit Program*, retrieved from: https://www.epa.gov/cwa-404/section-404-permit-program.

wetland impacts will likely be covered by this permit. The USACE consults with the USFWS as part of the permitting process to determine if protected species would be adversely affected by the permitted activity. Additionally, Section 401 of the Clean Water Act requires any applicant for a federal license or permit to conduct an activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification from the State in which the discharge originates that the discharge complies the applicable water quality standards.[250] In Minnesota, the MPCA administers Section 401 on non-tribal lands and issues a Water Quality Certification that becomes a condition of the federal permit.

In Minnesota, wetlands are also protected under the WCA, which is administered by BWSR. The applicable counties oversee local implementation of the WCA in the project area. The WCA requires that any person "proposing to impact a wetland to first, attempt to avoid the impact; second, attempt to minimize the impact; and finally, replace any impacted area with another wetland of at least equal function and value."[251] There are no wetland banking easements within or near the project area.

#### POTENTIAL IMPACTS

Wetlands consist of organic soils comprised of layers of decomposed plant material that formed very slowly; as a result, disturbed wetlands are not easily repaired.[252] However, crossing a wetland does not necessarily mean it will be impacted; in some cases it can be spanned. The applicants will avoid major disturbance of individual wetlands and drainage systems during construction to the extent feasible. This will be done by spanning wetlands and drainage systems, which will generally avoid contact with construction equipment, where possible.

According to the USFWS National Wetlands Inventory (NWI) database, the proposed route contains approximately 666 acres of wetlands, comprising about 0.1 percent of the proposed route. The majority of these wetlands are classified as shallow open water, seasonally flooded, or shallow marshes (Table 29). While the NWI database is a reliable tool, not all wetlands displayed on NWI are actually wetlands, nor does NWI capture all wetlands on the landscape. Thus, wetland delineations to be completed for the project before construction will confirm accuracy of the amount and type of wetlands that could be affected by the project.

**Table 29: Wetlands Within Proposed Route**

| Wetland Type | Acres in Proposed Route |
|---|---|
| Seasonally Flooded Wetlands | 295.7 |
| Wet Meadows (including Calcareous Fens) | 10.2 |
| Shallow Marshes | 69.1 |
| Deep Marshes | 1.9 |
| Shallow Open Water | 17.0 |
| Shrub Swamp | 33.7 |

[250] Minnesota Pollution Control Agency (n.d.) *Clean Water Act Section 401 Water Quality Certifications*, retrieved from: https://www.pca.state.mn.us/water/clean-water-act-section-401-water-quality-certifications.

[251] Minn. R. 8420.0100, subp. 2.

[252] Public Service Commission of Wisconsin (July 2013).

| | |
|---|---|
| Wooded Swamp | 3.2 |
| Bogs | <0.5 |
| Riverine | 235.2 |
| **TOTAL** | **666** |

Table 30 breaks down the amount and type of wetlands within each routing option's route width. Riverine wetlands make up to majority of the route widths' total and will be spanned for the project. DNR Alternative 1 would have the most wetland to avoid around 71 acres, most of it being freshwater/forested shrub and riverine. DNR Alternative 2 has more opportunity to avoid wetlands at 21 acres within its route width, especially since most of it is riverine. DNR Alternative 3's route width has a moderate amount of wetland at 43 acres, made up of a large amount of riverine. The Western Option has the least amount at 11 acres of riverine wetland, and the Eastern Option at 40 acres of wetland, mostly riverine with some freshwater forested/shrub area.

**Table 30: Wetland Route Width Summary of Each Routing Option**

| Wetland type | DNR Alternative 1 | DNR Alternative 2 | DNR Alternative 3 | Western Option | Eastern Option |
|---|---|---|---|---|---|
| **Freshwater forested/shrub** | 30.20 acres | 0.97 acres | 4.30 acres | -- | 3.86 acres |
| **Freshwater emergent** | 1.45 acres | 0.108 acres | 5.46 acres | -- | 0.06 acres |
| **Freshwater pond** | 0.07 acres | -- | 3.35 acres | -- | 0.07 acres |
| **Riverine** | 39.09 acres | 19.87 acres | 29.71 acres | 10.93 acres | 25.64 acres |
| **TOTAL** | 70.81 acres | 20.95 acres | 42.82 acres | 10.93 acres | 29.63 acres |

*Substations*

According to the NWI database there are two wetlands (0.23 acres) within the proposed expansion area for the Alexandria Substation. These wetlands are classified as a seasonally flooded basin (0.01 acres) and hardwood forest wetland (0.22 acres). The applicants stated they will complete a field wetland delineation to confirm the boundaries of these two wetlands. Additionally, the applicant will consult with the local government unit and USACE prior to construction.

The Riverview Substation bypass would require a transmission line be routed over a seasonally flooded basin at its northwest corner, with a new pole and foundation needed to accommodate the transmission line's turn south. A wetland field delineation should be completed to confirm the boundary of this wetland, as well as consultation with the local government unit and USACE prior to construction.

There are no wetlands or watercourses near the Quarry Substation tap and expansion. The new construction would occur in upland areas at these substations. For all construction areas, the applicants will use control devices to prevent sedimentation into adjacent wetlands.

The Big Oaks Substation Siting Area of 250 acres is within cultivated cropland; according to the NWI and PWI databases there are no wetlands within the siting area. Therefore, construction of the Big Oaks Substation is not anticipated to impact wetlands.

*Calcareous Fens*

A calcareous fen is a rare and distinctive peat-accumulating wetland that depend on a constant supply of calcium and other mineral rich groundwater and are legally protected. This unique microenvironment can support highly diverse and unique rare plant communities. Minnesota Statutes, Section 103G.223, states that calcareous fens may not be filled, drained, or otherwise degraded, wholly or partially, by any activity, except as provided for in a management plan approved by the commissioner of the DNR. Many unique characteristics of calcareous fens result from the upwelling of groundwater through calcareous substrates. Because of this dependence on groundwater hydrology, calcareous fens can be affected by nearby activities or even those several miles away.

DNR's scoping comment letter for the EA asked for the newly listed St. Martin 15 Calcareous Fen along the project route in St. Martin Township (T124 R32 S15) to be considered in the analysis of wetlands (Appendix B, Map 13). Two new pole structures are proposed within a mile on either side of the fen. At its closest point, the fen is 290 feet east of the proposed route. The DNR stated that they will require further analysis to determine if the location and depth of these new pole structures and foundations are likely to impact fen hydrology and thus require a Calcareous Fen Management Plan.

*Temporary Impacts*

Temporary impacts to wetlands may occur if they need to be crossed during construction of the transmission line. No staging or stringing setup areas will be placed within or adjacent to water resources to the extent feasible. If a terminal dead-end structure is in or adjacent to water resources, and there is no other location in that stringing section of line to pull from/to, stringing areas may need to be placed within or adjacent to water resources; this is rare and in most cases the applicants would be able to pull through such a dead-end and avoid water resources. If stringing areas need to be placed within a water resource, the applicants will consult with the DNR, USACE, and local government unit to obtain the required approvals prior to the disturbance.

Temporary impacts could include temporary fill via construction matting placement along access routes, structure work areas, and wire pull sites. While use of construction mats during construction in wetlands reduce soil compaction, it has potential to disturb or kill the underlying vegetation based on the amount of time these mats are in use. Vegetation would be expected to regenerate relatively quickly; however, disturbed areas would be more susceptible to invasive plant species, which, if established, could lead to long-term adverse impacts to wetland function. Commission route permits require use of construction mats when winter construction is not possible.[253] The USACE may have additional permit requirements such as access to wetland and riparian areas be the shortest route possible to minimize travel through the wetland.

Should dewatering be necessary to install the transmission structures, it would temporarily lower groundwater to allow for excavation. Reduced groundwater can reduce standing water, decrease soil moisture, affect ground surface stability, and impact vegetation. Water discharge could lead to contamination and sedimentation within nearby wetlands. These effects are especially pronounced in the case of a calcareous fen. The applicants have stated that they don't anticipate needing a water

[253] Draft Route Permit, Section 5.3.8.

appropriation permit for construction. Since the calcareous fen is between two proposed new pole structures rather than extensive construction, it's even less likely that impactful water appropriation will occur.

Impacts to wetlands can also occur if disturbed soils are eroded by rain or snowmelt and transported into a wetland. The indirect filling of wetlands by up slope construction erosion and run-off could result in temporary or permanent impacts to the receiving wetland, depending on the timing of clean-up and restoration of the affected area. Erosion and sediment controls utilized during ground disturbing activity are maintained until soil is fully stabilized.

Each new structure foundation is expected to impact approximately 115 square feet within the existing infrastructure right-of-way, not including access points that will cause temporary disturbance. The DRP Section 5.3.9 requires the permittee to access wetlands using the shortest route feasible to minimize travel through wetland areas and prevent unnecessary impacts. Detailed planning occurs during construction where equipment sets up relative to a new foundation, and crews will avoid to the maximum extent practicable staging their equipment in a wetland.

Temporary impacts due to construction based on the preliminary alignment and new structure locations proposed in the route permit application is not expected to amount to a significant amount of acreage. Although there are several wetlands within the proposed route, the double-circuiting work should mostly be able to avoid wetland areas during staging and stringing.

*Permanent Impacts*

Construction equipment access can cause rutting, compaction, erosion, and sedimentation. Rutting and compaction can change water flow, whereas erosion and sedimentation can increase water turbidity levels. Impacts that influence the hydrology of the wetland—even small changes—might significantly impair the function of the wetland. Fuel or hazardous substances could spill over the wetland, which could lead to contamination.

Transmission lines to be strung along existing rights-of-way would not require new wetland vegetation clearing for the ROW for all routing options. Permanent impacts would involve structure placement or other project related fill material being placed within a wetland for the life of the project. Areas with this potential for impact include where new poles are proposed to be installed (Appendix B, Maps 6A-6EE). Each new structure foundation will result in approximately 115 square feet of disturbance within the existing right-of-way. The specific boundaries of these wetlands could change after the wetland delineation is completed.

Many wetlands are over 50 feet away from construction for new poles and thus would not be expected to directly impact wetlands because construction equipment should be able to maneuver around them. Once new poles and foundations are placed in wetlands, however, the life of the project would require equipment passage through wetlands when necessary to complete operation and maintenance, presenting ongoing impacts to those wetlands.

When a wetland cannot be avoided, such as for the placement of new transmission poles within wetlands, construction must occur under permit by the USACE, which may include mitigation ratios as a condition. The Alexandria Substation expansion and Riverview bypass line may also permanently impact wetlands. The applicants estimate their current design would permanently impact 115 square feet per new structure (16 total for all routing options), thus up to 0.042 acres.

*Conversion Impacts (permanent)*

Wetland conversion is distinct from permanent wetland fill. Whereas permanent wetland fill eliminates the wetland, conversion is a process where the wetland changes from one wetland type to another. The wetland itself is not eliminated, however, it is still considered a permanent impact because it changes functionality of the wetland. Ongoing maintenance makes this conversion permanent. Consequently, the type and magnitude of wetland function would change, for example, wildlife habitat, flood flow attenuation, and sediment stabilization and retention.

Safe operation of the HVTLs would necessitate removal of woody vegetation in new ROW areas. For the project's current design along the parts of the project that will be the same regardless of which routing option is chosen, this impact would be limited to the Riverview bypass line which may route in a seasonally flooded basin wetland.

A desktop review of the entire project was completed in April of 2024 using the delineated wetlands from the CapX2020 project in 2012 and the most current version of NWI data. Based on the preliminary pole locations, the applicants identified 17 new structures/foundations in wetlands. Of the 17 new foundations, 16 are along the existing, cleared ROW to be utilized for all routing options, so no type of wetland conversion would be needed. The one new location is in a forested wetland on the island for the Eastern Option. This would result in conversion impacts of 0.045 acres form new foundations, assuming an area of 115 square feet per each of the 17 foundations. Thus, any conversion impacts for forested wetlands has already occurred as part of the original build out, and no additional tree clearing will be required in the existing ROW except if the Eastern Option is chosen.

*Summary*

Potential permanent wetland impacts in total are expected to be up to 0.32 acres. This estimate includes the Alexandria Substation expansion and each of the 17 new structures (one of which is specific to the Eastern Option and represents the only conversion impact). Because route widths are wide enough to offer flexibility, wetland delineations will further assist in avoiding wetlands at the River Crossing. Most of the wetlands are riverine and thus will spanned for the project. Impacts are anticipated to be short-term, minimal, and localized, especially when compared to total wetland acres counties crossed by the project.

**MITIGATION**

Potential impacts to wetlands can be avoided by selecting routes, alignments, and structure placements outside of wetlands. When a wetland crossing is unavoidable, spanning wetlands to the greatest extent possible is the preferred mitigation. If impacts to hydrologic features are unavoidable, the applicant could work with the jurisdictional agencies to determine the best ways to minimize the impacts and create appropriate mitigation measures.

If wetlands cannot be avoided, impacts can be minimized by a variety of strategies: use of construction mats and silt tubes; conducting construction and maintenance activities during winter months when the ground is frozen; spreading spoils from structure placement outside the wetland or disposing spoil off right-of-way; assembling structures on upland areas prior to installation; and transporting crews and equipment, to the greatest extent possible, over improved roads and via access routes which minimize travel over wetlands.

Although each of the new structures proposed within a wetland will result in approximately 115 square feet of disturbance, the DRP Section 5.3.9 required permittees to limit these impacts to the immediate area around the poles, which should decrease the amount of permanent impact.

If impacts to wetlands occur, they will be minimized through construction practices. Construction crews will maintain sound water and soil conservation practices during construction and operation of the facilities to protect topsoil and adjacent water resources and minimize soil erosion. Practices may include containing excavated material, protecting exposed soil, and stabilizing restored soil.

Based on the wetlands identified, mitigation would be required in accordance with the Clean Water Act, DNR Public Waters and Wetlands Work Permit, and WCA requirements. Mitigation developed on the route and final ROW would include wetland replacement as necessary for long-term impacts and location-specific wetland avoidance measures. The applicants believe that the project would qualify for the Utility Exemption from preparing a Wetland Replacement Plan under WCA, thus the project would not require replacement wetlands. Field wetland delineations should be completed before construction to confirm the boundaries of wetlands near new structures, as well as consultation with the local government unit and USACE.

For all routing options, promptly restoring areas after construction where ground disturbance occurs and revegetating with noxious/invasive species free seed will be expected conditions in the VMP. Other than typical CSW Permit conditions, the applicants committed to the following in the route permit application:

- When possible, construction will be scheduled during frozen ground conditions;
- Crews will attempt to access the wetland with the least amount of physical impact to the wetland (i.e., shortest route);
- The structures will be assembled on upland areas before they are brought to the site for installation; and
- When construction during winter is not possible, construction mats will be used where wetlands will be impacted.

Commission route permits require permittees to avoid and minimize wetland impacts. This includes requiring winter construction to the extent possible and requiring that soil excavated from wetland areas not be placed back into the wetland.[254] Spoil could fall back into the wetland during construction if appropriate precautions are not taken. Commission route permits require that all spoil be removed from the wetland. In addition, standard conditions in Section 5.3.9 of the DRP directs the applicant to:

- Avoid impacts to wetlands to the extent possible;
- Construct in wetland areas during frozen ground conditions where practicable; when construction during winter is not possible, to utilize wooden or composite mats to protect wetland vegetation; and
- Contain soil excavated from the wetlands and riparian areas.

[254] Draft Route Permit, Section 5.3.8.

## Rare and Unique Resources

**The ROI for rare and unique resources is the local vicinity. Several federally protected and state listed species have the potential to occur in the project area based on the USFWS Information, Planning, and Conservation tool and the DNR Natural Heritage Information System. The applicants have stated they will schedule the project's tree clearing activities to comply with USFWS requirements for the applicable species' inactive seasons, thus, the potential to adversely affect nesting species and bats within the project area is minimal for all routing options. If proper mitigation measures such as a protection plan are implemented for native prairie and plant communities near the River Crossing, impacts are expected to be minimal among all routing options. These long-term, localized impacts would affect a unique resource. Potential impacts can be mitigated and avoided in part.**

Rare and unique resources include assemblages of species or habitat that are designated for special care and conservation by state and federal agencies because loss of habitat and small or shrinking population is cause for concern. Rare and unique resources at the federal level are typically evaluated and protected by the USFWS or USACE. The plants and wildlife protected by the USFWS are discussed in this section, and calcareous fens, which are considered rare and unique by DNR and are protected by the USACE, are discussed in the Wetlands section. Applicants can access information about plants and wildlife protected by federal law through the Information for Planning and Consultation (IPaC) tool developed and maintained by the USFWS.

At the state level, the evaluation and protection of Minnesota's rare and unique resources are overseen by the DNR Division of Ecological and Water Resources through the identification and evaluation of native plant communities, rare plants, wildlife, and unique wetlands such as calcareous fens. Information about rare and unique resources protected by the state can be found through (1) a review of Sites of Biodiversity Significance maps maintained by MBS; and (2) requesting information from the Natural Heritage Information System (NHIS). Although these reviews do not represent a comprehensive survey, they provide information on the potential presence of rare and unique species and habitats. 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. Although reports or queries may not show records for state-listed species within the vicinity of a project, it does not necessarily mean that they are not present. It may simply mean that the area has not been surveyed or that records have not been reported to the Minnesota DNR.

### ENDANGERED, THREATENED, OR SPECIAL CONCERN SPECIES

Minnesota Statutes Section 84.0895 requires the DNR to adopt rules designating species as endangered, threatened, or species of special concern. The resulting list of these species is codified in Minnesota Rules, Chapter 6134. The Statute also authorizes the DNR to adopt rules that regulate treatment of species designated as endangered and threatened at the state level via Minnesota Rules, 6212.1800 through 6212.2300.

- A state-listed **endangered** species is defined as a species threatened with extinction throughout all or a significant portion of its range within Minnesota.
- A state-listed **threatened** species is defined as being likely to become endangered in the foreseeable future throughout all or a significant portion of its range in Minnesota.
- A species is of **special concern** if it is extremely uncommon in Minnesota or has unique or highly specific habitat requirements that deserves careful monitoring of its status.

Minnesota's Endangered Species Statutes and the associated rules impose a variety of restrictions, including a take permit program, and several exemptions pertaining to threatened or endangered species. Species of special concern, though often ecologically important, are not protected by Minnesota's Endangered Species Statue or the associated rules.

The applicants assessed information about plants and wildlife through the USFWS's IPaC tool on April 20, 2023, and identified three federally protected threatened, endangered, or candidate species that could be present in the proposed route (Appendix H). These include the endangered Northern Long-eared Bat, the proposed endangered Tricolored Bat, and the candidate Monarch Butterfly. The IPaC query also identifies bald eagles and golden eagles and several migratory birds as potentially being present in the proposed route. As follow up to its USFWS determination, the applicants stated they will consult with the USFWS to develop necessary avoidance and minimization measures for these species and will comply with any applicable USFWS requirements in place at the time of project construction.

On behalf of the applicants, Barr Engineering Company submitted a request to the DNR's Minnesota Conservation Explorer website to conduct a formal Natural Heritage Review (License Agreement #2022-008) to find documented occurrences of federally listed species, state-listed species, and designated critical habitat (Appendix G). The NHIS determined five state-listed species have been documented in the vicinity of the project: the Blanding's turtle, loggerhead shrike, Butternut, Marbled godwit, and creek heelsplitter. A summary of the DNR's response from their concurrence letter dated November 16, 2023, is summarized in Table 31 below along USFWS's response to the applicants' IPaC assessment.

**Table 31: Potentially Occurring Rare and Unique Resources**[255]

| Species Name | Protection Classification |
|---|---|
| Northern Long-eared Bat *(Myotis septentrionalis)* | Federal endangered, State Species of Special Concern |
| Tricolored Bat *(Perimyotis subflavus)* | Federal proposed endangered |
| Monarch Butterfly *(Danaus plexippus)* | Federal candidate |
| Blanding's turtles *(Emydoidea blandingii)* | State-listed threatened species |
| Loggerhead Shrike *(Lanius ludovicianus)* | State-listed endangered bird |
| Butternut *(Juglans cinerea)* | State-listed endangered plant |
| Marbled Godwit *(Limosa fedoa)* | State-listed bird of special concern |
| Creek Heelsplitter *(Lasmigona compressa)* and Black Sandshell *(Ligumia recta)* | both state-listed mussel species of special concern |

[255] Information sources are from the April 17, 2023 IPaC report, November 11, 2022 DNR Natural Heritage Review, and data on DNR Sites of Biodiversity Significance.

| | |
|---|---|
| MBS Sites of High or Moderate Biodiversity Significance | Varies, depending on resources present<br>• T126N R34W Sections 25 and 34-36<br>• T124N R30W Sections 33 and 34<br>• T124N R31W Sections 34 and 35<br>• T123N R30W Section 3<br>• T123N R27W Section 7 |
| Native plant communities | FFs59c – Elm – Ash – Basswood<br>State conservation rank: Imperiled |
| Native plant communities | FDs37b – Pin Oak – Bur Oak Woodland<br>State conservation rank: Vulnerable to Extirpation |
| Native plant communities | FFs68a – Silver Maple – (Virginia Creeper) Floodplain Forest<br>State conservation rank: Vulnerable to Extirpation |
| Native plant communities | FDs37 – Southern Dry-Mesic Oak (Maple) Woodland<br>State conservation rank: Vulnerable to Extirpation/Apparently Secure |
| Native plant communities | WMn82a – Willow – Dogwood Shrub Swamp<br>State conservation rank: Secure |

### *Northern Long-eared Bat*

In April of 2015, the USFWS listed the northern long-eared bat as federally threatened (80 Federal Register 18023-18028). In November of 2022 the USFWS reclassified the northern long-eared bat as endangered under the Endangered Species Act (ESA).

