Environmental Assessment:
Laketown 115 kV Transmission Line Project

The human and environmental impacts of constructing and operating this 115 kV transmission line and associated substation

April 2025

PUC Docket No. ET2/TL-24-132

OAH Docket No. 21-2500-40445

COMMERCE DEPARTMENT

Project Contacts

Responsible Government Unit

Public Utilities Commission
121 Seventh Place East, Suite 350
Saint Paul, MN 55101

Commission Representative

Jacques Harvieux
(651) 201-2233
Jacques.Harvieux@state.mn.us

Preparer

Department of Commerce
85 Seventh Place East, Suite 280
Saint Paul, MN 55101

Commerce Representative

Logan Hicks
(651) 539-2712
logan.m.hicks@state.mn.us

Applicants

Great River Energy
12300 Elm Creek Boulevard
Maple Grove, MN 55369

Minnesota Valley Electric Cooperative
125 Minnesota Valley Electric Drive
Jordan, MN 55352

Project Representatives

Michael Swenson
(763) 445-5979
mswenson@grenergy.com

Spencer Howe
(952) 334-2803
spencerh@mvec.net

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 applicants, as well as information from relevant federal and state environmental review documents for similar projects. Spatial data was used. Information was gathered from multiple site visits. Unless otherwise noted, all URL addresses were current as of March 24, 2025.

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 (24-132), 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.

Alternative Formats

This document can be made available in alternative formats, that is, large print or audio, by calling (651) 539-1530 (voice).

Contents

Tables

Figures

Appendices

Acronyms and Abbreviations

Acronym/Abbreviation	Description
ALJ	administrative law judge
ARMER	Allied Radio Matrix for Emergency Response
applicants	Great River Energy and Minnesota Valley Electric Cooperative
AQI	Air Quality Index
BMP	best management practice
BWSR	Board of Water and Soil Resources
CN	Certificate of Need
Commerce	Department of Commerce
Commission	Public Utilities Commission
CSAH	County State Aid Highway
CSW Permit	Construction Stormwater Permit
dBA	A-weighted sound level recorded in units of decibels
EERA	Energy Environmental Review and Analysis
DNR	Department of Natural Resources
DRP	draft route permit
EA	environmental assessment
EJ	Environmental justice
ELF-EMF	extremely low frequency electromagnetic fields
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
Ft	Feet/Foot
GHG	Greenhouse gas
HVTL	high voltage transmission line
IEEE	International Electrical and Electronic Engineers
kV	kilovolt
m	meter
MBS	Minnesota Biological Survey
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
MVEC	Minnesota Valley Electric Cooperative
MW	megawatt
MWh	megawatt hour
mG	milligauss
MISO	Midcontinent Independent System Operator
MNDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MWI	Minnesota Well Index
NAC	noise area classification
NESC	National Electric Safety Code
NEV	natural-to-earth
NHIS	Natural Heritage Information System
NLCD	National Land Cover Dataset

NPDES	National Pollutant Discharge Elimination System
NWI	National Wetland Inventory
project	Laketown 115 kV Transmission Line Project
PWI	Public Waters Inventory
RIM Reserve	Reinvest in Minnesota Reserve
ROI	region of influence
ROW	right-of-way
SGCN	Species in Greatest Conservation Need
SHPO	State Historic Preservation Office
SNA	Scientific and Natural Area
SSURGO	Soil Survey Geographic Database
SWPPP	Stormwater Pollution Prevention Plan
TCWR	Twin City & Western Railroad
US	United States
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VMP	Vegetation Management Plan
WCA	Wetland Conservation Act
WHPA	Wellhead Protection Area
WMA	Wildlife Management Area
WPA	Wellhead Protection Area

Definitions

Several terms used in this document have a 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.