The range of the northern long-eared bat stretches across much of the eastern and Midwestern United States. Even if there are no bat records listed in the Natural Heritage Information System, all seven of Minnesota's bats 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 (Appendix G). During summer, the bats roost singly or in colonies under bark, in cavities, in crevices of both live and dead trees; or in cooler places such as caves and mines. In winter, northern long eared bats use caves and mines as hibernacula.[256] The USFWS has not identified designated critical habitat for the northern long-eared bat currently.[257]

All routing options near the River Crossing have the potential to contain habitat for Northern Long-Eared Bats in the wooded areas with aggregates of trees near the Mississippi River. Typical protective measures for northern long-eared bat are to conduct tree removal outside of the bat's active season, which is May through September.

### *Tricolored Bat*

On September 13, 2022, the USFWS published a proposed rule listing the tricolored bat as federally endangered under the ESA.

The tricolored bat is one of the smallest bats species native to North America. It ranges from the eastern and central United States into portions of southern Canada, Mexico, and into Central America. The species overwinters in caves and mines where available. However, throughout much of its range in the

[256] Minnesota DNR. Retrieved from: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=AMACC01150

[257] USFWS. Retrieved from: https://www.fws.gov/Midwest/endangered/mammals/nleb/index.html

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.[258] Roost choice may also vary by region and this species has been observed roosting in eastern red cedar trees and pine needles, as well as within manufactured structures such as barns and bridges.[259]

Typical protective measures for tri colored bat is to conduct tree removal outside of the bat's active season, which is April through October.

### *Monarch Butterfly*

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. The USFWS has added the monarch to the updated national listing workplan and intends to propose its listing in Fiscal Year 2024, with a possible effective date within 12 months. The USFWS will also conduct an annual status review to determine if changes in prioritization are necessary.

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 for both laying eggs and as a food source for caterpillars.[260] Potential impacts to monarch butterflies could be reduced by minimizing the removal of flowering plants.

### *Blanding's Turtles*

Blanding's turtles have been documented in the direct vicinity of the proposed project. Blanding's turtles use upland areas up to and over a mile distant from wetlands, waterbodies, and watercourses. Uplands are used for nesting, basking, periods of dormancy, and traveling between wetlands. Factors believed to contribute to the decline of this species include collisions with vehicles, wetland drainage and degradation, and the development of upland habitat. Any added mortality can be detrimental to populations of Blanding's turtles, as these turtles have a low reproduction rate that depends upon a high survival rate to maintain population levels.

### *Loggerhead Shrike*

The loggerhead shrike has been documented in the vicinity of the project site near the Big Oaks Substation and Mississippi River crossings. Loggerhead shrikes use grasslands that contain short grass and scattered perching sites such as hedgerows, shrubs, or small trees. They can be found in native prairie, pastures, shelterbelts, old fields or orchards, cemeteries, grassy roadsides, and farmyards.

[258] Minnesota DNR. Retrieved from: https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=AMACC03020

[259] USFWS. Tricolored Bat. Retrieved from: https://www.fws.gov/species/tricolored-bat-perimyotis-subflavus.

[260] USFWS. Retrieved from: https://www.fws.gov/species/monarch-danaus-plexippus

*Butternut*

Butternut was documented on a riverbank terrace near the project area by Monticello. Most populations of this species in Minnesota are in mature, mesic hardwood forests. This species is very susceptible to a lethal fungal disease called butternut canker *(Sirococcus clavigignenti-juglandacearum)*. Nearly all of Minnesota's butternut populations are dead or dying from the fungus, triggering its protected status within the state.

*Marbled Godwit*

Marbled godwit has been documented in the vicinity of the project west of the Quarry substation. This species prefers to feed and nest in short upland grassland areas along the edges of seasonal wetlands but is also known to nest in adjacent cropland stubble if the adequate habitat is limited.

*Creek Heelsplitter and Black Sandshell*

Both mussel species have been documented in the Mississippi River in the vicinity of the eastern terminus of the project. Mussels are particularly vulnerable to deterioration in water quality, especially increased siltation.

#### STATE MANAGED LAND AND RARE COMMUNITIES

The DNR has established several classifications of rare communities across the state, including Scientific and Natural Areas (SNAs), MBS Sites of Biodiversity Significance, High Conservation Value Forest, and MBS native plant communities.

SNAs are areas of land designated to preserve natural features and rare resources of exceptional scientific and educational values. There are no SNAs in the local vicinity of the project.

As discussed in the Wildlife and Habitat section of this EA, there are several MBS Sites of Biodiversity Significance near the River Crossing. All the sites near the River Crossing are ranked as "high" or "moderate". Sites ranked as high contain very good quality occurrences of the rarest species, high quality examples of the rare native plant communities, and/or important functional landscapes. Sites ranked as moderate contain occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery.

Many MBS Sites of Biodiversity Significance contain native prairies, a rare and unique resource managed by the DNR and identified through the NHIS along with other native plant communities across the state. A native plant community is a group of native plants that interact with each other and their environment in ways that have not been greatly altered by modern human activity or introduced organisms. Native plant communities provide a range of ecological functions that are increasingly recognized as valuable for the quality of life in Minnesota. In addition to the habitat value native plant communities provide, they have also played an important role in the development of Minnesota's cultural history and heritage. As shown in Appendix B, Map 15, there are some native prairies near the River Crossing.

DNR High Conservation Value Forests are broadly defined as areas of outstanding biological or cultural significance. The DNR is required by Minnesota Statutes, chapters 89 and 89A to manage a broad set of objectives and forest resources, including the management and protection of rare species, communities, features, and values across the landscape. There is one State Forest in the local vicinity of the line to be double-circuited, however it is labelled as Other Forest Lands which are not considered a DNR Management Unit owned by the Division of Forestry within Statutory boundaries. It is also mapped over

School Lake 1,300 feet west of the proposed alignment, indicating that even if the alignment were near this land, it would not be placed within the lake and impact the area mapped as Forest Land.

There are no other lands within the project area reserved for the protection of natural resources such as National Wildlife Refuges or State Significant Ecological Areas.

#### POTENTIAL IMPACTS

Power lines can impact rare and unique resources during construction and operation. Adverse impacts include the taking or displacement of individual plants or animals, invasive species introduction, habitat loss, reduced community size, and, for avian species, collision with conductors or electrocution. Impacts to rare and unique resources are not necessarily adverse. In some limited cases, power line rights-of-way can be managed to provide habitat. For example, nesting platforms can be built on top of transmission structures for use by rare avian species.

The determination of impact partially hinges on tree clearing for the project. The applicants state that tree clearing will occur based on consultation with USFWS. Thus, the potential to adversely affect nesting species such as bats within the project area is minimal.

The DNR confirmed that the NHIS review submitted originally applies to the areas delineated for DNR Alternatives 1-3 (Appendix G). The DNR reported that there are no new concerns for species in the areas of DNR Alternatives 1-3, but that conclusions for butternut surveying and Blanding's turtle avoidance measures for the area between the Quarry Substation and the proposed Big Oaks Substation would also apply to the DNR River Crossings. While originally this list included loggerhead shrike conclusions, the DNR communicated to EERA that recent surveys indicate that loggerhead shrikes are no longer using the project area (Appendix G). Thus, impacts to this species are not anticipated. The seasonal restrictions on tree and shrub clearing are not required to avoid impacts.

##### *Northern Long-eared Bat and Tricolored Bat*

The project may affect these species if clearing or disturbing suitable roosting habitat occurs during any time of year. No hibernacula or maternity roosts trees are identified in the NHIS database within the project area. Even if there are no bat records listed nearby, all seven of Minnesota's bats 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.

Under the USFWS Final 4(d) Rule for the Northern long-eared bat, purposeful take of the species is prohibited with limited exception. Incidental take from tree removal is also prohibited if it occurs within one-quarter mile of a known hibernacula; or cuts or destroys known occupied maternity roost trees, or any other trees within a 150-foot radius from a known maternity tree during the pup season (June 1 and July 31). These prohibitions focus on protecting the bat's sensitive life stages (that is, hibernation and raising young) in areas affected by white nose-syndrome.[261]

[261] U.S. Fish and Wildlife Service (January 14, 2016) *Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat*, FEDERAL REGISTER 81(9), retrieved from: https://www.fws.gov/midwest/endangered/mammals/nleb/pdf/FRnlebFinal4dRule14Jan2016.pdf.

*Monarch Butterfly*

Construction activities involving clearing and grading may impact monarch butterfly individuals. These activities would occur throughout all project components. If the USFWS determines the monarch butterfly should be listed and protection for the species coincides with project planning, permitting, and/or construction, the applicants will review project activities for potential impacts on the species, develop appropriate avoidance and minimization measures, and consult with the USFWS as appropriate.

*Blanding's Turtles*

This project has the potential to impact this rare turtle through direct fatalities and habitat disturbance/destruction due to excavation, fill, and other construction activities associated with the project. Minnesota's Endangered Species Statute (Minnesota Statutes, section 84.0895) and associated Rules (Minnesota Rules, part 6212.1800 to 6212.2300 and 6134) prohibit the take of threatened or endangered species without a permit.

*Creek Heelsplitter and Black Sandshell*

No in-stream work will be required to construct the project; however, potential runoff from project workspaces could temporarily decrease water quality and impact aquatic species. The applicants will implement appropriate BMPs to prevent erosion and sediment runoff and protect water quality. As such, adverse impacts to aquatic species are not anticipated.

**MITIGATION**

Impacts to rare and unique resources can be avoided by selecting routes, alignments, and structure placements away from these resources and their habitats to the extent practicable. If these resources cannot be avoided, impacts can be minimized by routing alignments or placing structures away from rare and unique resources; spanning these resources; or using seasonal construction practices within the selected route. Upon determining a final route, biological surveys may be required as a permit condition should resource agencies deem it necessary.

The following mitigation measures, some of which are outlined in the applicants' draft VMP, can help to avoid or minimize impacts to rare and unique resources:

- Minimize tree felling and shrub removal.
- For water dependent species, limit in-water work and disturbance to the greatest extent possible.
- Implement water and soil conservation practices to protect topsoil and adjacent water resources. Minimize soil erosion by containing excavated material, protecting exposed soil, and stabilizing restored soil.
- Re-vegetate disturbed areas with certified weed-free, native species that provide value to local wildlife species where applicable.

Development of a VMP, in consultation with resources agencies known as the Vegetation Management Plan Working Group, is a common special condition used by the Commission when issuing route permits.

*MBS Sites and Native Prairie*

Activities in utility rights-of-way can negatively affect adjacent native plant communities, especially through the introduction of invasive plant species. As such, disturbance near these ecologically significant areas should be minimized and the DNR recommends the MBS Sites near the River Crossing

be avoided as much as possible. Actions to minimize disturbance may include, but are not limited to, the following recommendations:

- Confine construction activities to the existing rights-of-way;
- As much as possible, operate within already-disturbed areas;
- Retain a buffer between proposed activities and the MBS Site;
- Minimize vehicular disturbance in the area (allow only vehicles necessary for the proposed work);
- Do not park equipment or stockpile supplies in the area;
- Do not place spoil within MBS Sites or other sensitive areas;
- Inspect and clean all equipment prior to bringing it to the site to prevent the introduction and spread of invasive species;
- If possible, conduct the work under frozen ground conditions;
- Use effective erosion prevention and sediment control measures;
- Revegetate disturbed soil with native species suitable to the local habitat as soon after construction as possible; and
- Use only weed-free mulches, topsoils, and seed mixes. Of particular concern is birdsfoot trefoil (Lotus corniculatus) and crown vetch (Coronilla varia), two invasive species that are sold commercially and are problematic in prairies and disturbed open areas, such as roadsides.

The Commission has included special permit conditions in the past requiring the permittee to not impact native prairie unless addressed in a prairie protection and management plan coordinated with the DNR. Such measures would be expected to greatly reduce impacts.

The DNR NHIS response letter state that there have also been observations of cerulean warbler *(Setophaga cerulea)* in T124N R31W Sections 34 and 35. The cerulean warbler is a state-listed as a species of special concern in this MBS Site. If feasible, avoiding disturbance to this MBS Site from May 15th through August 15th would avoid disturbance of nesting birds.

### *Northern Long-eared Bat and Tricolored Bat*

Any tree removal should avoid the active season (April 1-September 30)[262] for the Northern long-eared bat. The DNR NHIS letter states that to minimize impacts to roosting colonies, it is recommended that tree removal also be avoided from June 1 through August 15. Ensuring construction and operation are consistent with USFWS guidance would minimize impacts to this species. It should be noted that the Tricolored Bat could be considered for federal listing as a threatened or endangered species under the ESA by the time construction commences. The project must comply with USFWS conservation measures:[263]

1. The project must not disturb or disrupt hibernating Northern Long-eared Bat in a known hibernaculum during hibernation.

[262] USFWS Interim Consultation Framework for the Northern Long-Eared Bat, Appendix A, March 6, 2023, retrieved from: https://www.fws.gov/sites/default/files/documents/App%20A%20Standing%20Analysis%20Interim%20Consultation%20Framework_6Mar23.pdf.

[263] USFWS Interim Consultation Framework for the Northern Long-Eared Bat, Appendix A, March 6, 2023, retrieved from: https://www.fws.gov/sites/default/files/documents/App%20A%20Standing%20Analysis%20Interim%20Consultation%20Framework_6Mar23.pdf.

2. The project must not alter the entrance or interior environment of a known hibernaculum at any time of year.
3. The project must not remove any trees within 0.25 miles of a known Northern Long-eared Bat hibernaculum at any time of the year. The 0.25-mile tree clearing buffer serves multiple purposes including protecting hibernating bats from disturbance, protecting the hibernaculum's microclimate roosting habitat around the hibernacula, and providing some roosting and foraging protection during spring staging and fall swarming.
4. The project must not cut or destroy known occupied maternity roost trees, or any other trees within a 150-foot radius from the maternity roost tree, from June 1 – July 31.

If the USFWS reaches a decision on the final rule listing the species as endangered prior to project construction, the applicants will consult the USFWS to determine if additional measures are needed to prevent adverse impacts to tricolored bats.

*Blanding's Turtles*

The DNR stated in their NHIS letter that given the project details, actions are required to avoid the potential take of Blanding's turtles. There are two sets of actions required, depending on the location.

1. In the area between the Quarry Substation and the proposed Big Oaks Substation, the following avoidance measures are required:
    - Avoid wetland and aquatic impacts during hibernation season, between September 15th and April 15th, if the area is suitable for hibernation. Project activities that do not disturb the bottom of wetlands (e.g., working on the ice surface in frozen wetlands) will not have an impact.
    - To avoid inadvertent take, the use of wildlife friendly erosion control is required. Do not use products containing plastic mesh or other plastic components. Also, be aware that hydro-mulch products may contain small synthetic (plastic) fibers to aid in its matrix strength. These loose fibers could potentially re-suspend and make their way into wetlands, streams, and lakes. Please review mulch products and do not allow any materials with synthetic (plastic) fiber additives in areas that drain to waterways.
    - Construction areas, especially aquatic or wetland areas, should be thoroughly checked for turtles before the use of heavy equipment or any ground disturbance.
        - The Blanding's turtle flyer must be given to all contractors working in the area.
        - Monitor for turtles during construction and report any sightings to the DNR Nongame Specialist.
        - If turtles are in imminent danger they must be moved by hand out of harm's way, otherwise, they are to be left undisturbed.
2. An avoidance plan is required for the River Crossings and Big Oaks Substation portions of the project. The avoidance plan must:
    - Provide a description of the project activities and construction methods
    - Identify measures that will be taken to avoid take and minimize disturbance to the species
    - Include a map of disturbance areas.

Other measures to avoid or minimize disturbance include avoidance of suitable habitat, timing the impacts to avoid incidental take, the recommendations listed in the Blanding's turtle flyer, and training for the construction crew. Potential impacts could also be minimized by spanning wetland complexes

with adjacent sandy uplands – the applicants state that this impact minimization measure was implemented during construction of the existing infrastructure and will be implemented in areas where new transmission line corridor is proposed.

*Loggerhead Shrike*

Given the potential for this species to be found in the vicinity of the project, the DNR originally stated in its NHIS letter that tree and shrub removal must be avoided during the breeding season, April through July, in the Big Oaks Substation and River Crossing areas. While originally DNR concluded that loggerhead shrike avoidance measures must be taken, they later communicated to EERA that recent surveys indicate that they are no longer using the project area (Appendix G). Thus, impacts to this species are not anticipated. The seasonal restrictions on tree and shrub clearing are not required to avoid impacts to shrikes.

*Butternut*

Given this species has been documented in the vicinity of the project, the DNR stated in its NHIS letter that a qualified surveyor is required to conduct a botanical survey of any deciduous trees in the project area to be removed in Sherburne County and T123N R27W Section 7 and T122N R25W Sections 30-33 in Stearns County. Survey results should be sent to the DNR NHIS Review Team. Because this species is highly susceptible to the butternut canker fungal disease, it is imperative to inspect and clean all equipment prior to bringing it to the site in these areas to prevent spread of invasive species.

*Marbled Godwit*

he DNR stated in its NHIS letter that if feasible, the applicants should avoid impacts to nesting habitat between May and August in this region. However, since this species was documented west of the Quarry Substation, it is unlikely any new project construction would impact this species.

*Creek Heelsplitter and Black Sandshell*

The DNR stated in its NHIS letter that it is important effective erosion prevention and sediment control practices be implemented and maintained throughout the duration of the project near the river to minimize impacts to these species particularly vulnerable to deterioration in water quality, especially increased siltation. The applicants will implement appropriate BMPs to prevent erosion and sediment runoff and protect water quality.

## Unavoidable Impacts

**Resource impacts are unavoidable when an impact cannot be avoided even with mitigation strategies.**

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

Unavoidable adverse impacts associated with construction of the proposed project include:

- Possible traffic delays and fugitive dust on roadways.
- Visual and noise disturbances.
- Soil compaction and erosion.

- Vegetative clearing; removal or changes to wetland type and function to be confirmed after delineation is completed.
- Disturbance and temporary displacement of wildlife, as well as direct impacts to wildlife due to inadvertent injury during structure placement or other construction activities.
- Minor amounts of habitat loss.
- Converting the underlying land use to an industrial use.
- Criteria pollutant and GHG emissions.

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

- Visual impact of structures, conductors, and the new Big Oaks Substation.
- Change in landscape character and any subsequent impact to cultural values.
- Loss of land use for other purposes where structures are placed.
- Injury or death of avian species that collide with, or are electrocuted by, new transmission lines or conductors.
- Interference with AM radio signals.
- Continued maintenance of tall-growing vegetation.
- Criteria pollutant and GHG emissions.
- Increased EMF on the landscape (potential impacts from EMF are minimal and are not expected to impact human health).

## Irretrievable or Irreversible Impacts

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

Irreversible impacts include the land required to construct the transmission line. While it is possible that the structures, conductors, and buildings could be removed and the right-of-way restored to previous conditions, this is unlikely to happen in the reasonably foreseeable future (~50 years). As it will be determined after wetland delineation, the loss of wetlands would be considered irreversible, because replacing these wetlands would take a significant amount of time. Certain land uses within the right-of-way will no longer be able to occur, especially at the Big Oaks Substation.

An irretrievable commitment of resources means the resource is not recoverable for later use by future generations. These impacts are primarily related to project construction, including the use of water, aggregate, hydrocarbon fuel, steel, concrete, wood, and other consumable resources. The commitment of labor and fiscal resources is also considered irretrievable.

## Resource Topics Receiving Abbreviated Analysis

**Resource topics that will have negligible impacts from the project and that do not impact the Commission's route permit decision receive less study and analysis.**

Many environmental factors and associated impacts from a project are analyzed during the environmental review process. However, if impacts are negligible and will not impact the permit decision, those resource impacts receive less study and analysis. The following resource topics meet this threshold, which is based on information provided by the applicant, field visits, scoping comments, environmental analysis, and staff experience with similar projects.

### Displacement

To the extent possible, the project will be constructed on land owned by the applicants. In that case, the project will not use traditional transmission line easements for right-of-way. No residence or business is expected to be removed for either the proposed project of the DNR Alternatives 1-3 to facilitate construction and operation. DNR Alternatives 2 and 3 would require additional easements on private property for construction of the transmission line that aren't required for the other routing options but would not result in displacement.

### Electronic Interference

The project area is served by several AM and FM radio stations, and digital television channels. 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. Additionally, 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.

There are a few cellular, AM, FM, Microwave, TV, or other broadcast transmission towers within the project area according to publicly available Federal Communications Commission sources, however, they are mostly along the existing transmission line to be double-circuited. There is one cellular tower within half a mile of the Eastern Option and DNR Alternative 1, and one microwave service tower near the Big Oaks Substation Siting Area. Thus, interference is not expected with AM, FM, TV, and other broadcast transmission towers. Impacts are also not expected to the cellular tower, as phone signals use an ultra-high frequency, generally around 900 MHz, which is significantly higher than the range of electromagnetic noise generated by transmission line conductors. Microwave service towers use a beam of radio waves in the microwave frequency range to transmit video, audio, or data between two locations. Of all the radio frequencies affected by corona-generated noise, AM radio interference is the most common, typically occurring immediately under transmission lines. Thus, impacts from the Big Oaks Substation and other parts of the project near the microwave service tower are not expected.

Electronic interference associated with electrical infrastructure is related to a phenomenon known as corona. Impacts are not expected, because anticipated electric fields are below levels expected to produce significant levels of corona. Section 5.4.3 of the DRP requires permittees to take whatever action is feasible to restore or provide equivalent reception should interference occur to "radio or television, satellite, wireless internet, GPS-based agriculture navigation systems or other communication devices" as a result of the project. Additional mitigation is not proposed.

### Forestry

Cutting tall growing vegetation (trees) is required to allow for the safe operation of the transmission line or to clear land for the Big Oaks Substation. Tree clearing can impact current and future forestry operations. Field visits indicate that active forestry operations, such as commercial timber harvest or woodlots, are not occurring in the route width around the River Crossing area. The applicants state that there are no commercial forest operations identified within the proposed route. The route segments follow existing ROWs for most of their lengths meaning they do not bisect large contiguous forested parcels. Substation locations are not in forested areas. Impacts to forestry operations are not expected to occur.

The landowner list that will require new easements for the DNR Alternatives do not include commercial timber companies. While personal use timber harvest may be occurring, potential impacts can be mitigated. The applicants indicate they will work with landowners to minimize damage and arrange compensation as applicable, thus it's possible that easement agreements can compensate for impacts to future timber harvest. These agreements are outside the scope of this EA.

### Geology

The project area is mostly within a province characterized by relatively extensive surficial sand plains that are part of a thick layer of sediment deposited by glaciers overlaying the bedrock. There are no mapped karst features in the project area and outside of areas prone to surface karst development. Construction of the project will not alter geology because construction methods will not cause significant bedrock and geologic structure modification. Impacts to geology are not expected to occur.

### Tourism

Electrical infrastructure can impact tourism if they affect visitor experiences at tourism sites, primarily through aesthetic or noise impacts, or degrade natural or human-made resources that provide tourist-type activities. Tourism in the vicinity of the proposed route centers around outdoor recreational activities such as state and county parks, WMAs, WPAs, state water trails, and snowmobile trails. Local economies benefit from tourists who travel from outside the region to enjoy these recreational amenities. Any impacts to tourism would occur due to construction, thus, impacts would be temporary and isolated to specific areas throughout the proposed route. To the extent practicable, the applicants would plan the construction timeline for winter, to avoid the higher volume recreation seasons at these public lands. Various sections of the DRP indirectly address impacts to recreation, such as noise, aesthetics, soils, etc. and as a result indirectly mitigate impacts to tourism. No mitigation is proposed.

## Cumulative Potential Effects

**Cumulative potential effects result from the incremental effects of a project in addition to other projects in the environmentally relevant area. Consideration of cumulative potential effects is intended to aid decision-makers so that they do not make decisions about a specific project in a vacuum. Effects that may be minimal in the context of a single project may accumulate and become significant when all projects are considered.**

Minnesota Rule 4410.0200, subpart 11a, defines cumulative potential effects, in part, as the "effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects ... regardless of what person undertakes the other projects or what jurisdictions have authority over the project."

### Analysis Background

The "environmentally relevant area" includes locations where the potential effects of the project coincide with the potential effects of other projects to impact the elements studied in this EA. Generally, this area includes the ROI for the different resource elements. Consideration of cumulative potential effects is intended to aid decision-makers so that they do not make decisions about a specific project in a vacuum. Effects that may be minimal in the context of a single project may accumulate and become significant when all projects are considered. Cumulative potential effects—where they coincide—increase or decrease the breadth of the impact to the resources and elements studied in the potential

impacts and mitigation sections in this EA. This may or may not change the impact intensity level assigned to the resource or element.

Where cumulative effects are anticipated, a written description is provided. Where cumulative potential effects are not anticipated no further analysis is provided. For the purposes of this EA, actions that have occurred in the past and their associated impacts are considered part of the existing environmental and were analyzed in this section.

### Existing Projects

Generally, projects already constructed can be considered a part of the existing environment. While cumulative potential effects tend to focus on future projects, effects from past projects that affect the same resources should also be considered in an assessment of incremental effects that could occur with the proposed project.

For instance, while the Vonco II Waste Management Campus landfill has been a part of the landscape for a number of years, it's visual effects may compound with the new Big Oaks Substation. This landfill is immediately adjacent to the east of the Big Oaks Substation Siting Area. The highest elevation point at this landfill appears to be approximately 1,045 feet, whereas the highest point for the bluff on the same side of the river is approximately 1,000 feet. This additional 45 feet of height at the landfill is currently visible to residents on the west side of the river; thus, if the Big Oaks Substation is constructed to a similar height, aesthetic impacts could be cumulatively greater to local residents.

The existing Sherco Power Plant is farther north from the Big Oaks Substation Siting Area, approximately one mile. The tallest stack at this site is from a coal fired boiler at about 650 feet and is also a part of the viewshed in the local area.[264] However, this facility is in excess of a mile from the project most northern boundary, largely obscured by the river bluff elevation of about 1,000 feet, and will have less of a cumulative impact on aesthetics. It nonetheless contributes to an increased industrial landscape along a more rural segment of the Mississippi River, which overall may be considered insignificant, but to residents within the viewshed (such as those across the river), the impact would be more significant. The Sherco Power Plant will cease operations by 2030. The existing interconnection infrastructure and agricultural land nearby is likely to create an opportunity for additional solar development in the area over the next decade.

Adjacent to the power plant is Liberty Paper, Inc., a smaller facility that is not expected to cumulatively affect visual impacts but emits an above average amount of air pollution such as Volatile Organic Compounds and Sulfur Dioxide.[265] Their emissions pale in comparison to the nearby Sherco Power Plant, which is one of the highest emitters of Nitrogen Oxide and Sulfur Dioxide in the state.[266] The nearby Monticello Nuclear Plant is not a significant source of air pollution in comparison to either facility. However, the proposed Big Oaks Substation is not expected to be a significant source of air pollution as discussed in the Air Quality section of this EA, even with future expansions in mind as discussed later in this section of the EA.

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[264] Minnesota PCA (September 11, 2023). *What's In My Neighborhood, Xcel Energy - Sherburne County Generating Plant*. Documents: 14100004-107-aqpermit. Retrieved from: https://webapp.pca.state.mn.us/wimn/site/2344/documents.

[265] Minnesota PCA (2022 reported air emissions). *Point source air emissions data.* Facility ID 14100036. Retrieved from: https://public.tableau.com/app/profile/mpca.data.services/viz/Pointsourceairemissionsdata_v10_5-11130/Byfacility.

[266] *Ibid.,* Facility ID 14100004.

Other existing facilities that are a part of the current landscape that were considered but do not have a significant contribution to a cumulative potential effect on the same resources are the University of Minnesota's SPRF, existing transmission lines in the same area, the Martin Mariella Monticello Gravel Pit, and oak savanna forest restoration maintained by the applicants near the River Crossing.

### Future Projects

Cumulative effects are discussed here for projects that are foreseeable in the next five years in the project area. It is assumed that the construction-related impacts of these projects are short-term, for example, construction impacts will cause local disturbances, such as increased noise levels, and traffic delays/and reroutes. Thus, the discussion here is focused on the potential long-term impacts of these projects.

EERA staff analyzed what projects are "reasonably likely to occur"[267] as summarized in Table 32. To staff's knowledge, the planned, privately sponsored projects in the project area include the Xcel Energy Sherco 3 Solar Project, Northland Reliability Project, an additional potential Xcel Energy solar facility, three battery storage projects to be permitted, a permitted battery storage project on Sherco Power Plant property, the Minnesota Energy Connection Project, a Microsoft Data Center, and the Country Lumber development project. This is based on information from the applicants, such as responses they received from other State, County, Township, and local agencies as stated in the application, as well as a review of other public projects within the County, from MnDoT, or as covered in media reports.

**Table 32: Reasonably Foreseeable Future Projects**

| Project | Location | Anticipated Timeframe | Description |
|---|---|---|---|
| Decommissioning of Sherco Generating Station | Becker | 2023 - 2030 | The 3 units of the 2,400 MW coal fired Sherco Generating Facility will be retired in phases between December 2023 and 2030 |
| Sherco Solar 3 Project | Becker | 2024 | 250 MW solar energy generating facility in Becker |
| Sherco Solar Units 1 and 2 | Becker, Clear Lake | 2024 - 2025 | 460 MW solar energy generating facility in Becker |
| Unnamed Xcel Energy Solar Project and Associated Transmission Line | Sherburne County | 2025 - 2027 | 800 acre solar facility approximately 1.75 miles north of the Sherco Solar 3 facility. Would also include a transmission line. |
| Xcel Energy Long Duration Energy Storage Project - Becker | Becker | 2024 - 2025 | 10 MW energy storage battery project on the existing Sherco plant site in Becker. |
| Xcel Energy Sherco West Battery Energy Storage (BESS) | Clear Lake Township | 2025 - 2028 | 58 MW BESS on a 20-acre site adjacent to the Sherco Generating Plan in Clear Lake Township. |
| Xcel Energy Battery Storage | Becker | 2024 - 2025 | 10 MW/1,000 MWh iron-air battery storage system as a pilot project on 5 acres at Sherco Plant |
| Microsoft Data Center | Becker | TBD | Microsoft recently purchased 295 acres from Xcel Energy to develop a data center. |

[267] Minn. R. 4410.0200, subp. 11a.

| | | | |
|---|---|---|---|
| Elk River Technologies Data Center | Becker | TBD | Elk River Technologies has an option to develop a data center on 348 acres in Becker for a data center. |
| Potential Xcel Data Center | Becker | TBD | Xcel Energy is marketing a site to the west of the Sherco plant for a potential data center. |
| Highway 24 Bridge | Clearwater | 2026 | Reconstruction of Highway 24 bridge over Interstate 94 in Clearwater |
| Northland Reliability Project | Sherburne to St. Louis Counties | 2025 | Project would add 140 miles of new double-circuit 345 kV transmission line and replace 40 miles of existing line with double-circuit 345 kV transmission line from the Iron Range Substation to the new Big Oaks Substation. |
| Minnesota Energy Connection Project | Sherburne County | 2025 - 2031 | New double-circuit 345 kV transmission line between the Sherburne County Substation and Lyon County. Several routes are under consideration. One route follows River Road SE (Sherburne CR 8) near units 3, 4, 5, and 6. |
| Country Lumber development project | Sherburne County | 2023-2024 | 10-acre development project less than two miles northeast of the Big Oaks Substation siting area in the City of Becker. Currently constructing a main office and multiple lumber storage outbuildings. |

Although improvements to U.S. Highway 10 between St. Cloud and Clear Lake and the intersection of US. Highway 10 and Highway 25 near Becker are being studied, no specific projects are yet proposed or funded, and not included in this assessment.

Additionally, no relevant projects were found on the Environmental Quality Board's interactive project database other than the Long Duration Energy Storage Project listed above.[268] Information was checked for the South St. Louis Soil and Water Conservation District, Sherburne County Planning, and the City of Becker Planning, and one future project that intersects with the proposed project was identified. The City of Becker showed a 10-acre Country Lumber development project taking place less than two miles northeast of the Big Oaks Substation siting area in Becker.[269]

Regarding the construction and operation of the project for the purposes of this cumulative potential effects analysis, the assumption that the Big Oaks Substation will not be decommissioned and removed at the end of the project's useful life was used. The following subsections analyze the cumulative potential effects of the project and the reasonably foreseeable future projects where potential effects coincide.

### HUMAN SETTLEMENT

Cumulative potential effects on human settlements are anticipated to be moderate. Future projects will result in long-term aesthetic impacts. Some projects would have positive effects on human settlements by improving transportation and safety. Most will occur in developed areas, for example, in cities and along existing roads and highways. These impacts are anticipated to be both positive, for example, the Highway 24 Bridge, and negative, such as with the proposed project.

[268] Environmental Quality Board Environmental Review Projects Database, retrieved from: https://webapp.pca.state.mn.us/eqb-search/search

[269] City of Becker, retrieved from: https://www.ci.becker.mn.us/388/Development-Project-Updates

Future energy and data center projects will result in aesthetic impacts. The anticipated transportation projects are largely improvements in existing roadways, so aesthetic impacts are anticipated to be minimal. Collectively, the growth of solar energy generation, both utility-scale and community solar, will change the aesthetics of the area by converting agricultural land to power production. The proposed project will also result in aesthetic impacts as discussed in this EA. New solar facilities, data centers, and transmission lines introduce new visual elements into the landscape, while the decommissioning of the Sherco Generating Plant will remove a large visual element in the existing landscape. The proposed project might negatively affect property values, and cause additional impacts to aesthetics and rural character.

Decommissioning of the Sherco Generating Plant, construction of the proposed project, and the other identified projects will generate construction related jobs and material sales. These jobs and materials may or may not be sourced locally. Impacts are anticipated to be positive, but short-term. The closure of the Sherco Generating Plant will result in the loss of approximately 300 fulltime positions. While none of the identified projects are anticipated to create significant numbers of long-term jobs individually, the cumulative impact will somewhat counter the job losses from the Sherco Generating Plant. The increase in renewable energy projects in the area may increase tension in the project area between renewable energy and rural character.

#### Public Health and Safety

Cumulative potential effects on public health and safety are anticipated to be minimal to slightly positive. Impacts on public health and safety as a result of the proposed project are anticipated to be minimal as discussed in this EA. Some of the projects considered here are road and highway related. They are undertaken to maintain and improve local roads to ensure their safe operation and the public's health and safety.

The proposed project and the other transmission projects identified to connect to the Big Oaks Substation would make the electrical grid more reliable and is expected to add to background EMF levels. Most of the projects foreseen in the project area are energy-related and are also expected to have minimal impacts on public safety when operational. However, impacts are anticipated to be negligible. Construction activities along with maintenance of electrical equipment have inherent risks. These risks are minimal to trained personal. Potential impacts can be mitigated through worker training, safety equipment, etc. The overall impact intensity level is anticipated to remain minimal.

#### Land-based Economies

Cumulative potential effects on land-based economies are anticipated to be moderate. Electrical outages are not expected due to construction of the project. The project area continues to see a decline in agricultural lands due to population growth in the area as well as additional electric power generation, particularly solar generation, and data centers. Additional energy infrastructure will result in conversion of agricultural land from production to power generation.

#### Archaeological and Historical Resources

Because archaeological resources are unidentified, cumulative potential effects are unknown. There are 79 potential sites within the proposed route. The applicants will survey the construction area for the presence of these sites in the summer of 2024 and coordinate with SHPO. Since any identified sites that could be impacted by construction will be coordinated with SHPO, and state and/or federal regulations will apply to avoid impacts to these resources, the overall impact intensity level is expected to remain

minimal. With proper mitigation measures, impacts to these resources can be minimized. Cumulative potential effects from reasonably foreseeable future projects are also not expected because they will not be occurring in the parts of the project that include new construction in previously undisturbed areas.

### Natural Resources

Cumulative potential effects on the natural environment are anticipated to be minimal to moderate. Most of the foreseeable projects are in cultivated agricultural areas or along roadways resulting in minimal loss of high-quality habitat or vegetation, which were rated as moderate for some routing options in this EA. Impacts are limited where projects such as road improvements or transmission lines occur along roadways by using existing infrastructure right-of-way. Wildlife might be inadvertently harmed or killed during construction. Long term impacts include a greater risk of bird electrocution or collision due to increased electrical equipment on the landscape. Potential impacts can be mitigated. The overall impact intensity level is expected to remain minimal; the increased presence of new transmission lines that will connect to the Big Oaks Substation may cumulatively increase the impact intensity level to moderate due to electrocution or collision for a diverse community of avian species that may use this ecologically significant portion of the Mississippi River.

Air quality impacts associated with construction vehicles for the proposed project and reasonably foreseeable future projects will occur over the short term (emissions and fugitive dust). HVTLs will produce ozone and nitrous oxide through the corona effect. Impacts would be long term, permanent, and negligible. The overall impact intensity level is expected to remain minimal.

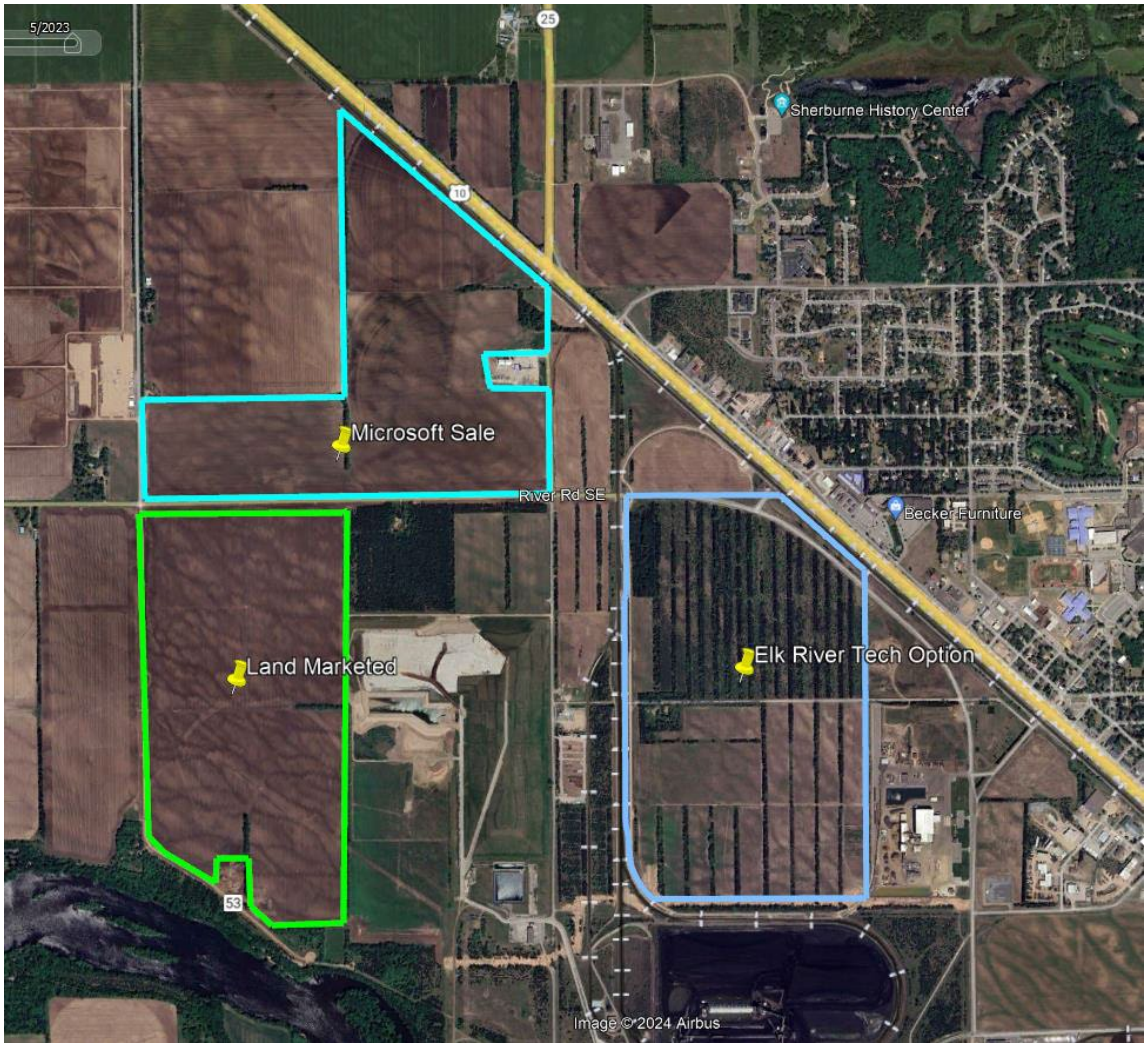
### Rare and Unique Resources

Cumulative potential effects on rare and unique natural resources are uncertain. There are relatively more rare and unique resources near the River Crossing, however, future transmission lines are expected to connect to the Big Oaks Substation on the east side of the Mississippi River.[270] If the proposed route of these transmission lines change and need to cross the same corridor of the river to connect to the Big Oaks Substation, cumulative impacts to MBS Sites of Biodiversity Significance and native plant communities could become significant, depending on the amount of transmission infrastructure that would further fragment ecologically significant habitats in this area. As future projects are currently proposed, the overall impact to Rare and Unique Resources are expected to remain minimal. If the numerous data center projects proposed in the area are poorly sited, these impacts could increase to moderate if more MBS Sites of Biodiversity Significance and native plant communities are affected. However, as they are currently proposed and shown in Figure 8 below, it is more likely these projects will take agricultural lands out of production rather than beneficial habitat. See also Sherburne County's Future Land Use Map, which has a unique energy production category.[271]

[270] See Minnesota Energy Connection Project Map, available at: https://www.mnenergyconnection.com/maps/. See Northland Reliability Project Map, available at: https://northlandreliabilityproject.com/maps/.