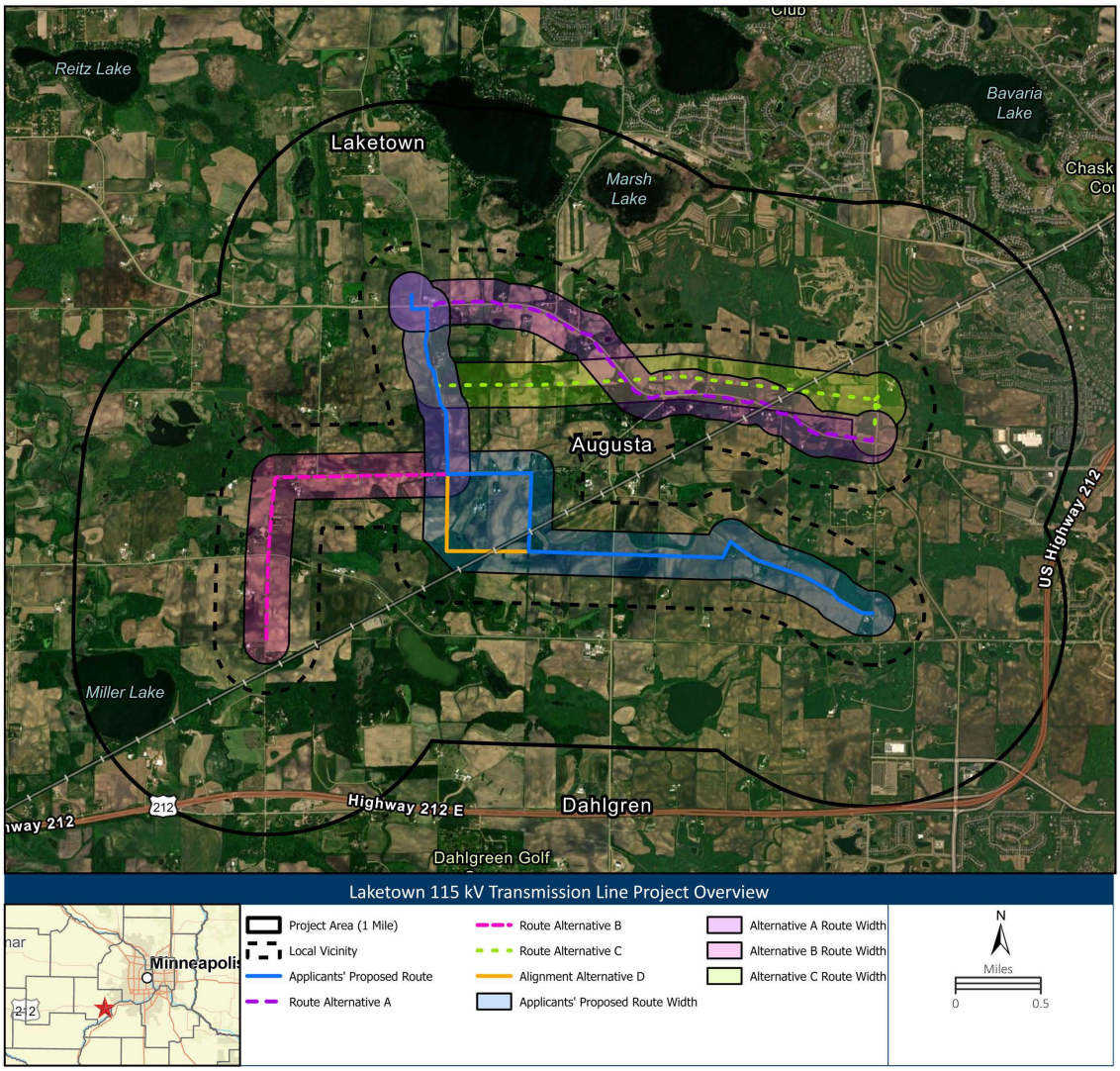
right-of-way means the land interest required within a route for the construction, maintenance, and operation of a high voltage transmission line (Minnesota Rule 7850.1000, subpart 15).

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.

Project Overview Map



* Electronic readers may view the map on an interactive web viewer. The viewer is available at: https://apps.commerce.state.mn.us/web/project/15657/.

Summary

Great River Energy (GRE) and Minnesota Valley Energy Cooperative (MVEC) (the applicants) must obtain a route permit from the Minnesota Public Utilities Commission (Commission) before they can construct the proposed Laketown 115 kilovolt (kV) Transmission Line Project (project).

What is this document?

This document is an environmental assessment. The Commission will use the information in this document to inform their decision about issuing a permit for the project. You can use it to help make comments about the project.

This environmental assessment (EA) contains an overview of the resources affected by the project. It also discusses potential human and environmental impacts and mitigation measures. Energy Environmental Review and Analysis staff within the Department of Commerce (Commerce) prepared this document as part of the environmental review process.

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: Logan Hicks, logan.m.hicks@state.mn.us, (651) 539-2712 or the Commission Energy Facilities Planner: Jacques Harvieux, jacques.harvieux@state.mn.us, (651) 201-2233.

Additional documents and information, including the route permit application, can be found on the State of Minnesota eDockets system: https://www.edockets.state.mn.us/documents (enter Docket # 24-132) or the EERA website: https://apps.commerce.state.mn.us/web/project/15657.

What are the applicants proposing to construct and why?

The project includes both a new substation and new HVTL to address electrical reliability concerns.

The project includes a new 115 kV high voltage transmission line (HVTL) and a new substation—the Laketown Substation. The new MVEC-owned Laketown Substation is proposed to interconnect to an existing GRE-owned 115 kV HVTL. The substation would step down the voltage from 115 kV to 12.47 kV. The electricity would then be distributed to consumers via MVEC distribution lines.

The project will address electrical reliability concerns for current and future electricity consumers.

What permits are needed?

The project requires a route permit from the Commission.

The project requires a route permit from the Commission because it meets the definition of high voltage transmission line under Minnesota Statute. A transmission line qualifies as an HVTL when it is longer than 1,500 feet and capable of operating at a voltage greater than 100kV. 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.

In addition to the route permit, various federal, state, and local approvals might be required for activities related to construction and operation of the project.

What routing alternatives does this EA study?

Five routing alternatives are studied. The applicants' proposed route and four routing alternatives.

For the purposes of this EA, the applicants' proposed route as well as all alternatives begin at the proposed new substation, the Laketown Substation, at the corner of Jersey Avenue and County State Aid Highway (CSAH) 10.

Applicants' Proposed Route

The Applicants' Proposed Route is the route requested in the permit application. It begins at the Laketown Substation and connects to the grid at a GRE-owned 115 kV transmission line along Guernsey Avenue.

The Applicants' Proposed Route begins at the Laketown Substation. It then crosses County Highway 10, runs slightly east, and then continues south along Jersey Avenue, crossing from west to east side of the road more than halfway down the length of the road. It then turns east at Augusta Road, on the opposite side of the road from local MVEC distribution lines. The proposed route then travels south through private property, before turning east along private property as well. Just before Hampshire Road, the proposed route then cuts back northeast, perpendicular to Hampshire Road, then turns southeast and runs along Hampshire Road. The proposed route follows Hampshire Road until it reaches the connection point along a GRE-owned 115 kV transmission line on the west side of Guernsey Avenue. The route width for this proposed route ranges from 1,400 feet to 4,500 feet wide depending on the location.

Route Alternative A

Route Alternative A was proposed by the public through the scoping process. The route begins at the Laketown Substation and travels along CSAH 10, connecting to the grid at a GRE-owned 115 kV transmission line along Guernsey Avenue.

Traveling north to south, Route Alternative A begins at the Laketown Substation then follows the applicant's proposed route across CSAH 10 and then east. The proposed route then continues east and south along CSAH 10, crossing the road several times at various locations. It reaches a connection point along a GRE-owned 115 kV transmission line on the west side of Guernsey Avenue. The route width for this route alternative is approximately 1,400 feet wide.