[271] Sherburne County (2023), *Future Land Use*. Retrieved from: https://www.co.sherburne.mn.us/DocumentCenter/View/9456/2023-Future-Land-Use-Map-.

**Figure 8: Major Data Center Projects in Becker**



# Chapter 5: Potential Impacts and Mitigation that Vary Between Routing Options

This chapter details potential human and environmental impacts and mitigative measures anticipated to be route specific, that is, different between the proposed project and DNR Alternatives 1-3. Chapter 4 defined how potential impacts and mitigative measures are described in this EA and also the environmental setting for the project. **Unless otherwise noted, the source of information for this chapter is the combined certificate of need and route permit application.**

## Natural Resources

Electric infrastructure such as transmission lines impact the natural environment. Impacts are dependent upon many factors, such as how the project is designed, constructed, and maintained. Other factors such as the environmental setting influence potential impacts.

### Vegetation

**The ROI for vegetation is the route width. The Big Oaks Substation is not expected to remove a significant amount of forested land. Potential impacts, such as clearing, compacting, or otherwise disturbing vegetation, are expected to be minimal for the Western Option and DNR Alternatives 2 and 3. Impacts would be more moderate for the Eastern Option and DNR Alternative 1.**

**Tree clearing impacts for the project are most impactful for the River Crossing where new transmission line construction will be occurring. DNR Alternative 2 and the Western Option have the least amount of forested land within their route width by far, meaning it may be easiest for these options to place an alignment that avoids the most impacts to forested land. Based on the alignments as they are currently proposed, the Eastern Option and DNR Alternative 1 would remove over 25 acres of forested land for the ROW, whereas the other routing options would remove less than 9 acres. Invasive species might establish. Potential impacts will be both short- and long-term. Impacts are localized, but unavoidable. Potential impacts can be minimized.**

The proposed route width is within four ecological subsections with the Minnesota River Prairie and Hardwood Hills subsections in the western two-thirds and the Anoka Sand Plain and Big Woods subsections in the eastern third. Pre-settlement vegetation in the Minnesota River Prairie subsection consisted primarily of tallgrass prairie and wet prairie islands. Floodplain forests were within the riparian areas along watercourses and waterbodies. In the Hardwood Hills subsection, irregular topography and presence of numerous lakes and wetlands provided a partial barrier to fire, resulting in more woodland or forest compared to the Minnesota River Prairie subsection. At pre-settlement, mixed hardwood forests were found in the eastern portion of the subsection, while tallgrass prairie was found on flatter terrain in the west. Pre-settlement vegetation in the Anoka Sand Plain subsection primarily consisted of oak barrens and openings. Upland prairie and floodplain forest formed a narrow band along the Mississippi River, while a large portion of the sandplain was primarily brushland. Pre-settlement vegetation in the Big Woods subsection was dominated by oak woodlands and maple-basswood forests. Aspen forests were common along the western edge of the subsection, along with bur oak forests.

Today's landscape along the route width is dominated by agricultural land, with corn and soybeans representing most of the crops. Areas of native vegetation with native prairie, plant communities, and SBS sites are present along the proposed route, namely clustered around the River Crossing. Impacts to

native plant communities and native prairies were discussed in the Unique and Rare Resources section of this EA.

In other places along the proposed route where a new transmission line will be double-circuited on existing infrastructure, there are 9 SBS sites (numerous rated as "below" weren't included in this count; 9 rated "moderate") and no native prairies. No new poles or foundations are proposed within the route width where these SBS sites overlap except within the existing ROW for SBS site "SAUK CENTRE 36" that is already segmented. Thus, new pole and foundation construction activities should be able to access the areas with no impact to vegetation, and other impacts are not expected along parts of the project within existing ROW.

MDA administers the *Minnesota Noxious Weed Law*. Noxious weeds are defined as an annual, biennial, or perennial plants designated to be injurious to the environment, public health, public roads, crops, livestock, or other property. The purpose of the law is to protect residents of Minnesota from the injurious effects of these weeds.[272] MDA lists four categories of noxious weeds with differing levels of eradication, control, reporting, transport, sales, and propagation requirements. There are 14 weeds on the eradicate list, nine on the control list, and 15 restricted weeds.[273] None of the weeds on these lists are to be transported, propagated, or sold in the state.

Native North American wild rice is classified as a grass in the family *Poaceae* and the genus *Zizania*. The most common species throughout Minnesota is northern wild rice, or *Zizania palustris*.[274] Wild rice is a valued resource in Minnesota managed by the state that can be negatively impacted by water flow, turbidity, water quality and water level fluctuations. There is one DNR-designated wild rice lakes within the route width, Rice Lake within the City of Hasty. New infrastructure is not proposed on this segment of existing transmission line that will be double-circuited; thus, no new impacts are expected to this lake.

#### POTENTIAL IMPACTS

Construction activities will cause both short- and long-term impacts to vegetation. Short-term impacts will result from grading and other physical disturbances. Establishing and using access roads and staging and stringing areas will concentrate surface disturbance and equipment use, causing short-term impacts to vegetation. Site preparation and structure installation might remove, disturb, or compact vegetation. The Big Oaks Substation will be sited to avoid natural vegetation to the extent feasible and as such, construction will likely result in the permanent loss of 10 acres of agricultural land within the siting area.

Based on 2021 NLCD spatial data, tall growing vegetation estimates (including all forested cover types and woody wetlands) within the route width are:

- Western Option: 59.5 acres
- Eastern Option: 154 acres
- DNR Alternative 1: 202.4 acres
- DNR Alternative 2: 46.7 acres

[272] Minnesota Department of Agriculture, *Noxious Weed List*, updated January 2023, retrieved from: https://www.mda.state.mn.us/plants-insects/minnesota-noxious-weed-list.

[273] *Ibid.*

[274] Minnesota DNR, February 15, 2008. *Natural Wild Rice In Minnesota*. Retrieved from: https://files.dnr.state.mn.us/wildlife/wildrice/natural-wild-rice-in-minnesota.pdf?v=2024.03.26-12.23.19.

- DNR Alternative 3: 379.7 acres

While these impacts are inflated values since only 150 feet of width for each option would be cleared within their respective route widths, they do give an idea of which option may most easily avoid impacts to forested land within their route widths. For instance, DNR Alternative 2 and the Western Option have the least amount of forested land within their route width by far. Based on the proposed alignments, the total ROW acreage of impacts to forested land for each option are expected to be:

- Western Option: 8.5 acres
- Eastern Option: 29.3 acres
- DNR Alternative 1: 26.1 acres
- DNR Alternative 2: 4.7 acres
- DNR Alternative 3: 6.2 acres

The NLCD is based on 30-meter resolution meaning cover types are grouped into 30 by 30-meter blocks. This scale provides an accurate depiction of land cover types at the landscape scale. However, smaller cover types may be classified the same as larger, surrounding cover types. Therefore, when reviewing projects at a localized scale, the NLCD may not accurately depict all parcels. This often manifests in the overestimation of developed cover types near roads.

Long-term impacts include removal of woody vegetation within the right-of-way, which will result in conversion to low-stature vegetation (shrubs and grasses) throughout its length. Up to 4.7 to 29.3 acres of forested land would be cleared for construction of the River Crossing, depending on the routing option selected. The applicants would routinely clear woody vegetation from the right-of-way to ensure it does not interfere with the safe operation of the HVTL. At the River Crossing, depending on the route chosen, removal of woody vegetation will widen existing corridors through wooded areas or remove wooded areas from the landscape. Habitat fragmentation is discussed in more detail in the Wildlife and Habitats section of this EA. Conversion of wooded landscapes to open landscapes could indirectly affect native vegetation by increasing potential for spread of invasive and non-native species.

Construction activities could introduce noxious weeds and invasive species, especially 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. Noxious weeds have potential to dominate and displace native plants and plant communities, permanently altering ecosystem functions.

Maintenance and emergency repair could result in direct impacts to vegetation from removal, disturbance, or compaction caused by these activities. Maintenance and emergency repair is expected to be infrequent throughout the life of the project, and potential impacts to vegetation would be short-term and more localized than construction-related impacts.

#### MITIGATION

Impacts to vegetation, especially trees, can be avoided or minimized by selecting a route that avoids important vegetation resources. For the River Crossing, collocating with existing infrastructure right-of-way, for example, roadways or transmission lines, might limit tree removal. DNR Alternative 1 is the only routing option that follows some existing right-of-way for the River Crossing, however, would need to

expand it by 75 feet wide in a densely forested area. Plant communities can be spanned. Additionally, new plantings within the right-of-way of compatible cover types, or planting of tall-growing trees in areas outside the right-of-way can mitigate impacts. Use of the wire/border zone method of vegetation clearing and management can reduce impacts to tall growing species at the edge of the right-of-way. Major restoration efforts for the community could include replacing trees within the same local municipality and monitoring all restoration efforts for multiple growing seasons.

Mitigation measures to reduce the spread of invasive and non-native plant species during construction include the regular and frequent cleaning and inspection of construction equipment and vehicles; minimizing ground disturbance to the greatest degree practicable; rapid revegetation of disturbed areas with native or appropriately certified weed-free seed mixes and using weed-free straw and hay for erosion control; conducting field surveys of the right-of-way prior to construction to identify areas containing noxious weed (weed surveys during construction would identify infestations of the right-of-way and staging areas); and eradicating new infestations as soon as practicable in conjunction with landowner input.

Mitigation and restoration measures for vegetation on landowner property are standard Commission route permit conditions. Impacts can be mitigated by compensating individual landowners through negotiated easement agreements. No further mitigation is recommended.

### Wildlife and Habitat

**The ROI for wildlife and habitat is the route width, whereas the ROI for avian species is the local vicinity. Wildlife and avian species in the local vicinity are expected to be displaced during construction due to increased human activity. Most wildlife would return to the area after construction. Distinct impacts to terrestrial species, avian species, and habitat will occur. Due to the limited amount of ROW clearing associated with the project overall, potential impacts to wildlife and habitat are expected to be minimal for most routing options; the Eastern Option and DNR Alternative 1 are rated moderate due to the acreage of MBS Sites of Biodiversity Significance that would be cleared for new ROW, the percentage of those MBS Sites of Biodiversity Significance considered high quality, acreage of forested habitat that would be cleared for new ROW, clearing on an island likely important to avian species, and an Aquatic Management Area nearby the island. The Eastern Option also has the highest potential for impacts from edge effect and avian collision, whereas DNR Alternative 1 has the least potential for impacts for both those categories.**

**Impacts to terrestrial species will be intermittent, temporary, and localized during construction. While direct significant impacts might occur to individuals, population level impacts are not anticipated. These minimal, short-term impacts can be minimized. Operational impacts are expected from intermittent but long-term maintenance of the right-of-way.**

**Impacts to habitat are primarily associated with creating new transmission line corridors. Avian species – especially large bodied birds – are susceptible to electrocution from, and collision with, HVTLs during operation. All routing options would introduce an additional transmission line to the existing five in the local vicinity that cross the Mississippi River, an area that likely supports large numbers of raptors and migratory birds near high quality habitat and sensitive plant communities. Potential impacts to avian species are expected to be moderate for most routing options due to the new corridor that will be introduced over the river, resulting in a new flight obstacle and increased habitat loss in addition to the existing transmission lines. Impacts to wildlife and habitat are expected to be the greatest for the Eastern Option and the least for DNR Alternative 2. These short- and long-term, localized impacts are unavoidable but can be minimized.**

Construction and operation for all routing options may cause short-term and long-term impacts to wildlife and habitat. Impacts on wildlife are assessed by evaluating the vegetation cover/habitat in the project area, and the proximity of the project to wildlife habitat. The project area is entirely within the Eastern Broadleaf Forest Province per the DNR's Ecological Classification System. [275]

Vegetation communities in the project area currently include agricultural land, wetlands, wildlife lands, forest, native plant communities, and residential lawns. Pre-European settlement in this portion of the State were historically prairie and semi-humid mixed conifer-deciduous forests. Boundaries of the province are defined by deciduous and the mixed conifer-hardwood forest. The area has been cut by rivers into deep valleys along the present course of the Minnesota, St. Croix, and lower Mississippi rivers. Headward erosion of streams draining into the deepening Mississippi valley dissected the flanking uplands, exposing bedrock and drift, contributing massive amounts of sediment and silt to river valleys. Precipitation approximately equals evapotranspiration in this region, seemingly an important influence on forest and prairie species. [276]

[275] Minnesota DNR, *Ecological Classification System*. Eastern Broadleaf Forest Province. Retrieved from: https://www.dnr.state.mn.us/ecs/222/index.html

[276] *Ibid.*

### Wildlife and Habitat Lands

Several lands that are preserved or managed for wildlife and associated habitat are scattered throughout the geographic area. These lands within the route width of the existing line to be double-circuited include: the Lake Osakis and Avon Hills National Audubon Society Important Bird Areas (IBA), several USFWS Grassland Bird Conservation Areas (GBCA), the USFWS Douglas and Stearns County Waterfowl Production Areas, and the DNR Sauk River WMA.

The National Audubon Society works to identify, monitor, and protect habitat for bird species throughout the United States, in part by designating sites as IBAs. The USFWS designates GBCAs as priority areas for grassland protection and enhancement that are thought to provide suitable habitat for many or all priority grassland bird species in tall grass prairie. Waterfowl Production Areas are small natural wetlands and grasslands designated by USFWS that provide breeding, resting, and nesting habitat for waterfowl, shorebirds, grassland birds and other wildlife. The DNR manages WMA land to protect wildlife habitat as well as provide hunting and recreational activities related to wildlife.

There are no Scientific and Natural Areas, wetland banking easements, or Migratory Waterfowl Feeding and Resting Areas within the route width. Two Reinvest in Minnesota conservation easements (easement no. 73-01-92-01 and 21-03-09-02) are within the route width of the existing line to be double-circuited.

### Wildlife Action Network

Parts of the project are within areas identified as the DNR's Wildlife Action Network (WAN).[277] The WAN identifies significant aquatic and terrestrial biological habitats across the state with the intent of aiding conservation efforts to address large-scale threats, including climate change, invasive species, habitat loss, and others. The WAN is a metric that can be used to assess buffers and connectors of habitats representing the diversity of habitat quality, supporting Species in Greatest Conservation Need (SGCN).[278] As detailed by the DNR, "Consideration should be given to projects or activities that could result in the loss, degradation or fragmentation of habitat within the WAN, as habitat loss was identified as a substantial contributor to SGCN population declines." SGCN are defined as native animals whose populations are rare, declining, or vulnerable to decline and are below levels desirable to ensure their long-term health and stability.[279]

For purposes of this EA, scores in areas of the WAN assigned "medium" or higher were to assess the wildlife impacts from the project, where multiple metrics overlap to contribute to a score of "medium" or higher. A few parts of the route width include those criteria: Robinson Hill Creek (the trout stream), an area directly east of that before the route nears the Mississippi River, the area around Warner Lake and Plum Creek, and the River Crossing area that includes the Mississippi River. Of all these areas, only the River Crossing is likely to be potentially impacted because the other areas are within the part of the project that will be double-circuiting existing infrastructure.

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[277] Minnesota DNR, *The Wildlife Action Network developed for the 2015-2025 MN Wildlife Action Plan.* (April 2016). Retrieved from: https://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/mnwap/mndnr_wildlife_action_network_description.pdf.

[278] *Ibid.*

[279] Minnesota DNR, *Minnesota's Wildlife Action Plan 2015-2025*, Chapter 2 (2016). Retrieved from: https://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/mnwap/wildlife-action-plan-2015-2025.pdf

The WAN scores in the River Crossing area are "medium" flanking the Mississippi River, including the majority of the Big Oaks Substation Siting Area. Additionally, the segment of the Mississippi River itself in this area is scored "medium-high". The medium score for both sides of the river is due to SGCN richness and sites of biodiversity significance. The medium-high score is attributed to SGCN populations and stream biotic integrity in addition to SGCN richness and sites of biodiversity significance.[280] SGCN richness grids provide information on SGCN that did not have mapped populations, representing "hotspots" for these species.

### Wildlife in Local Vicinity

Most wildlife using the local vicinity are common species associated with disturbed habitats and are accustomed to human activities occurring in the area, for example, agriculture, roads, and rural homesteads. There are hotspots of diverse habitat for resident and migratory wildlife species. The applicant identified wildlife that could be present within the project area: large and small mammals, songbirds, waterfowl, raptors, fish, reptiles, mussels, and insects. These species use the area for forage, shelter, breeding, or as stopover during migration.

The applicants assessed information about plants and wildlife through the USFWS's Information, Planning, and Conservation (IPaC) tool and identified three threatened, endangered, or candidate species that could be present in the project area. These include the endangered Northern Long-eared Bat, the proposed endangered Tricolored Bat, and the candidate Monarch Butterfly. Potential impacts to these species are further discussed in the Rare and Unique Resources section of this EA.

In addition, the USFWS identifies Birds of Conservation Concern of migratory birds that are a conservation priority to the USFWS but are not listed as having status protected by law. Twenty species in this USFWS category were identified as potentially present in the project area.[281] The birds with the highest probability of presence as presented in the report include the Bald Eagle, Black Tern, Chimney Swift, Lesser Yellowlegs, Red-headed Woodpecker, Rusty Blackbird, and Wood Thrush. The state of Minnesota, including the River Crossing, is in the Central Flyway of North America. Migratory birds use portions of the Central Flyway as resting grounds during spring and fall migration, as well as breeding and nesting grounds throughout the summer.

### Potential Impacts

#### *Construction*

During construction, wildlife in the project area may be displaced due to equipment noise, increased human activity, and other disturbance of habitat. The distance animals are displaced depends on the species and the tolerance level of each animal. Most wildlife would likely return to the area after construction; however, others might be permanently displaced. Because other suitable habitat is available in and near the project area, potential temporary impacts to wildlife are not expected to cause permanent changes to local populations.

[280] Minnesota DNR, *The Wildlife Action Network developed for the 2015-2025 MN Wildlife Action Plan.* (April 2016). Retrieved from: https://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/mnwap/mndnr_wildlife_action_network_description.pdf.

[281] The Applicants' Route Permit Application, Appendix J. Retrieved from: https://apps.commerce.state.mn.us/web/project-file/12539.

Should winter construction occur, reptiles, such as snakes, move underground below the frost line and become inactive or hibernate over winter months.[282] Turtles and amphibians generally hibernate under pond bottoms, but will also hibernate on land underneath the frost line. As stated by the DNR, "Insects may winter above or below ground as eggs, larvae, pupae, or adults, depending on the species" in areas like grass thatch, leaf litter, bunch grasses, tunnels in wood, etc.[283] Impacts to overwintering reptiles, amphibians, and insects (pollinators) might occur during transmission structure placement, that is, individuals might be inadvertently killed, should placement occur at their place of hibernation.

During operations, the acres that would be cleared during construction would be restored where permanent infrastructure isn't present consistent with the VMP prepared by the applicants. The composition and structure of vegetation—and, as a result, wildlife habitat—will be altered in these areas. Habitat loss has a consistent negative affect on biodiversity and can adversely impact species richness, population growth rates, reductions in habitat specialist species, and breeding success, among other measures.[284] Potential operational impacts to wildlife would be associated with fencing, lighting, or noise from the project.

### *Habitat Fragmentation and Edge Effect*

Habitat fragmentation is "usually defined as a landscape-scale process involving both habitat loss and the breaking apart of habitat."[285] This definition, however, does not isolate the impact of fragmentation independent of habitat loss. The potential impact from habitat fragmentation—when controlled for habitat loss—is "generally much weaker than the effects of habitat loss."[286] Negative impacts associated with habitat fragmentation include 1) an increased number of smaller habitat patches interspersed among larger areas of non-suitable habitat, and 2) increased "edge for a given amount of habitat."[287]

"An 'edge' is the boundary, or interface, between two biological communities or between different landscape elements."[288] Edge effects may alter habitats that are important to interior forest dwellers through microclimate changes to these areas. Additionally, increased predation, competition, and parasitism from plants and animals intruding on interior forest environments can become more prevalent, as well as interior forest species increasingly moving through and along edges, that is, habitat transition areas.[289,290] Generally, fragmentation increases edge effect, which favors invasive and early successional species. It can lead to a brief up-tick in species abundance, but that is usually a short lived, if ever realized benefit. Habitat interior specialist species are generally sensitive to the pressures of edge effect, so in comparison even minor negative impacts would likely outweigh any positive impacts created by fragmentation.

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[282] Minnesota Department of Natural Resources (2010) Snakes and Lizards of Minnesota, retrieved from: http://files.dnr.state.mn.us/natural_resources/animals/reptiles_amphibians/snake_lizard_mn.pdf.

[283] Department of Natural Resources (December 2014) DNR Pollinator Best Management Practices, retrieved from: https://files.dnr.state.mn.us/natural_resources/npc/2014_draft_pollinator_bmp_guidelines.pdf.

[284] Fahrig, Lenore (2003). *Effects of Habitat Fragmentation on Biodiversity*, Annual Review of Ecology and Systematics (34):487-515. Retrieved from: http://www.montana.edu/hansenlab/documents/bio515_13/farhig%202003.pdf, page 487.

[285] Fahrig, Lenore (2003). *Effects of Habitat Fragmentation on Biodiversity*, ANNUAL REVIEW OF ECOLOGY AND SYSTEMATIC (34):487-515. Retrieved from: http://www.montana.edu/hansenlab/documents/bio515_13/farhig%202003.pdf, page 487.

[286] *Ibid.,* page 502.

[287] *Ibid.,* page 505.

[288] British Columbia Ministry of Forests Research Program (June 1998) Biodiversity and Interior Habitats: The Need to Minimize Edge Effects, retrieved from: https://www.for.gov.bc.ca/hfd/pubs/Docs/En/En21.pdf.

[289] *Ibid.*

[290] Fahrig, Lenore (2003), page 505.

Where the proposed transmission line will parallel existing right-of-way, such as with DNR Alternative 1, edge effects could be limited to one side of the right-of-way. As a result, edge effects are expected to intensify in locations where new right-of-way will be created and lessen where existing right-of-way is expanded, but this is also expected to be relative to the quality of habitat and the level of expansion.

*Substations*

The applicants stated that the Big Oaks Substation will be sited to avoid natural vegetation to the extent feasible and will likely be on agricultural land. As such, construction of the Big Oaks Substation will result in the permanent removal of 10 acres of agricultural habitat. Extensive similar agricultural habitat is present adjacent to the siting area.

Expansions for the Alexandria, Riverview, and Quarry Substations, along with construction of the new Big Oaks Substation will introduce increased lighting impacts to animals in the area. Animals depend on the daily cycle of light and dark for behaviors such as hunting, migrating, sleeping, and protection from predators. In addition to the undesirable effects of upward facing lighting, the hue of lights can also affect wildlife. LED lighting has become increasingly popular due to its efficiency and long lifespan. However, these bright lights tend to emit blue light, which can be harmful to birds, insects, and fish.

In areas near existing substations that will be adjusted to accommodate line taps or bypasses, impacts to wildlife are anticipated to be minimal and/or temporary in nature. Wildlife inhabiting these areas are already accustomed to disturbance from operation and routine maintenance activities.

*Double-Circuit Transmission Line*

Apart from structure placement, no other permanent changes to wildlife habitat are anticipated to occur within the right-of-way where the second circuit will be strung. Where 11 new structures will be placed in wetlands, transecting any wetland type can impact habitat quality and subsequent wildlife that depend on that habitat. However, all of these wetland structures will be placed in existing ROW that has already been cleared.

Permanent removal of potential habitat will occur in areas where up to 60 new structures are proposed along the existing line within the right-of-way or near existing substation to accommodate line taps or bypasses. Each structure will be within existing ROW, thus result in a permanent loss of approximately 115 square feet of potential habitat.

Preserved or managed wildlife lands were spanned to the extent feasible; however, the applicants state that the Avon Hills IBA is too large to span and will require the placement of three new structures within it.[291] Although the anticipated alignment is within the IBA, new impacts to bird species are expected to be minimal given that the area already contains several existing transmission lines adjacent to the anticipated alignment.

Where the second circuit will be strung along existing infrastructure, impacts to wildlife are anticipated to be minimal and/or temporary in nature. Wildlife inhabiting these areas are already accustomed to disturbance from operation and routine maintenance activities. In addition, the existing infrastructure already poses a threat to avian collisions; as such, the second circuit is not anticipated to pose a significantly increased threat.

[291] Route Permit Application, Appendix C, Maps C47 - C49 and C51 - C52.

### *Avian Species*

Per the Avian Power Line Interaction Committee (APLIC), migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can collide with power lines. Mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles.

The Bald and Golden Eagle Protection Act (BGEPA) provides additional protections and regulations specific to bald eagles and their nests. The potential presence of an eagle's nest within 500 feet of the Option route width was noted in a public comment submitted during the scoping period for the EA.[292] Suitable nesting habitat is present in the vicinity of the River Crossing and eagles could be actively nesting in the area. Eagles have the potential to be impacted during construction and operation of the project as a result of collision with transmission lines or if construction activities are conducted within 660 feet of an active eagle nest. During the nesting season construction noise and human activity may disturb nesting eagles to such a degree that adults abandon the nest.[293]

### *River Crossing Avian Impacts*

Potential impacts to avian species include electrocution from, and collision with, HVTLs during operation. Electrocution risk is greater with large-bodied birds and is most prevalent when the power line structure is the tallest feature on the landscape, such as on a river bluff. Each routing option will be spanning over river bluffs on each side of the river. The most critical component of avian electrocution is the "physical separation between energized and/or grounded structures, conductors, hardware, or equipment that can be bridged by birds to complete a circuit. Generally, electrocution can occur on structures with the following:

- Phase conductors separated by less than the wrist-to-wrist or head-to-toe distance of a bird;
- Distance between grounded hardware (for example, grounded wires, metal braces) and any energized phase conductor that is less than wrist-to-wrist or head-to-foot distance of a bird."[294]

Independent of the risk of electrocution, birds might be injured or killed by colliding with transmission line structures and conductors. The risk of collision is influenced by several factors including habitat, flyways, foraging areas, and bird size. Waterfowl, especially larger waterfowl such as swans and geese, are more likely to collide with transmission lines. The frequency of collisions increases when a transmission line is placed between agricultural fields that serve as feeding areas and wetlands or open water, which serve as resting areas. In these areas, it is likely that waterfowl and other birds would be traveling between different habitats, increasing the likelihood of collision.

This segment of the Mississippi River near the River Crossing has five existing transmission lines: one 115 kV line and four 345 kV (Appendix B, Map 2B). All four of the existing 345 kV lines cross the river to the east of all routing options near the Monticello Nuclear Generation Plant, whereas the 115 kV line

[292] Updated - Combined Public Comments on Scope of the EA, January 9, 2024. Brian Severson, page 26. eDockets No. 20241-202015-01.

[293] Bald and Golden Eagle Protection Act. June 8, 1940. 16 U.S.C. 668-668d. Retrieved from: https://www.fws.gov/law/bald-and-golden-eagle-protection-act.

[294] Avian Power Line Interaction Committee, Edison Electric Institute, and California Energy Commission (2006). *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*. Retrieved from: https://www.nrc.gov/docs/ML1224/ML12243A391.pdf, page 55.

crosses the river over the island near the Eastern Option and DNR Alternative 1. In this area, the river is not considered an IBA, Grassland Bird Conservation Area, or Waterfowl Production Area. It cannot be ruled out that this portion of the river could support large numbers of raptors and migratory birds. Where there are existing transmission lines, if the corridor gets wider such as with the Eastern Option and DNR Alternative 1, there would be the potential to create a barrier to movement, which is usually more common with grassland birds. Expanding the corridor could also increase the edge effect further into interior habitat – however, it is unlikely that impact would be significant. The DNR stated in their scoping comment letter that they strongly encourage the use of existing crossing corridors within this stretch of the Mississippi River, as the Eastern Option would further fragment the habitat in this area.[295]

The incidence of birds colliding with transmission lines is also influenced by the number of vertical planes in which the conductors are strung. The four existing 345 kV transmission lines crossing the river east of the Monticello Nuclear Generation Plant are generally designed with the same structures at 150 to 155 feet tall and have vertical planes at similar heights. The existing 115 kV transmission line is a smaller structure at 130 feet tall and with lower vertical planes. These heights of vertical planes for 115 kV that are different than 345 kV currently present an increased hazard for avian collision near the River Crossing. The existing 115 kV line and 345 kV lines are a bit less than one mile away from each other if a bird were traveling along the Mississippi River.

Varying heights of vertical planes in a common area result in increased flight obstacles for avian species. Stringing new conductors in a single vertical plane (with a shield wire on a separate plane, for a total of two vertical planes) presents less of a barrier to birds crossing the transmission line right-of-way. This configuration requires a wider structure (H-frame) with more vegetation clearing to accommodate a wider right-of-way of 230 feet. Conversely, stringing the conductor wires in more planes (for the project, four separate planes total) creates a greater barrier to birds attempting to fly, not only across the lines, but over and potentially between them (monopole) with less vegetation clearing for a 150 foot ROW.

The applicants propose to install bird flight diverters on the shield wire plane for any routing option to reduce the potential for avian collision. The applicants anticipate the following new structures with each routing option:

- The **Eastern Option** would utilize two new tangent single-circuit structures, smaller than existing 345 kV double-circuit structures in the area. Structures will be in vertical configuration on a monopole approximately 150 feet tall with four sets of vertical planes from the three conductor phases and shield wire. These conductor plane heights will be different than the existing 115 kV transmission line nearby at 130 feet, but the same as the 345 kV lines in this utility corridor. Potential for collision impacts would be increased on the island due to variations in height with the 115 kV line, but would be the same height as the 345 kV lines that are a bit less than a mile away.
- **DNR Alternative 1** would utilize one new double-circuit 345/115 kV monopole structure which would string the new 345 kV on one side and existing 115 kV on the other. This multi-pole angle structure is similar to an H-frame structure but unique as it's needed to reduce the lateral loading on the foundation, given the anticipated poor soil conditions on the island. The structure would consist of three planes at one section crossing the river, and four planes at another section crossing the river because it crosses the river at an angle, unlike the other routing

[295] Minnesota DNR Scoping Comments, January 8, 2024 eDockets No. 20241-201967-01.

options. Generally, the height would be approximately 120 feet. To facilitate the new 345 kV line over the River Crossing, the existing 115 kV line's conductor planes would change to coincide in height with the new 120 feet high crossing, however, because the height and number of planes will change as it crosses the river, this option both decreasing collision impacts from the existing 115 kV line by making it a uniform height with the new line, but also increases the number of planes present in this area in the river and thus increases impacts. These height inconsistencies will also differ with the nearby 345 kV lines, but this issue already exists with the 115 kV line.

- The **Western Option** and **DNR Alternatives 2 and 3** would utilize monopole or H-frame structures for the transmission lines crossing the river. Data throughout the EA is based on these options using monopole structures with a 150 foot ROW. If H-frames were used instead, two H-frames would be placed only on each side of the river, thus the river ROW would be 230 feet but would taper down to 150 feet once the lines reach the next structure.
    - Monopole structures would be in vertical configuration approximately 150 feet tall with four sets of vertical planes from the three conductor phases and shield wire.
    - H-frames would be in horizontal configurations approximately 120 feet tall with two sets of vertical planes from the one conductor phase plane and one shield wire plane.

  Each of these routing options are several miles from the existing transmission lines in the River Crossing area, thus impacts from heights of structures and planes aren't expected to interact with each other. DNR Alternative 3 is the farthest away from existing transmission lines that cross the river followed by DNR Alternative 2 and the Western Option. While being farther away may decrease the incidence of collision impacts with existing transmission lines, it may also create a new impact to birds flying through the area since there are no existing transmission lines. The largest collision impact for any of these options would be introducing a new transmission line corridor over the river, followed by the number of new planes based on which structure type is chosen. If H-frames are chosen, two new vertical planes would be introduced, whereas monopole structures would introduce four new vertical planes. Thus, H-frames on these routing options would be the least impactful among all routing options for collision impacts.

**Conclusion**

DNR Alternative 1 presents a moderate amount of avian collision impacts as it would be consistent in height with the existing 115 kV line without increasing impacts with the nearby 345 kV lines but would introduce more vertical planes that also vary in height to this area. The Eastern Option would introduce two specialty structures that would be 20 feet taller than the existing 115 kV line, increasing the variability of heights of vertical planes in a condensed area. The Eastern Option also does not have the flexibility in structure choice that the Western Option and DNR Alternatives 2 or 3 have, thus represents the highest potential for impact. The Western Option and DNR Alternatives 2 or 3 could decrease impacts the most by choosing H-frame structures with two sets of vertical planes in a new crossing corridor away from the existing transmission lines, which would represent the least amount of avian collision impacts.

### *Double-Circuit Line Avian Impacts*

Where the new transmission line to be double-circuited on existing infrastructure is near waterfowl production areas, IBAs, or GBCAs, avian collision occurrences may minimally increase; however, most of

the alignment is a suitable distance away from these areas, decreasing the likelihood of impacts.[296] To some extent, the integrity of some of these preserved or managed wildlife lands has already been altered from the construction and maintenance of the existing infrastructure and ROW. As such, impacts due to construction of the second circuit without new infrastructure proposed within these areas are not anticipated to further alter the quality of these habitats.

There are some parts of the alignment that cross IBAs or GBCAs where an additional transmission line will be strung on existing infrastructure, which will be collocated along the same vertical plane; thus, avian collision impacts in these areas are expected to be negligible. Multiple waterfowl production areas are nearly adjacent to the existing ROW, thus waterfowl utilizing these areas could encounter the transmission line. As with IBAs and GBCAs, the collocation of the additional transmission line on the same vertical plane would result in a negligible increase in impacts.

*Vegetation Clearing*

During construction of the River Crossing, current vegetation would be removed to accommodate the new electrical facilities and to stage associated materials and equipment. Estimated acreage of vegetation removed based on all the proposed alignments, which could change within their respective route widths, is summarized in Table 33.

**Table 33: Vegetation Removed Between Projects**

| River Crossing Name | Forested Area Cleared for ROW | Non-forested Area Cleared for ROW | Total Forested/Non-forested Area Cleared |
|---|---|---|---|
| **Western Crossing** | 8.47 acres | 4.70 acres | 13.17 acres |
| **Eastern Crossing** | 29.26 acres | 9.75 acres | 39.01 acres |
| **DNR Alternative 1** | 26.06 acres | 24.21 acres | 50.27 acres |
| **DNR Alternative 2** | 4.67 acres | 15.48 acres | 20.15 acres |
| **DNR Alternative 3** | 6.16 acres | 64.97 acres | 71.13 acres |

Although rivers will be spanned for most routing options, and no structures will be placed directly in the river, the increased vegetation clearing for new or expanded right-of-way will directly impact aquatic species and/or their habitat along this stretch. The Eastern Option and DNR Alternative 1 are near a specific aquatic habitat likely to be impacted, the Mississippi Island Sherburne State Aquatic Management Area. Vegetation clearing for new or expanded right-of-way will occur near existing corridors and be 150 feet wide for all routing options. DNR Alternative 1 would create double-circuited infrastructure and expand an existing right-of-way of 75 feet to 150 feet for a total of 75 new feet of ROW. While all routing options except DNR Alternative 3 require a minimal amount of new ROW between 1.4 and 2.9 miles (Tables 3 and 4), these clearings are concentrated in vegetation areas that include native prairies and moderate to high quality MBS communities (Table 31).

DNR Alternative 3 requires the most ROW clearing at 4.4 miles, whereas the Western Option requires the least at 1.4 miles. Structure installation on the island would require heavy equipment to access the work area. DNR Alternative 1 and the Eastern Option would disturb more habitat associated with the island. The island is encompassed by a MBS Site of Biodiversity Significance of biodiversity significance rated as “high” as discussed later in this section and in the Rare and Unique Resources section of this EA.

[296] Detailed route maps with waterfowl production areas, IBAs, and GBCAs can be viewed in Appendix C of the applicants’ Route Permit Application, accessible from: https://apps.commerce.state.mn.us/web/project-file/12536.

Routes that cross over the island are more likely to have moderate impacts to wildlife and habitat, as islands can be an important migratory stopover and nesting habitat. Additionally, the islands will likely have a fair number of birds landing and taking off from them. It varies by species, but the angle of descent and take-off can put birds at greater risk of strike as they maneuver through the air space.

DNR stated in its scoping comments that DNR Alternative 2 would cross at a narrower point of the Mississippi River with less impact to MBS Sites of Biodiversity Significance and native plant communities than the applicants' Eastern and Western Options. DNR Alternative 2 could likely span the river entirely, but still disturbs sensitive ecological areas (Table 34). DNR Alternative 3 entirely avoids MBS Sites of Biodiversity Significance and native plant communities, crossing the river at a narrow point that can likely be completely spanned to avoid disturbing the river bluffs. However, the applicants stated that DNR Alternative 3 would place structures very near the river bluff on the east side of the Mississippi River with limited safe working area due to the existing 345 kV lines, potentially disturbing the river bluffs (Appendix B, Map 4C). The Eastern Option is routed to avoid crossing over some of the smaller islands in the Mississippi River; as such, the anticipated alignment requires a new corridor, fragmenting densely forested wildlife habitat on a larger island in the Mississippi River that will cause permanent impacts.

Impacts to MBS Sites of Biodiversity Significance near the River Crossing (Appendix B, Maps 4A-4C) are expected to be the greatest along the Eastern River Crossing for the project, shortly followed by DNR Alternative 1. Several moderate to high MBS Sites are in the area as demonstrated by acreage amounts for each routing option in Table 34. DNR Alternatives 2 and 3 have the least amount of MBS Site of Biodiversity Significance acreage along the ROWs of their proposed alignments.

MBS Sites are assigned a biodiversity significance rank by MBS ecologists once surveyed.[297] These ranks communicate the statewide native biological diversity significance of each site based on the presence of rare species populations, the size and condition of native plant communities within the site, and the landscape context of the site.[298] Sites on the east side of the Mississippi River that could be impacted by the project are generally rated "moderate", meaning they contain occurrences of rare species, moderately disturbed native plant communities, and/or landscapes that have strong potential for recovery of native plant communities and characteristic ecological processes.[299] All of the sites that could be impacted by the project on the west side of the river are rated "high", meaning they contain very good quality occurrences of the rarest species, high-quality examples of rare native plant communities, and/or important functional landscapes (Appendix B, Map 14).[300]

**Table 34: Summary of MBS Site Impacts**

| Route Option | Western Option | Eastern Option | DNR Alternative 1 | DNR Alternative 2 | DNR Alternative 3 |
|---|---|---|---|---|---|
| **Transmission Line Type and Length (miles)** | 4.6 | 7.4 | 8 | 3.7 | 4.4 |

[297] Minnesota DNR, *MBS Site Biodiversity Significance Ranks*. Retrieved from: https://www.dnr.state.mn.us/eco/mbs/biodiversity_guidelines.html.
[298] *Ibid.*
[299] *Ibid.*
[300] *Ibid.*

| Route Option | Western Option | Eastern Option | DNR Alternative 1 | DNR Alternative 2 | DNR Alternative 3 |
|---|---|---|---|---|---|
| Stringing 2nd Circuit (345kV) on Existing Structures | 3.2 | 4.5 | 4.9 | 2.2 | - |
| Single Circuit 345kV | 1.4 | 2.9 | 2.2 | 1.6 | 4.4 |
| Double Circuit (345kV/115kV) | - | - | 0.7 | - | - |
| Triple Circuit (345kV/345kV/115kV) | - | - | 0.3 | - | - |
| **Structure Count** | **27** | **42** | **45** | **23** | **26** |
| Stringing 2nd Circuit (345kV) on Existing Structures | 17 | 24 | 26 | 12 | - |
| Single Circuit 345kV Structures | 10 | 18 | 14 | 11 | 26 |
| Double Circuit (345kV/115kV) Structures | - | - | 3 | - | - |
| Triple Circuit (345kV/345kV/115kV) Structures | - | - | 2 | - | - |
| **MBS Sites in New ROW (acres)** | 11.6 | 27.4 | 23 | 3.4 | 2.2 |
| 150 foot ROW **(existing)** - **Moderate** | 0 | 0 | 0 | 0 | 0 |
| 150 foot ROW **(existing)** - **High** | 0 | 10.0 | 10.9 | 0 | 0 |
| 150 foot ROW **(new)** - **Moderate** | 5.9 | 19.0 | 19.6 | 0.0 | 2.2 |
| 150 foot ROW **(new)** - **High** | 5.7 | 8.4 | 3.4 | 3.4 | 0 |

*Summary of Impacts*

Impacts to wildlife and habitat are expected to be the greatest for the Eastern Option and the least for DNR Alternative 2. A full summary of the factors considered to make this determination for each route is provided in Table 35.