Route Alternative B

Route Alternative B was proposed by the public through the scoping process. The route alternative begins at the Laketown Substation and connects to an Xcel-owned 115 kV transmission line along County Road 140.

Traveling north to south, Route Alternative B begins at the Laketown Substation then follows the Applicant's Proposed Route until it reaches Augusta Avenue. Rather than turning east, this route alternative would turn west until it reaches Kelly Avenue. It will then travel south until it connects to the grid via an Xcel-owned 115 kV transmission line running east to west along County Road 140. The route width for this route alternative is approximately 1,400 feet wide.

Route Alternative C

Route Alternative C was proposed by the public through the scoping process. The route begins at the Laketown Substation and travels south then east, connecting at a GRE-owned 115 kV transmission line along Guernsey Avenue.

Traveling north to south, Route Alternative C begins at the Laketown Substation then follows the Applicant's Proposed Route until it reaches an Xcel-owned 230 kV transmission line that crosses Jersey Avenue. It will then collocate with the 230 kV transmission line, traveling east until it connects with the GRE-owned 115 kV transmission line along Guernsey Avenue. This route alternative would require a switch modification and a connection to the transmission line on the eastern side of Guernsey Avenue. The route width for this route alternative is approximately 1,400 feet wide.

Alignment Alternative D

Alignment Alternative D was proposed by the public through the scoping process. The route follows the Applicants' Proposed Route, differing only at a portion south of August Road and west of CSAH 43.

Alignment Alternative D separates from the Applicants' Proposed Route at Augusta Avenue. Rather than traveling east along Augusta Road, it would bypass the road and travel south into private property, before turning east and meeting again with the original Applicant's Proposed Route. This alignment alternative remains in the original route width of the Applicants' Propose Route width.

What potential impacts were identified?

The project will impact human and environmental resources. Distinct impacts will occur during construction and operation.

A potential impact is the anticipated change to an existing condition caused either directly or indirectly by the 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. 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 grouped: human settlement, human health and safety, public services, archeological and historic resources, land-based economies, and natural resources.

Select resource topics received abbreviated study because impacts to these resources are anticipated to be negligible and of relatively minor importance to the Commission's route permit decision. Potential impacts are anticipated to be negligible to airports, electrical interference, emergency services, floodplains, forestry, geology, mining, and topography.

Human Settlement

Aesthetics Visual impacts are subjective. Thus, potential impacts are unique to the individual and can vary widely. 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 moderate to significant. On whole, impacts are anticipated to be moderate for all routes, but possibly higher for the Applicants' Proposed Route. 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.

Cultural Values Impacts associated with rural character and sense of place are expected to be dependent on the individual. For those residents that place high value on rural character and a sense of place, impacts are anticipated to be moderate to significant. These impacts will be localized, short- and long-term, but might diminish over time depending on the individual. Impacts to community unity are likely to occur regardless of the route segment is selected. These impacts are anticipated to be minimal and long-term. Impacts are unavoidable.

Displacement Removal of homes or buildings to facilitate the safe construction and operation of the project is not expected for all route options. Mitigation is not proposed.

Environmental Justice A meaningfully greater low-income or minority population does not reside in these census tracts. This means that when compared to the combined population of Carver County, the percentage of people living in poverty or not self-identifying as white alone were either: 1) not greater than 50 percent, or 2) not 10 percentage points or more than the percentage of the same population in Carver County. Therefore, disproportionate and adverse impacts to these populations are not expected. Mitigation is not proposed.

Land Use and Zoning Potential conflicts with existing land uses are most likely to occur along the Applicants' Proposed Route and Alignment Alternative D. These routes span the most agricultural land, although impacts are anticipated to be minimal, if it all, since HVTL does not have a large potential to change underlying land use.

Interference with county zoning ordinances is not expected. Zoning with the local cities of Victoria and Carver may occur if the Applicants' Proposed Route or Route Alternative C is selected. Both these cities are expanding and developing currently rural areas into commercial, mixed and industrial zoning.