**Table 35: Summary of Wildlife and Habitat Impacts**

| Impact | Western Option | Eastern Option | DNR Alternative 1 | DNR Alternative 2 | DNR Alternative 3 |
|---|---|---|---|---|---|
| **Edge Effects** | New 150 foot ROW in some moderate and high quality habitat. **Moderate** impact among routing options. | New 150 foot ROW in high quality island habitat. **Highest** impact among routing options. | New 75 feet of ROW in high quality island habitat, thus could be limited to one side. Among the **least** impactful routing options. | New 150 foot ROW in mostly low quality habitat. Among the **least** impactful routing options. | New 150 foot ROW in mostly low quality habitat. Due to the amount of ROW clearing, a **moderate** impact among routing options. |
| **MBS Sites in New 150 foot ROW (acres)** | **11.6** | **27.4** | **23** | **3.4** | **2.2** |
| rated **Moderate** | 5.9 | 19.0 | 19.6 | 0.0 | 2.2 |

| Impact | Western Option | Eastern Option | DNR Alternative 1 | DNR Alternative 2 | DNR Alternative 3 |
|---|---|---|---|---|---|
| rated **High** | 5.7 | 8.4 | 3.4 | 3.4 | 0 |
| **Route Crosses an Island** | No | **Yes** | **Yes** | No | No |
| **Height and Amount of New Conductor Planes (Avian Collision Impacts)** | **Moderate** impact potential with two sets of vertical planes in a new crossing corridor away from the existing transmission lines. | **Highest** impact potential with structures that would increase variation in height and number of vertical planes of transmission lines in the area. | **Moderate** impact by collocating height with the existing 115 kV line without increasing impacts of the nearby 345 kV lines, but would introduce more vertical planes with varying height to the area. | **Moderate** impact potential with two sets of vertical planes in a new crossing corridor away from the existing transmission lines. | **Moderate** impact potential with two sets of vertical planes in a new crossing corridor away from the existing transmission lines. |
| **Coincides in Area with Existing Lines** | **No** | Yes | Yes | **No** | **No** |
| **Aquatic Management Area Nearby** | No | **Yes** | **Yes** | No | No |
| **Forested ROW Clearing (acres)** | 8.47 | **29.26** | 26.06 | 4.67 | 6.16 |

### MITIGATION

Expansions for the Alexandria, Riverview, Quarry, and construction of the new Big Oaks Substation will introduce increased lighting impacts to animals in the area. To minimize impacts to wildlife, projects that utilize LED luminaries should follow the MnDOT Approved Products for luminaries,[301] which limits the uplight rating to 0. A nominal color temperature below 2700K is preferable for wildlife, so choosing products that have the lowest number for backlight and glare will minimize impacts.

The applicants will prepare a VMP for the project prior to construction in consultation with State Agencies. The plan will include proposed seed mixes, short-term monitoring, maintenance, and measures to mitigate the introduction of invasive species and noxious weeds to the project area.

Plastic erosion control netting is frequently used for erosion control during construction and landscape projects and can negatively impact wildlife populations. Wildlife entanglement and death from plastic netting and other plastic materials has been documented in birds, fish, mammals, and reptiles.[302] The Commission can require a special permit condition to use wildlife friendly erosion control for the project to minimize impacts.

Additionally, the DRP (Section 5.3.16) require that permittees "incorporate adequate spacing of conductors and grounding devices in accordance with APLIC standards to eliminate the risk of electrocution to raptors with larger wingspans that may simultaneously come in contact with a conductor and grounding devices." Section 5.3.16 of the DRP also requires the applicants cooperate with

[301] Minnesota Department of Transportation, *Approved/Qualified Products*. Retrieved from: https://www.dot.state.mn.us/products/roadwaylighting/luminaires.html.

[302] DNR. *Wildlife-friendly Erosion Control*, (2013). Retrieved from: http://files.dnr.state.mn.us/eco/nongame/wildlife-friendly-erosion-control.pdf.

the DNR to identify areas of the transmission line where bird flight diverters will be incorporated into the transmission line design to prevent large avian collisions attributed to visibility issues. All of this avian protection coordination must be documented into the record per the DRP along with the plan and profile. Bird diverters are placed on top of the shield wire and could reduce impacts because of the natural tendency for birds to avoid obstacles in flight by increasing altitude. Implementation of APLIC safety standards will also minimize the potential for bird collisions.

To minimize risks of bird mortality associated with perching on uninsulated or unguarded power poles, the applicant can follow the guidelines set forth by the APLIC and the USFWS.[303] These include but are not limited to: developing an Avian Protection Plan, artificial nest platforms, insolation cover, and grounding of common perching spots.

The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. Under the MBTA, USFWS must prevent the mortality of migratory birds whenever possible.

If the project has the potential to disturb or kill eagles, the applicants may need to obtain a permit from the USFWS to avoid violating the Eagle Act should such impacts occur. If construction activities take place in suitable eagle nesting habitat during the species' nesting season, the applicants stated that surveys to identify active nests within 660 feet of work areas will be conducted in early spring of the year of construction. If active nests are identified within the disturbance buffer, the applicants will consult with the USFWS to determine next steps and develop appropriate avoidance and minimization measures such as using a biological monitor to watch for impacts to active nests.

Minimizing disturbance to large numbers of migratory birds or raptors that may be supported by this portion of the Mississippi River could 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.[304] Other mitigations may include flight diverters, timing maintenance to avoid impacts to birds that may be using the ROW or its edges for nesting, constructing poles within or near grassland and wetlands with tops to reduce raptor perching (which protects other birds from increased predation and reduces raptors line strike potential), among other USFWS recommendations.

Potential impacts to wildlife can be avoided by routing power lines away from quality habitat or migratory corridors. Impacts can be minimized by spanning habitats and minimizing the number of structures to the extent practicable. Impacts to avian species can be mitigated by winter construction—nesting activities would not be occurring and most species would have migrated out of the local vicinity. Generally, impacts to species that are expected to rely on MBS Sites of Biodiversity Significance of biodiversity significance can be minimized by selecting a route with the least amount of acreage that could be disturbed such as DNR Alternative 2 or 3. However, this minimization measure is highly dependent of the habitat type and species.

[303] Avian Power Line Interaction Committee, Edison Electric Institute, and California Energy Commission (2006). *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*. Retrieved from: https://www.nrc.gov/docs/ML1224/ML12243A391.pdf.

[304] *Ibid.*

# Chapter 6: Application of Routing Factors

The Minnesota Legislature has directed the Commission to select HVTL routes that minimize adverse human and environmental impacts while ensuring continuing electric power system reliability and integrity.[305] An HVTL route must be compatible with environmental preservation and the efficient use of resources while also ensuring electric energy needs are met and fulfilled in an orderly and timely fashion.[306]

Minnesota Statute 216E.03, subdivision 7(b) identifies 12 considerations that the Commission must take into account when designating a route for a HVTL. These considerations are further clarified and expanded by Minnesota Rule 7850.4100, which identifies 14 factors the Commission must consider when making a permit decision.

- **A**. effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services;
- **B**. effects on public health and safety;
- **C**. effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining;
- **D**. effects on archaeological and historic resources;
- **E**. effects on the natural environment, including effects on air and water quality resources and flora and fauna;
- **F**. effects on rare and unique natural resources;
- **G**. application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity
- **H**. use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries;
- **I**. use of existing large electric power generating plant sites;
- **J**. use of existing transportation, pipeline, and electrical transmission systems or rights-of-way;
- **K**. electrical system reliability;
- **L**. costs of constructing, operating, and maintaining the facility which are dependent on design and route;
- **M**. adverse human and natural environmental effects which cannot be avoided; and
- **N**. irreversible and irretrievable commitments of resources.

This analysis applies the routing factors to the project. The analysis that follows applies the information and data available in the route permit application and this EA to the factors the Commission must consider when making a route permit decision. Some factors are described in just a few words. Other factors are more descriptive and include a list of elements that, when grouped, make up the factor. Finally, certain factors are relatively succinct, but the scoping process identified elements to be analyzed in this EA. For example, the public health and safety factor includes an EMF element.

[305] Minn. Stat. 216E.02, subd. 1.

[306] *Ibid*.

**Factor I** (use of existing large electric power generating plant sites) does not apply to HVTLs. It is assumed that all routing options maximize energy efficiencies and accommodate expansion of transmission capacity (**Factor G**), and all routing options are electrically reliable (**Factor K**). **Factor M** (unavoidable impacts) and **Factor N** (irreversible and irretrievable resource commitments) are discussed at the end of Chapter 4 in this EA. **Factor H** (use of existing rights-of-way) and **Factor J** (use of existing infrastructure rights-of-way) apply solely to high voltage transmission lines. **Factor G** (application of design options) and **Factor L** (costs dependent on design) apply to the DNR Alternatives 1-3, which are designs under consideration in addition to the proposed project.

Other factors are ranked as follows:

| | |
|---|---|
| ● | • Route alternative is consistent with the routing factor OR<br>• Impacts are anticipated to be negligible to minimal and able to be mitigated or consistent with factor. |
| ○ | • Route alternative is consistent with routing factor but less so than the other options OR<br>• Impacts are anticipated to be minimal but the potential for impacts is greater than the other options or require special permit conditions OR<br>• Impacts are anticipated to be moderate |
| ⊘ | • Route alternative is not consistent with routing factor or consistent only in part OR<br>• Impacts might be moderate but the potential for impacts is greater than the other options or require special permit conditions OR<br>• Impacts are anticipated to be significant |

Graphics above are used to illustrate distinct impacts associated with construction and operation. A discussion highlighting differences in the types of impacts follows.

## Analysis

**This analysis applies the routing factors to the proposed project and discusses the relative merits of the DNR Alternatives 1-3.**

**Should the Commission issue a route permit for the project, it must select the proposed project's Western Option, the proposed project's Eastern Option, DNR Alternative 1, DNR Alternative 2, or DNR Alternative 3.** Graphics (described above) are used to illustrate the application of the routing factors outlined in Minnesota Rule 7850.4100 to the proposed project. These same graphics are used to explain the distinct impacts associated with DNR Alternatives 1-3. A discussion highlighting differences follows.

**Table 36: Application of Routing Factors/Relative Merits of Routing Options**

| Element | Application of Routing Factor | | Relative Merits of Routing Factor | | |
|---|---|---|---|---|---|
| | Proposed Project (Western Option) | Proposed Project (Eastern Option) | DNR Alternative 1 | DNR Alternative 2 | DNR Alternative 3 |
| **Factor A: Human Settlement** | | | | | |
| Aesthetics | ● | ● | ● | ● | ● |

| Element | Application of Routing Factor | | Relative Merits of Routing Factor | | |
|---|---|---|---|---|---|
| | Proposed Project (Western Option) | Proposed Project (Eastern Option) | DNR Alternative 1 | DNR Alternative 2 | DNR Alternative 3 |
| Displacement | ● | ● | ● | ● | ● |
| Cultural Values | ● | ● | ● | ● | ● |
| Electric | ● | ● | ● | ● | ● |
| Environmental | ● | ● | ● | ● | ● |
| Floodplains | ● | ● | ● | ● | ● |
| Land Use and | ● | ● | ● | ● | ● |
| Noise | ● | ● | ● | ● | ● |
| Property Values * | ● | ● | ● | ● | ● |
| Recreation | ● | ● | ● | ● | ● |
| Socioeconomics | ● | ● | ● | ● | ● |
| **Factor A: Public Services** | | | | | |
| Airports | ● | ● | ● | ● | ● |
| Roads and | ● | ● | ● | ● | ● |
| Utilities | ● | ● | ● | ● | ● |
| **Factor B: Public Safety** | | | | | |
| EMF | ● | ● | ● | ● | ● |
| Emergency | ● | ● | ● | ● | ● |
| Induced Voltage | ● | ● | ● | ● | ● |
| Medical Devices | ● | ● | ● | ● | ● |
| Public Safety | ● | ● | ● | ● | ● |
| Stray Voltage | ● | ● | ● | ● | ● |
| Worker Safety | ● | ● | ● | ● | ● |
| **Factor C: Land Based Economies** | | | | | |
| Agriculture | ● | ● | ● | ● | ● |
| Forestry | ● | ● | ● | ● | ● |
| Mining | ● | ● | ● | ● | ● |
| Tourism | ● | ● | ● | ● | ● |
| **Factor D: Archaeological and Historic Resources** | | | | | |
| Archeological | ● | ● | ● | ● | ● |
| Historic | ● | ● | ● | ● | ● |

| Element | Application of Routing Factor | | Relative Merits of Routing Factor | | |
|---|---|---|---|---|---|
| | Proposed Project (Western Option) | Proposed Project (Eastern Option) | DNR Alternative 1 | DNR Alternative 2 | DNR Alternative 3 |
| **Factor E: Natural Resources** | | | | | |
| Air Quality | ● | ● | ● | ● | ● |
| Climate Change | ● | ● | ● | ● | ● |
| Geology | ● | ● | ● | ● | ● |
| Groundwater | ● | ● | ● | ● | ● |
| Soils | ● | ● | ● | ● | ● |
| Surface Water | ● | ● | ● | ● | ● |
| Topography | ● | ● | ● | ● | ● |
| Vegetation | ● | ○ | ○ | ● | ● |
| Wetlands | ● | ● | ● | ● | ● |
| Wildlife & Habitat | ● | ○ | ○ | ● | ● |
| **Factor F: Rare and Unique Resources** | | | | | |
| — | ● | ● | ● | ● | ● |
| **Factor H: Paralleling Existing ROW** | | | | | |
| — | ● | ● | ● | ● | ● |
| **Factor J: Use of Existing Infrastructure** | | | | | |
| — | ● | ● | ● | ● | ● |
| **Factor L: Cost ($210-238 million outside of the River Crossing)** | | | | | |
| — | $10.13 million | $15.31 million | $26.96 million | $10.14 million | $21.17 million |
| **Minnesota Statute 216E.03, Subdivision 7(12): Existing HVTL route and Highway ROW** | | | | | |
| — | ● | ● | ● | ● | ● |

## Discussion

**The following summarizes potential impacts to factor elements that are anticipated to be moderate to significant, as well as routing factors that are less consistent, consistent in part, or not consistent.**

### Vegetation

The Big Oaks Substation is not expected to remove a significant amount of forested land. Potential impacts, such as clearing, compacting, or otherwise disturbing vegetation, are expected to be minimal for the Western Option and DNR Alternatives 2 and 3. Impacts would be more moderate for the Eastern Option and DNR Alternative 1.

Tree clearing impacts for the project are most impactful for the River Crossing where new transmission line construction will be occurring. DNR Alternative 2 and the Western Option have the least amount of forested land within their route width by far, meaning it may be easiest for these options to place an alignment that avoids the most impacts to forested land. Based on the alignments as they are currently proposed, the Eastern Option and DNR Alternative 1 would remove over 25 acres of forested land for the ROW, whereas the other routing options would remove less than 9 acres. Invasive species might establish. Potential impacts will be both short- and long-term. Impacts are localized, but unavoidable. Potential impacts can be minimized.

### Wildlife and Habitat

Wildlife and avian species in the local vicinity are expected to be displaced during construction due to increased human activity. Most wildlife would return to the area after construction. Distinct impacts to terrestrial species, avian species, and habitat will occur. Due to the limited amount of ROW clearing associated with the project overall, potential impacts to wildlife and habitat are expected to be minimal for most routing options; the Eastern Option and DNR Alternative 1 are rated moderate due to the acreage of MBS Sites of Biodiversity Significance that would be cleared for new ROW, the percentage of those MBS Sites of Biodiversity Significance considered high quality, acreage of forested habitat that would be cleared for new ROW, clearing on an island likely important to avian species, and an Aquatic Management Area nearby the island. The Eastern Option also has the highest potential for impacts from edge effect and avian collision.

Impacts to terrestrial species will be intermittent, temporary, and localized during construction. While direct significant impacts might occur to individuals, population level impacts are not anticipated. These minimal, short-term impacts can be minimized. Operational impacts are expected from intermittent but long-term maintenance of the right-of-way.

Impacts to habitat are primarily associated with creating new transmission line corridors. Avian species – especially large bodied birds – are susceptible to electrocution from, and collision with, HVTLs during operation. All routing options would introduce an additional transmission line to the existing five in the local vicinity that cross the Mississippi River, an area that likely supports large numbers of raptors and migratory birds near high quality habitat and sensitive plant communities. Potential impacts to avian species are expected to be moderate for all routing options due to the new corridor that will be introduced over the river, resulting in a new flight obstacle and increased habitat loss in addition to the existing transmission lines. Impacts to wildlife and habitat are expected to be the greatest for the Eastern Option and the least for DNR Alternative 2. These short- and long-term, localized impacts are unavoidable but can be minimized.

**Table 37: Summary of Wildlife and Habitat Impact Intensity**

| Wildlife and Habitat Impact | Western Option | Eastern Option | DNR Alternative 1 | DNR Alternative 2 | DNR Alternative 3 |
|---|---|---|---|---|---|
| **Overall** | Minimal | Moderate | Moderate | Minimal | Minimal |
| **Terrestrial** | Minimal | Minimal | Minimal | Minimal | Minimal |
| **Avian** | Moderate | Moderate | Moderate | Moderate | Moderate |

### Costs

The project will cost the same outside of the River Crossing and continues to be updated in the record. Based on the route permit application, the cost for the Eastern Segment outside of the River Crossing could be $210-238 million. Future estimates will likely be higher.

Costs vary at the River Crossing for each routing option due to the length of the transmission line, the amount of new ROW clearing required, the type of structures to be utilized, the complexity of construction, and whether coordination with other utilities such as modifying existing transmission lines or planning with the Monticello Nuclear Generating Plant is needed. For example, the Eastern Option and DNR Alternative 1 would construct on an island, which requires heavy equipment and concrete truck access or the more expensive use of maneuvering a helicopter around a small section. DNR Alternative 1 also requires a unique monopole for two transmission lines with different voltages and a structure that can reduce the lateral loading on the foundation given the poor soil conditions anticipated on the island.

For the listed reasons, DNR Alternative 1 costs the most at $27 million. DNR Alternative 3 costs the next most due to the length of the transmission line at $21.2 million. Since the Eastern Option also requires more complex construction on an island and would be longer than the cheapest options, it is the third most expensive at $15.3 million. The cheapest options are shorter than the others at $10.14 and $10.13 million for DNR Alternative 2 and the Western Option, respectively.

## Recommended Mitigation Measures

**The following summarizes mitigation measures recommended by Staff that are not part of the sample permit issued for the project.**

### Aesthetics

The Commission could require downward illumination (shielded lighting) at all locations where lighting is required to mitigate impacts to wildlife, the night sky, and nearby residents, which would also reduce cumulative impacts with existing lighting at facilities near the River Crossing. Example permit language could be:

> *Facility Lighting*
> *To reduce harm to birds, insects, and other animals, the Permittee shall utilize downlit and shielded lighting at the site entrances and inverters. Lighting utilized shall minimize blue hue. The Permittee shall keep records of compliance with this section and provide them upon the request of Department of Commerce or Commission staff.*

### Noise

The Commission could require construction timing restrictions, that is, limiting the duration of certain construction activities, to mitigate impacts to state noise standards.

### Surface Water

Use of the wire/border zone vegetation clearing method could help to stabilize soils by allowing certain low growing woody vegetation and trees to persist along the outside edges of the ROW.

### Vegetation

The Commission could require continued coordination with state agencies in developing a VMP to mitigate impacts to vegetation. In recent transmission line dockets, this has been suggested to be a standard permit condition rather than a special one.

### Wildlife and Habitat

Soil disturbing activities such as earthmoving and wind erosion associated with right-of-way clearing and construction would generate dust. The Commission could require the applicant use dust mitigation and control measures that do not contain chloride, which the DNR suggested in their scoping comments. Chloride products that are released into the environment do not break down, and instead accumulate to levels that are toxic to plants and wildlife. Example permit language could be:

> *To protect plants and wildlife from chloride products that do not break down in the environment, the Permittee is prohibited from using dust control products containing calcium chloride or magnesium chloride during construction and operation. The Permittee shall keep records of compliance with this section and provide them upon the request of Department of Commerce or Commission staff.*

Additionally, the Commission could require the applicant to utilize wildlife friendly erosion control measures during construction and operation that would not contain plastic mesh netting. The DNR also suggested these measures in their scoping comments, stating this would minimize entanglement issues and prevent small synthetic (plastic) fibers from potentially re-suspending into natural resources such as waterways. Example permit language could be:

> *The Permittee shall use only "bio-netting" or "natural netting" types and mulch products without synthetic (plastic) fiber additives.*

### Archeological and Historic Resources

Due to the number of potential archeological resources in the project area, the Commission could require the applicants to file a demonstration into the record, perhaps as part of the plan and profile required per DRP Section 9.2, that they have coordinated with SHPO once a final alignment has been determined for the project and before beginning construction.

### Rare and Unique Resources

The Commission could require collaboration with the DNR and a Native Prairie Protection Plan to avoid impacts to native prairie and plant communities documented in the local vicinity of the River Crossing. Example permit language could be:

> *Native Prairie*
> *The Permittee shall not impact native prairie during construction activities, as defined in Minn. Stat. § 216E.01, unless addressed in a prairie protection and management plan. The Permittee shall prepare a prairie protection and management plan in consultation with the DNR if native prairie, as defined in Minn. Stat. § 84.02, subd. 5, is identified within the Project Boundary. The Permittee shall file the prairie protection and management plan with the Commission at least 30 days prior to submitting the plan and profile required by Section 9.2 of this permit. The prairie protection and management plan shall address steps that will be taken to avoid impacts to native prairie and mitigation to unavoidable impacts to native prairie by restoration or*

*management of other native prairie areas that are in degraded condition, by conveyance of conservation easements, or by other means agreed to by the Permittee, the DNR, and the Commission.*

## Wetlands

Due to the St. Martin 15 Calcareous Fen's presence near construction of new poles and foundations within the route width to be double-circuited, and the DNR's specific concern with impacts to the fen as outlined in their scoping comment letter,[307] the Commission could require collaboration with the DNR and a Calcareous Fen Management Plan as specified in Minn. Stat. 103G.223. Example permit language, taken from previous wind permits, could be:

*Calcareous Fens*
*Should any calcareous fens be identified within the project area, the Permittee must work with MN DNR to determine if any impacts will occur during any phase of the Project. If the project is anticipated to impact any calcareous fens, the Permittee must develop a Calcareous Fen Management Plan in coordination with the MN DNR, as specified in Minn. Stat. 103G.223. Should a Calcareous Fen Management Plan be required, the approved plan must be submitted to the Commission 30 days prior to submittal of the plan and profile required in Section 9.2 of this Permit.*

[307] Minnesota DNR Scoping Comments, January 8, 2024 eDockets No. 20241-201967-01.

# Chapter 7: Alternatives to the Proposed Project

The Alexandria to Big Oaks 345 kV Transmission Project is one possible solution to provide benefits to the Midwest subregion of the MISO footprint, increase transmission system capacity and mitigate current capacity issues, and improve regional electric system reliability as more renewable energy resources are added.

This chapter evaluates alternatives to the project that may also address these problems. As described in Chapter 2, the Minnesota Public Utilities Commission (Commission) must determine whether the proposed project is needed or if another project would be more appropriate for Minnesota. For example, a project of a different type or size, or a project that connects different endpoints (substations). The alternatives discussed here include the following:

- No-build alternative
- Generation and non-wire alternatives
    - Peaking generation
    - Renewable energy sources
    - Distributed generation
    - Purchased power
- Transmission alternatives
    - Higher and lower voltages
    - Line of a different size, including DC alternatives and AC alternatives
    - Alternative endpoints
    - Upgrading of existing facilities, including conductors and double-circuiting existing lines
    - Undergrounding
- Demand side management

These alternatives are commonly referred to as system alternatives. This chapter discusses whether these system alternatives are feasible (whether they can be engineered, designed, and constructed) and available (whether the alternative is readily obtainable and at the appropriate scale) and, if so, whether they can meet the need for the project. Additionally, this chapter discusses the potential human and environmental impacts of the alternatives, particularly in comparison to the project.

## Need for the Project

The applicants indicate that the project is needed to provide benefits to the Midwest subregion of the MISO footprint by facilitating more reliable, safe, and affordable energy delivery. The current 345 kV transmission system is at capacity which leads to several reliability concerns that could affect customers' service. The project intends to provide additional transmission capacity, mitigate current capacity issues, and improve electric system reliability throughout the region as more renewable energy resources are added to the electric system in and around the region.

## No-Build Alternative

Under the no-build alternative, the applicants' proposed project would not be constructed and all other electrical transmission facilities in the project area would remain as is. This could occur if the Commission determines that the need for the project is not clearly established; no CN would be issued, and the project would not be constructed. This alternative is both feasible and available but would not meet the need for the project.

The applicants have concluded that if the project is not built, the congestion relief, reliability benefits, and economic savings driving the project would not be realized. The no-build alternative would result in continued reliance on relatively higher-cost generation resources. Some of these generators, such as coal plants or natural gas-fired plants, emit greenhouse gases. The proposed project is expected to reduce $CO_2$ emissions within the MISO Midwest subregion by allowing greater access to renewable generation resources. The no-build alternative would also prevent economic benefits that are expected to result from relieving existing congestion on the system. The applicants estimate that the project provides up to $2.1 billion in economic savings across the MISO footprint over the first 20 years in service and up to $3.8 billion over the first 40 years in service.[308]

The no-build alternative would have no direct human or environmental impacts and would avoid the potential impacts of the project. It would, however, result in continued reliance on the relatively higher-cost generation resources discussed above. These resources tend to emit more GHG, which could result in increased human or environmental impacts over time such as global climate change. In addition, the no-build alternative would result in a lower level of reliability for customers as MISO found that the project will address several reliability issues on the existing transmission system. Lastly, if the project is not built, it would reduce the available options to meet, or as easily meet, the state's renewable energy goals.

## Generation and Non-Wire Alternatives

To be a viable alternative to the project, a generation or non-wire alternative (or combination of alternatives) must address the primary needs for the project. There are various generation and other non-wire system alternatives that are analyzed as different ways to feasibly meet the project's goal by utilizing purchased, peaking, renewable, or distributed electricity generation.

### Purchased Power

Under a purchased power alternative, power would be purchased from existing generation sources, rather than generated by constructing a new electric generating plant. This alternative is more relevant to a site permit application for a large electric power generating plant than a route permit for a transmission line project. A purchased power alternative may be feasible and available, but it would not meet the need for the project.

The applicants state that purchased power would not meet the need for the project because power (whether produced or purchased by the applicants) would still need to be transferred by the transmission system from where it is generated to its customers. The applicants are currently purchasing power from existing generators to meet consumer demands, some of which is unable to reach customers due to congestion on the transmission grid. The applicant states that the existing 230 kV system in western and central Minnesota and eastern North and South Dakota are at capacity, leading to thermal, voltage, and congestion issues. Purchasing additional existing generation would not alleviate these reliability and congestion issues because no new capacity, redundancy or resiliency would be added to the system. Additional energy purchased wouldn't make it to customers due to this congestion.

[308] Certificate of Need Application at p. 113.

The human and environmental impacts of purchased power would vary, depending on how the power was produced and how it was transmitted to the project area. The generators producing the purchased power are assumed to already be in operation, independent and regardless of any power purchased in an attempt to meet the need for the project – thus, additional human or environmental impacts are not expected. While the project will relieve transmission congestion and increase market access to lower-cost renewable generation, the purchased power alternative would result in continued reliance on a highly congested system that utilizes generally higher-cost generation sources. Thus, to the extent that power is purchased from these resources that tend to emit more GHG, increased human or environmental impacts over time such as global climate change would be expected. The purchased power alternative would also not address the reliability and congestion issues present on today's transmission grid.

### Peaking Generation

Under this alternative, electrical peaking generation would be provided rather than transmission to meet the need for the project. Analysis by the applicants primarily considered flexible generation resources, such as natural gas or diesel generators that can be quickly dispatched to supplement other generation resources. The applicants' analysis indicates that peaking resources cannot meet one of the key purposes of the project: to enable greater generation deliverability across the MISO Midwest subregion. Not only will construction of additional peaking generation not create the needed transmission capacity across the MISO Midwest subregion, but would worsen the existing congestion and curtailment issues as well as increase customer costs.

Potential human and environmental impacts associated with peaking generation would depend on the type of fuel used by the peaking generator. Peaking generators are typically fueled by natural gas or diesel. A natural gas peaking plant or diesel peaking generator and its auxiliary components (e.g., natural gas pipelines) can affect the environment by their construction and operation. These include land-use and aesthetic impacts as well as GHG and other emissions that affect air quality.

Regarding land-use and aesthetic impacts, natural gas-fired peaking plants and diesel peaking generators generally need less space than coal-fired generators or nuclear power plants, but natural gas-fired peaking plants need a large natural gas supply line and sometimes a large tank for backup fuel. A peaking plant would impact soils, vegetation, and wildlife present within and around the plant, similar to the project's Big Oaks Substation. The peaking plant would also impact land use as it will eliminate opportunities to use this land for agriculture, residences, or other uses. A peaking plant would have aesthetic impacts as it will change the viewshed for residents located near the plant. Depending on its location, a natural gas-fired peaking plant may require construction of a natural gas pipeline to transport natural gas to the plant. This will require digging of trenches that may impact residential properties, roads, farm fields, wooded areas, or wetlands. Both a natural gas-fired and a diesel peaking plant would likely require construction of transmission lines to connect the plant to the bulk power system. These transmission lines would result in aesthetic impacts and could have impacts on vegetation and wildlife.

Compared to the project, a peaking plant would have greater impacts to air quality. During operation, peaking plants emit air pollutants into the atmosphere. Depending on whether the peaking plant is natural gas-fired or diesel, these emissions may include $CO_2$, methane, nitrogen oxide, ozone, hydrocarbons, chlorofluorocarbons, carbon monoxide, and particulate matter. In contrast, the applicants estimate that the project will reduce $CO_2$ emissions within the MISO footprint by 17.8 to 22.4

million metric tons over the first 20 years in service and by 36.1 to 49.6 million metric tons over the first 40 years.[309]

### Renewable Generation

Under a renewable generation alternative, the project need would be met by new electrical generation that utilizes a renewable resource such as wind or solar. Generation rather than transmission, is feasible and available, but does not meet the need for the project as well as the proposal, no matter the energy source. According to the applicants' analysis, the project is needed to provide additional transmission capacity and greater deliverability for existing renewable resources, let alone new renewable sources. The addition of new renewable generation resources in lieu of adding transmission capacity would only worsen the existing congestion and curtailment issues on the system and require further build-out of the transmission system.

Potential human and environmental impacts associated with renewable generation would depend on the type of generation resource. Wind farms create potential aesthetic and noise impacts. They also have the potential to impact birds and bats, which can be struck by rotating turbine blades. Impacts of solar farms include the loss of land that could be used for other purposes such as agriculture, as well as aesthetic impacts. Hydroelectric dams impact water resources and associated natural resources. Renewable generation would likely require construction of new transmission lines to connect the facilities to the bulk power system, resulting in aesthetic impacts and could affect vegetation and wildlife. Thus, more renewable generation would likely have increased impact when compared to the project at this time.

### Distributed Generation

Distributed generation is defined by being near load centers, connected to the local distribution system, and able to run continuously when called upon. The most common source of this generation is natural gas or other fossil fuels. Renewable distributed generation was also considered as potential distributed generation alternatives. According to analysis provided by the applicants, fossil-fueled distributed generation and renewable distributed generation have the same drawbacks as other generation alternatives discussed above. The project is needed to provide additional transmission capacity to provide greater generation deliverability across the MISO Midwest subregion. As a result, adding additional distributed generation will not provide this capacity and instead will worsen the existing congestion and curtailment issues on the system. Construction of new distributed generation resources will also result in the underutilization of existing generation resources that could be utilized on a transmission system with less congestion and curtailment issues.

Potential human and environmental impacts associated with distributed generation would depend on the resource type. If renewable, its potential impacts would be similar to that of other renewable generators (discussed above), although potential impacts could be less given the generally smaller scale of distributed generation facilities. If the distributed generation is a fossil-fueled generator, its impacts would be similar to those of a peaking plant (discussed above) although on a smaller scale.

## Demand Side Management

Demand side management is the industry term for a suite of measures, including conservation, designed to reduce and manage demand for electrical energy, particularly peak loads. These alternatives have the

[309] Certificate of Need Application at p. 82.

potential to reduce overall demand as well as reduce peak demand. In this context, demand side management and conservation examples are assumed to encompass all forms of peak shaving programs, such as interruptible loads and dual fuel programs, as well as more general energy conservation programs, such as energy-efficiency rebates.

Since the need for the project is driven in part by the need for additional transmission capacity to deliver increasing amounts of renewable generation on the system across the MISO Midwest subregion rather than a localized increase in demand, analysis conducted by MISO and the applicants concluded that conservation and demand-side management are not effective alternatives to meet the identified need. Thus, demand side management and conservation are feasible and available but would not meet the need for the project.

Demand side management would have no direct human or environmental impacts, and would avoid the impacts of the proposed project. However, attempting to meet the need for the project with demand side management would adversely affect the local transmission system and reduce electrical reliability. It would also not provide the same level of carbon reduction benefits as the project. In their Certificate of Need Application, the applicants estimate that the project will reduce $CO_2$ emissions within the MISO footprint by 17.8 to 22.4 million metric tons over the first 20 years in service and by 36.1 to 49.6 million metric tons over the first 40 years.[310]

## Transmission Alternatives

Alternatives in this category would meet the need for the project by using transmission lines of a different size, such as a line with a different voltage than the proposed project, direct current instead of alternating current, alternative endpoints, upgrading existing facilities, different conductors, or undergrounding.

### Higher Voltages

Transmission lines carry electricity over long distances, from the generating facility to areas of demand. The electricity in transmission lines is transported at voltages over 200 kV to maximize efficiency. There are two possible voltages greater than 345 kV that are feasible and available to the project: 500 kV and 765 kV. Currently, there are no 500 kV or 765 kV transmission lines in the project area. Existing voltages in the area range from 115 kV to 345 kV. Because of this constraint, constructing a new 765 kV or 500 kV transmission line would require additional substation transformers to accommodate higher voltage transmission lines. Specifically, connecting higher voltage lines to the existing electric system, mainly comprised of 345 kV, 230 kV, 115 kV, 69 kV, and 41.6 kV lines in the project area, would require installation of additional transformers at the existing Big Stone South Substation, the existing Alexandria Substation, the existing Riverview Substation, and at the new Big Oaks Substation. The applicants' analysis indicates that these higher voltage options would be more costly and are typically used for long distance power transfer.

In addition, given that the highest voltages on the existing system in the project area are comprised of 345 kV and 230 kV, the 500 kV or 765 kV lines would likely limit reliability benefits when of the underlying system to accommodate power transfers when the 500 kV or 765 kV facilities experience an outage. To realize the full reliability benefits of constructing the project at 500 kV or 765 kV, the applicants believe at least one additional 500 kV or 765 kV line would be needed to interconnect with

[310] Certificate of Need Application at p. 82.

the project so that at least one 500 kV or 765 kV line is available when the other 500 kV or 765 kV line experiences an outage.

The Eastern Segment of the proposed project involves stringing a second 345 kV circuit on existing double-circuit capable structures. These existing double-circuit capable structures on the Eastern Segment were not designed to accommodate a 500 kV or 765 kV line, so new 500 kV or 765 kV lines would require removal of these existing structures and construction of new, larger structures on a wider right-of-way at a higher cost and impact. Based on the applicants' analysis, a single circuit 500 kV line would generally cost approximately $4.1 million per mile and would require, at a minimum, a 500 kV/345 kV transformer at each substation connection for approximately $20 million per transformer. In contrast, the indicative cost estimate for a double-circuit 345 kV line is approximately $3.5 million per mile.

Aesthetic, residential, agricultural, and natural resource impacts would be similar for a 500 kV or 765 kV to those of the proposed project. However, a 500 kV or 765 kV transmission line would likely have greater human and environmental impacts due to the construction of the new structure type that would need to be used and the width of right-of-way required. The typical construction for a 500 kV or 765 kV transmission line would likely be a two-pole H-Frame structure or a four-legged latticed type structure that would result in greater environmental impacts along the route. This would be comprised of two or four foundations per structure as opposed to one foundation for a double-circuit 345 kV monopole structure. A 500 kV or a 765 kV transmission line would require at least a 200-foot-wide right-of-way, where a 345 kV transmission line typically only requires a 150 foot wide right-of-way. Additionally, the typical span for a 500 kV or 765 kV transmission line ranges between 1,000 to 1,700 feet, whereas the typical span for a 345 kV transmission line is 1,000 feet. These longer spans mean fewer total structures would be needed for the project and that many natural resources (waterways and wetlands) could be spanned. However, whether more resources could be spanned relative to the proposed 345 kV line is uncertain, given the proposed project already spans most natural resources in the project area.

Aesthetic and agricultural impacts are likely to be greater with a 500 kV or 765 kV line. The two-pole H-Frame structure or the four-legged latticed type structures required for a 500 kV or 765 kV transmission line would have a larger footprint and are likely to be slightly taller than the proposed 345 kV monopole structures, thus more visible on the landscape. Although there may be slightly fewer 500 kV or 765 kV structures in farm fields, their footprint and height impact on each field would be greater than 345 kV monopoles. Placing a two-pole or four-legged latticed type structure on a field line would not minimize agricultural impacts in comparison to a 345 kV monopole. The legs of a latticed type structure would impact fields on both sides of a field line rather than in one place. In sum, the potential impacts of a 500 kV or 765 kV line would be relatively similar to those of the proposed project; however, it is anticipated that aesthetic and land use impacts would be greater.

### High Voltage Direct Current Line

A High Voltage Direct Current (HVDC) line consists primarily of a Big Oaks Substation, in which the Alternating Current (AC) voltage of the conventional power grid is converted to HVDC voltage, a transmission line, and another Big Oaks Substation at the other end, where the voltage is converted back into AC. An HVDC transmission line is generally employed to deliver generation over a considerable distance, more than 300 miles, to a load center. The applicants evaluated whether an HVDC line would be a reasonable alternative to the project and found that, generally, HVDC systems typically do not allow for cost-effective interconnections along the line. While line losses and conductor costs associated

with HVDC lines are generally less than those associated with high voltage AC lines, HVDC lines also require expensive Big Oaks Substations at each end point of the line to convert power from AC to Direct Current (DC) and DC to AC. HVDC Big Oaks Substations also do not eliminate the need for AC substation facilities that would be required after the power is converted back to AC. The applicants identified that extended lead times (6 years or more) are required for HVDC systems. In addition, costs for Big Oaks Substations for 500 to 600 kV HVDC lines can range from approximately $400 million to $500 million. Given the substantial additional design cost that would not exceed to benefits, the applicants concluded that HVDC is not a more prudent or reasonable alternative to the project.

The potential human and environmental impacts of an HVDC line would be similar to those of a higher voltage 500 kV or 765 kV AC transmission line. However, HVDC lines also require Big Oaks Substations that would be similar in size to a substation and would not eliminate the need for the AC substations after the power is converted back to AC. These Big Oaks Substations would result in greater land use and aesthetic impacts as compared to the project.

### Lower Voltages

Transmission line voltages lower than 345 kV include: 230 kV, 161 kV, 138 kV, 115 kV, 69 kV, and 41.6 kV. Because there are existing 230 kV, 115 kV, 69 kV, and 41.6 kV transmission lines in the project area, the applicants examined these lower voltages as feasible and available alternatives to the project.

The project is designed to address issues on the heavily constrained 230 kV system in eastern North and South Dakota and western and central Minnesota. The existing 230 kV system is congested during periods of high renewable generation which results in higher energy prices for Minnesota customers. This is because lower cost renewable energy is unable to reach customers. Because of congestion, higher cost resources must be dispatched and renewable generation must be curtailed. Given the lower capacity of 115 kV, 69 kV, and 41.6 kV transmission lines, the applicants concluded that these voltages would not have sufficient capacity to address the congestion issues on the existing 230 kV system or to support future renewable generation. As a result, installing these lower voltage alternatives would require more transmission facilities to be constructed in the future to provide additional capacity to support future generation.

The applicants also considered a lower voltage 230 kV alternative. The 230 kV system in the project area is currently heavily congested, so it is beneficial to install transmission facilities with voltages greater than 230 kV to unload the existing 230 kV system. In addition, the applicants' analysis found that the cost of a 345 kV is similar to 230 kV but allows for significantly greater capacity to support future generation in the project area. The applicants also concluded that a 230 kV alternative will result in additional costs associated with substation upgrades to accommodate the introduction of a new voltage to the system at certain substations. If a lower voltage alternative such as 230 kV or 115 kV is selected, additional transformers might be needed at various substations resulting in increased costs to customers.

Lower voltage lines also typically have higher losses than higher voltage lines. This is because when the voltage of a line is lowered, the line rating must be increased to achieve similar levels of power transfer. To achieve a comparable line rating on a lower voltage line, larger conductor and thus larger structures, foundations and associated hardware would also lead to higher cost.

Aesthetic, residential, agricultural, and natural resource impacts would be similar for a 230 kV, 115 kV, or 69 kV transmission line to those of the project. For the Western Segment, a 230 kV, 115 kV, or 69 kV

transmission line could have potentially fewer human and environmental impacts than the proposed 345 kV line due to the shorter height of structures and narrower right-of-way width typically required for these lower voltage lines. Lower voltage lines do have shorter span lengths which would result in more structures and fewer opportunities to span existing resources such as wetlands. For the Eastern Segment, a lower voltage line would have similar impacts as the project assuming that the lower voltage line could be strung on the existing double-circuit capable structures.

Structures for a 230 kV, 115 kV, or 69 kV line typically range from 70 to 100 feet tall, with spans between structures of 300 to 800 feet. Structures for the 345 kV line range from 75 feet to 160 feet tall, with spans of about 1,000 feet between structures. Thus, there is a trade-off between the voltages and their associated structures—a larger number of smaller structures for lower voltage lines versus a smaller number of larger structures for 345 kV lines. Aesthetic impacts are likely to be greater with a 345 kV line because the structures are relatively taller and more visible than the lower voltage structures.

Agricultural impacts are likely to be slightly greater for the lower voltage lines due to the greater number of structures required from the shorter spans. More structures in more agricultural fields would lead to greater impediments to agricultural production. Impacts to natural resources would likely be similar between the project and a lower voltage; however, there may be resources which could be spanned by a 345 kV line that could not be spanned by a lower voltage line. Lower voltage lines typically require a slightly narrower right-of-way width compared to a 345 kV line. The typical right-of-way width for a 230 kV line is 125 feet whereas the typical right-of-way width for a 345 kV line is 150 feet. This larger right-of-way width for a 345 kV line may result in slightly greater impacts to vegetation and wildlife as compared to a lower voltage line.

### Alternative Endpoints

It is possible that the need for the project could be met with the same 345 kV voltage proposed, but with different substation endpoints. That is, endpoints other than the Big Stone South, Alexandria, Riverview, and the proposed Big Oaks substations. MISO evaluated alternative Tranche 1 projects on a regional basis. For eastern North and South Dakota and western and central Minnesota, MISO evaluated system solutions against its approved projects, including the Jamestown – Ellendale 345 kV line in North Dakota and the Big Stone South – Alexandria – Big Oaks 345 kV line. These five alternatives included:

- Alternative 1: Big Stone South – Alexandria 345 kV and Jamestown – Ellendale 345 kV;
- Alternative 2: Big Stone South – Hankinson – Fergus Falls 345 kV and Jamestown – Ellendale 345 kV;
- Alternative 3: Big Stone South – Hazel Creek – Blue Lake 345 kV and Jamestown – Ellendale 345 kV;
- Alternative 4: Big Stone South – Alexandria 345 kV, Big Stone South – Hazel Creek – Blue Lake 345 kV, and Jamestown – Ellendale 345 kV; and
- Alternative 5: Big Stone South – Breckenridge – Barnesville 345 kV and Jamestown – Ellendale 345 kV.

MISO determined that none of these alternatives cost-effectively provided the same congestion, reliability, or generation outlet benefits as the project.

In addition, MISO and the applicants evaluated an alternative terminating at the existing Monticello Substation rather than constructing a new Big Oaks Substation. Both MISO and the applicants

determined that there was not sufficient space at the existing Monticello Substation to add the additional 345 kV line termination required for the project and the Northland Reliability Project (Docket Nos. CN-22-416 and TL-22-415). Constructing a new substation would also prove more beneficial because it would provide room for additional transmission line terminations that may be needed in the future as the system expands.

The potential human and environmental impacts of these six alternatives (Alternatives 1-5 and Monticello Substation) would be greater than those of the project. All six of these alternatives would require construction of new 345 kV facilities across predominantly agricultural landscapes in western and central Minnesota, and eastern North and South Dakota. In comparison, the majority of the Eastern Segment of the project involves stringing a second 345 kV circuit on existing double-circuit capable structures and will result in minimal additional impacts. Alternatives 3 and 4 are longer in length than the project and would likely have greater human and environmental impacts.

### Double-Circuiting

Double-circuiting is the construction of two separate circuits on the same structures to reduce the overall amount of right-of-way required. Double-circuiting transmission lines minimizes the need for new right-of-way and expansion of the overall footprint of the transmission system.

The Eastern Segment of the project is already proposed to be double-circuited with an existing 345 kV transmission line for over 90 percent of its length. The project deviates from the existing 345 kV transmission line to terminate at the Big Oaks Substation because the existing Monticello Substation where the existing 345 kV transmission line terminates is at capacity and cannot accommodate an additional 345 kV line termination. The applicants examined double-circuiting the remaining portion of the Eastern Segment of the project from where the transmission line leaves the existing CapX2020 structures to cross the Mississippi River into the Big Oaks Substation. The applicants determined that there was no additional capacity or reliability benefit to constructing this short one-mile segment as a 345 kV double-circuit transmission line at the time of initial construction.

The applicants considered double-circuiting the Western Segment of the project with the existing 115 kV transmission line segments between Big Stone, South Dakota, and Alexandria, Minnesota. The applicants determined that double-circuiting this existing 115 kV transmission line was not prudent because many of these segments have recently been upgraded. Replacing these existing 115 kV transmission line segments with double-circuit 345/115 kV transmission lines would result in removing the existing structures that still have much of their useful life yet, generally a total of 60 years. Replacing transmission lines that are far from the end of their useful lives would add significant costs to the project and remove active benefits with a cost that has already been made.

While double-circuiting the Western Segment of the project with the existing 115 kV line segments may be technically feasible, the applicants identified several operational and maintenance concerns. For example, generally, both lines must be taken out of service to work on a single line that would cause increased congestion and reliability concerns when maintenance is underway. Furthermore, with MISO's approval specifying that the Western Segment will be built with double-circuit capable structures for a future 345 kV circuit, it is less desirable to leverage the existing 115 kV transmission line segments because it would result in the need for a triple-circuit line to reserve space for the future 345 kV line, which is not preferred for reliability and maintenance reasons.

The potential human and environmental impacts of double-circuiting the Eastern Segment will be the same as the project because this segment is already proposed to be double-circuited for over 90 percent of its length. The potential human and environmental impacts of double-circuiting the Western Segment will likely be less than the project. Constructing the Western Segment as double-circuit with the existing 115 kV line segments would require removal of these existing structures, many of which have been recently upgraded, and replacing them with taller structures with wider rights-of-way, which results in greater aesthetic impacts. In comparison, land use along the Western Segment of the project could be reduced by double circuiting the existing 115 kV lines because the existing right-of-way would only need to be expanded rather than acquiring a new 150-foot-wide right-of-way.

### Alternative Number, Size, And Type of Conductor

The applicants have stated that the conductor for the project will be determined during final design based on the results of a conductor optimization study. This study will identify the optimal conductor configuration or configurations based on a technical and economic analysis of different conductor sizes and configurations.

For the Eastern Segment, the applicants are currently evaluating a double bundled 2x397.5 kcmil 26/7 ZTACSR "Ibis" conductor and a double bundled round (non-twisted pair) 954 kcmil 20/7 ACSS/TW "Cardinal" conductor. For the Western Segment, the applicants are considering twisted pair conductor using either double bundled 2 x 636 kcmil 26/7 ACSR "Grosbeak" or double bundled 2 x 795 45/7 ACSR "Tern".

The potential human and environmental impacts of the different conductors under evaluation are expected to be similar regardless of the conductor chosen for the project.

### Upgrading Existing Facilities

The applicants considered upgrading existing transmission facilities as an alternative to the project. For the Eastern Segment, the majority of the line already involves upgrading an existing 345 kV transmission circuit on double-circuit capable structures by adding an additional 345 kV transmission circuit. Upgrading existing facilities as an alternative to the project would involve either reconductoring or double-circuiting, and thus are already covered under those sections in Chapter 7.

### Undergrounding

Both AC and DC underground designs were considered as alternatives to the project. High voltage AC underground cable systems at 345 kV are generally limited in length to 50 miles or less because of its impact on reactive power. While longer installations can be constructed with the addition of shunt reactors along the line, this is an atypical design and practical applications of underground high voltage AC lines for more than 50 miles are cost prohibitive due to the technical requirements. Given that the project is approximately 200 miles in length, the applicants determined that an underground high voltage AC design was cost prohibitive.

High voltage DC cable systems are used for underground lines of approximately 100 miles or more. High voltage DC systems do not have the same reactive power limitations and line losses as high voltage AC underground cable systems. High voltage DC cable systems require Big Oaks Substations on each end of the line to convert the voltage from DC to AC and AC to DC. Because of the need for conversion from overhead to underground and conversion of voltage through Big Oaks Substations, high voltage DC lines do not readily accommodate interconnections at midpoints along the lines.

The applicants' analysis determined that both underground AC and DC designs are infeasible due to costs. Indicative estimates for underground high voltage DC over 100 miles are $25 million or more per mile, depending on the ultimate design. As with any high voltage DC option, the costs of two Big Oaks Substations would be approximately $800 million to $1 billion. Construction costs for AC underground transmission are anticipated to be similar to underground high voltage DC but would not require Big Oaks Substations. Specifically, two miles of a 345 kV line using an open trench construction method was determined by applicants to cost at least $20 million per mile. This compares to an indicative cost estimate of $3.5 million per mile for applicants' overhead designs. If underground is considered, the specific location must be studied as certain installations, for example a deep burial under a river, would result in additional costs. In addition, all underground cable installations behave differently, electrically, than overhead lines and therefore a study would be required to determine if reactive compensation is required. If reactive compensation is required, this would add several million dollars to the underground costs stated above. Based on this cost analysis, the applicants determined that the underground design is not a reasonable alternative.

The majority of the Eastern Segment of the project involves stringing a second 345 kV transmission line circuit on existing transmission structures that were initially constructed as double-circuit capable. An underground design for the Eastern Segment would mean that the cost savings associated with using these existing double-circuit structures would not be realized – in addition, reconstruction for an underground alternative would result in significantly more environmental impacts.

The potential human and environmental impacts of undergrounding would be greater than the project. There are human and environmental impacts both during and after construction of an underground transmission line. During both underground and overhead transmission line construction, the right-of-way must be cleared of vegetation. For overhead transmission, excavation work is primarily focused on line structure foundations; however, for underground transmission, excavation work is along the entire length of the line. This results in increased impact especially in sensitive environmental areas. In addition, large areas for access roads capable of supporting heavy construction equipment, trenching activities, and cable installation are needed for underground transmission. After construction, the right-of-way for an underground transmission line needs to be maintained free of all woody vegetation to reduce soil moisture loss, since high-voltage underground conductors make use of soil moisture for conductor cooling. A permanent road must also be maintained along the right-of-way for maintenance and repair and could result in more land disturbances during outages when the underground facilities must be accessed.

Undergrounding would result in less aesthetic impacts for the Western Segment as it would eliminate the need for overhead structures. However, an overhead to underground Big Oaks Substation would be required that would have aesthetic and land use impacts. For the Eastern Segment, undergrounding the new 345 kV circuit would not reduce the aesthetic impacts as the majority of the double-circuit structures are already in place and would remain even if the new circuit is placed underground.

# Sources

Unless otherwise noted, all links were valid as of February 14, 2024.


Avian Power Line Interaction Committee (APLIC). (2006). *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*. Edison Electric Institute, APLIC, and the California Energy Commission. https://www.nrc.gov/docs/ML1224/ML12243A391.pdf

Chalmers, James (2019) *High Voltage Transmission Lines and Residential Property Values in New England PowerPoint Presentation*,https://www.nhmunicipal.org/sites/default/files/uploads/Annual_Conference/2019/Sessions/Wednesday/market_effects_of_utility_rows_presentation-1045am.pdf

Explore Minnesota. *Tourism and Minnesota's Economy*. (n.d.) https://mn.gov/tourism-industry/research/tourism-and-the-economy.jsp.

Federal Aviation Administration (February 9, 2018) *Fundamentals of Noise and Sound*. (2018) retrieved from: https://www.faa.gov/regulations_policies/policy_guidance/noise/basics

Federal Emergency Management Agency, National Risk Index, https://hazards.fema.gov/nri/map.

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

IEEE Standards Association. *2017 – National Electrical Safety Code Brochure*. (2017). https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/nesc_2017_brochure.pdf

McGarr, Patricia L. et al. (November 21, 2021), https://www.linncountyiowa.gov/DocumentCenter/View/18016/Real-Estate-Adjacent-Property-Value-Impact-Report-PDF?bidId=

Michigan Agricultural Electric Council. *Stray Voltage: Questions and Answers*. (2008). Retrieved from: http://maec.msu.edu/Stray%20Voltage%20Brochure%202008.pdf

Minnesota House Research, *Property Tax 101: Property Tax Variation by Property Type*. (2022) https://www.house.leg.state.mn.us/hrd/pubs/ss/ssptvart.pdf .

Minnesota Department of Commerce.

- *Rights-of-way and Easements for Energy Facility Construction and Operation*, https://apps.commerce.state.mn.us/eera/web/project-file/12227 .

Minnesota Department of Health

- *Minnesota Well Index*. (n.d.) https://www.health.state.mn.us/communities/environment/water/mwi/index.html
- Source Water Protection Web Map Viewer, https://www.health.state.mn.us/communities/environment/water/swp/mapviewer.html

Minnesota Department of Natural Resources

- *Ecological Classification System: Ecological Land Classification Hierarchy*. (n.d.) https://www.dnr.state.mn.us/ecs/index.html
- *Minnesota Climate Summaries and Publications. Normals, Means, and Extremes for Major Airport Weather Stations* https://files.dnr.state.mn.us/natural_resources/climate/summaries_and_publications/2005_Annual_LCD_RST_page_3.pdf
- *Minnesota Regions Prone to Surface Karst Feature Development* (2016). http://files.dnr.state.mn.us/waters/groundwater_section/mapping/gw/gw01_report.pdf
- *Natural Heritage Information System*. (n.d.) http://www.dnr.state.mn.us/nhnrp/nhis.html
- Rare Species Guide, https://www.dnr.state.mn.us/rsg/index.html
- *Requirements for Projects Involving Public Waters Work Permits*. (n.d.) http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/requirements.html.
- *Utility Crossing License.* https://www.dnr.state.mn.us/permits/utility_crossing/index.html
- *Wildlife-friendly Erosion Control*. (2013). http://files.dnr.state.mn.us/eco/nongame/wildlife-friendly-erosion-control.pdf.

Minnesota Department of Transportation

- *Land Management*. (2022). https://www.dot.state.mn.us/utility/forms.html.
- Utility Accommodation on Trunk Highway Right of Way: Policy OP002, 2017.

Minnesota Pollution Control Agency

- *The Air We Breathe: The State of Minnesota's Air* Quality (2017), https://www.pca.state.mn.us/sites/default/files/lraq-1sy17.pdf,.
- *Annual AQI Days by Reporting Region*, https://public.tableau.com/app/profile/mpca.data.services/viz/MinnesotaAirQualityIndex_0/AQIExternal
- *Clean Water Act Section 401 Water Quality Certifications*. (n.d.) https://www.pca.state.mn.us/water/clean-water-act-section-401-water-quality-certifications.
- *Construction Stormwater*. (2022). https://www.pca.state.mn.us/business-with-us/construction-stormwater
- *Greenhouse gas emissions data*, https://www.pca.state.mn.us/air/greenhouse-gas-emissions-data
- *A Guide to Noise Control in Minnesota*. (2015). https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf
- *Minnesota Stormwater Manual*. (2022). https://www.pca.state.mn.us/water/minnesotas-stormwater-manual.
- *Minnesota Stormwater Manual: Structural BMP Use in Karst Settings*. (2022). https://stormwater.pca.state.mn.us/index.php/Structural_BMP_use_in_karst_settings
- *Toxics and Pollution Prevention Evaluation Report.* (2018). https://www.pca.state.mn.us/sites/default/files/lrp-p2s-2sy17.pdf

Minnesota Public Utilities Commission, Electric Service Area Map, retrieved from: https://minnesota.maps.arcgis.com/apps/webappviewer/index.html?id=95ae13000e0b4d53a793423df1176514/

National Institute of Environmental Health Sciences.

- *EMF: Electric and Magnetic Fields Associated with the Use of Electric Power*. (2002). https://www.niehs.nih.gov/health/materials/electric_and_magnetic_fields_associated_with_the_use_of_electric_power_questions_and_answers_english_508.pdf
- *Electric and Magnetic Fields.* (2018). http://www.niehs.nih.gov/health/topics/agents/emf/index.cfm.

National Cancer Institute (May 27, 2016) *Magnetic Field Exposure and Cancer*. (2016). http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/magnetic-fields-fact-sheet

North American Electric Reliability Corporation (2017) *Standards*, retrieved from: http://www.nerc.com/pa/stand/Pages/default.aspx

North Dakota State University Agricultural Engineering Department. *Extension Publication #108: Stray Voltage* (1986)

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

Township Cooperative Planning Association https://tcpamn.org/

United States Energy Information Administration

- *Electric Power Monthly*, June 2022, Table 6.07b, Capacity Factor for Utility Scale Generators Primarily Using Non-Fossil Fuels. (2022)., https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_6_07_b
- *Levelized Costs of New Generation in the Annual Energy Outlook 2022*. Table 1a. March 2022, https://www.eia.gov/outlooks/aeo/pdf/electricity_generation.pdf

United States Environmental Protection Agency

- *National Ambient Air Quality Standards (NAAQS) Table*. (2016), retrieved from: https://www.epa.gov/criteria-air-pollutants/naaqs-table
- *Ozone Pollution*. (2020), retrieved from: https://www.epa.gov/ozone-pollution
- *What is a Wetland.* (2022), retrieved from: https://www.epa.gov/wetlands/what-wetland
- *Environmental Justice*. (2022), retrieved from: https://www.epa.gov/environmentaljustice
- *Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis*. (1998), Guidance for Incorporating Environmental Justice Concern in EPA's NEPA Compliance Analyses (pdf)
- *EJ Screen: Environmental Screening and Mapping Tool*. (2023), retrieved from: https://www.epa.gov/ejscreen
- *What are Hazardous Air Pollutants?* (2022), retrieved from: https://www.epa.gov/haps/what-are-hazardous-air-pollutants
- *Ground-level Ozone Basics*. (2022), retrieved from: https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics#formation
- *Section 404 Permit Program*. (2022), retrieved from: http://www.epa.gov/cwa-404/section-404-permit-program.

United States Federal Aviation Administration, *Airport Data and Information Portal* https://adip.faa.gov/agis/public/#/public ,

United States Census, Explore Census Data, https://data.census.gov/cedsci/

United States Department of Agriculture

- 2017 Census of Agriculture, County Profile: Douglas to Sherburne County, Minnesota https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Minnesota/cp27039.pdf

United States Geological Survey

- *Total Water Use* (n.d.), retrieved from: https://www.usgs.gov/mission-areas/water-resources/science/total-water-use?qt-science_center_objects=0#qt-science_center_objects

University of Calgary. *Energy Education: Primary Pollutant*. (2018), retrieved from: https://energyeducation.ca/encyclopedia/Primary_pollutant.

University of Minnesota Extension. *Impact of Agricultural Drainage in Minnesota*. (2018), retrieved from: https://extension.umn.edu/agricultural-drainage/impact-agricultural-drainage-minnesota#sources-1360510

Wisconsin Public Service Corporation (2011) Answers to Your Stray Voltage Questions: Backed by Research, (2011). https://www.wisconsinpublicservice.com/partners/agriculture/stray-voltage/pdf/stray-voltage.pdf

World Health Organization

- *Extremely Low Frequency Fields*. (2007). https://www.who.int/publications/i/item/9789241572385
- *Radiation: Electromagnetic Fields, What are typical exposure levels at home and in the environment?* (2016). https://www.who.int/news-room/questions-and-answers/item/radiation-electromagnetic-fields

# Geospatial Sources

Unless otherwise noted, all links were valid as of February 14, 2024.


Minnesota Board of Water and Soil Resources. *State Funded Conservation Easements (RIM Reserve)*. Retrieved from: https://gisdata.mn.gov/.

Minnesota Department of Natural Resources

- *Minnesota County Boundaries*. Available from https://gisdata.mn.gov/
- *Public Waters Inventory (PWI) Basin and Watercourse Delineations.* Available from https://gisdata.mn.gov/
- *MBS Sites of Biodiversity Significance*. Available from https://gisdata.mn.gov/
- *Minnesota Snowmobile Trails*. Available from https://gisdata.mn.gov/
- *National Wetland Inventory of Minnesota*. (2015). https://resources.gisdata.mn.gov/pub/gdrs/data/pub/us_mn_state_dnr/water_nat_wetlands_inv_2009_2014/metadata/metadata.html#Distribution_Information
- *State Administered Lands – DNR Management Units, Minnesota*. Available from https://gisdata.mn.gov/
- *DNR Native Plant Communities*. Available from https://gisdata.mn.gov/

Minnesota Department of Transportation. *Roads, Minnesota, 2012*. Available from https://gisdata.mn.gov/

Minnesota State Geospatial Information Office.

- City, Township, and Unorganized Territory (CTU) Boundaries, Minnesota, May 29, 2014. Available from: https://gisdata.mn.gov/
- Impaired Streams. January 22, 2016. Available from https://gisdata.mn.gov/

Minnesota Board of Water and Soil Resources. *State Funded Conservation Easements (RIM Reserve)*. Available from https://gisdata.mn.gov/.

Minnesota Department of Natural Resources.

- *Minnesota County Boundaries*. Available from https://gisdata.mn.gov/.
- *Public Waters Inventory (PWI) Basin and Watercourse Delineations.* Available from https://gisdata.mn.gov/.
- *MBS Sites of Biodiversity Significance*. Available from https://gisdata.mn.gov/.
- *Minnesota Snowmobile Trails*. Available from https://gisdata.mn.gov/.
- *National Wetland Inventory of Minnesota*. (2015). https://resources.gisdata.mn.gov/pub/gdrs/data/pub/us_mn_state_dnr/water_nat_wetlands_inv_2009_2014/metadata/metadata.html#Distribution_Information
- *State Administered Lands – DNR Management Units, Minnesota*. Available from https://gisdata.mn.gov/.
- *DNR Native Plant Communities*. Available from https://gisdata.mn.gov/.

Minnesota Department of Transportation. *Roads, Minnesota, 2012*. Available from https://gisdata.mn.gov/.

Minnesota State Geospatial Information Office.

- City, Township, and Unorganized Territory (CTU) Boundaries, Minnesota, May 29, 2014. Available from https://gisdata.mn.gov/
- Impaired Streams. January 22, 2016. Available from https://gisdata.mn.gov/

Natural Resource Institute. *Minnesota Natural Resources Atlas*, January 2024, retrieved from: https://mnatlas.org/gis-tool/

U.S. Fish and Wildlife Service. *Wetlands and Deepwater Habitats of the United States*. Available from http://www.fws.gov/wetlands/Data/State-Downloads.html.

U.S. Geological Survey, *NLCD 2023 Land Cover Conterminous United States*. Available from: https://www.mrlc.gov/data