Noise Distinct noises are associated with construction and operation. Noise created by construction activities are anticipated to be minimal for all routing options. Construction activity and crews would be present at a particular location during daytime hours for a few days at a time but on multiple occasions over the course of the nine months. 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 period of time, potential impacts are expected to be minimal.

Property Values A property's value is influenced by a complex interaction of factors. The presence of a HVTL or substation becomes one of these factors. 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. On whole, impacts are anticipated to be negative, of a small size, and dissipate rapidly with distance. However, impacts to specific properties could vary widely. Smaller properties are generally more vulnerable to value impacts. Long-term impacts might or might not occur. Impacts are anticipated to be minimal to moderate. Potential impacts to these unique resources can be mitigated.

Public Utilities and Infrastructure Potential impacts to the electrical grid, roads and railroads, and other utilities are anticipated to be short-term, intermittent, and localized during construction. Impacts to water (wells and septic systems) and pipelines are not expected to occur. Construction impacts are expected to be minimal and are associated with short electrical outages and possible traffic delays. Operation of the

project will provide a more reliable electrical grid. Negative impacts, such as traffic delays, should be negligible. Impacts are unavoidable but can be minimized.

Recreation Potential impacts to recreational opportunities are anticipated to be minimal for all routing options. During construction, unavoidable short-term impacts will occur. Construction equipment and vehicle traffic will create noise, dust, and visual impacts. These impacts will be intermittent and localized. Operational impacts will be long-term and are primarily associated with visual impacts caused by new built features introduced to the landscape. Because direct long-term impacts are primarily aesthetic in nature, indirect long-term impacts to recreation are expected to be subjective and unique to the individual. These unavoidable impacts will affect unique resources. Potential impacts can be minimized.

Socioeconomics 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 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.

Public Health and Safety

Electromagnetic Fields Impacts to human health from possible exposure to EMFs are not anticipated. The HVTL will be constructed to maintain proper safety clearances. The substation site 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 of a small size. Impacts can be mitigated.

Implantable Medical Devices Magnetic fields produced by HVTLs are not high enough to interfere with these devices; however, electric fields potentially can. 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. Should interference occur moving away from the transmission line is a standard response. Electric fields are easily shielded. Potential impacts are expected to be minimal across routing options. Impacts to human health are not anticipated. Potential impacts, if they occur, would be short-term, intermittent, and localized. Impacts would affect a unique resource (people). Impacts can be mitigated.

Public and Worker Safety Like any construction project, there are risks. These include potential injury from falls, equipment and vehicle use, electrical accidents, etc. Public risks involve electrocution. This risk is higher in low-voltage lines because the conductor is lower to the ground. Electrocution risks could also result from unauthorized entry into the substation. Potential impacts are anticipated to be minimal for all routing options. Impacts would be short-and long-term and can be minimized.

Stray Voltage 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 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 mitigates this concern. Therefore, potential impacts from stray voltage are anticipated to be minimal for all routing options. Potential impacts can be mitigated.

Land Based Economies

Agriculture Potential impacts to agricultural producers are anticipated to be of small-size and minimal across all routing options. This is because HVTLs generally do not interfere with future farming or grazing operations. Potential on-the-ground impacts can be mitigated. Short- and long-term financial impacts, such as crop losses, can be mitigated through easement agreements.

Tourism Indirect impacts to tourism are associated with direct impacts to recreational opportunities. These unavoidable impacts will be short-term and intermittent during construction, and long-term and localized during operation. The project will not preclude future tourist activities. Potential impacts are unavoidable but can be minimized.

Archaeological and Historic Resources

A preliminary study shows that there is a low potential for any archaeological resources in the area. Whichever route the Commission chooses, additional surveys would be required. Since impacts to archeological and historic resources are not anticipated mitigation is not proposed.

Natural Environment

Air Quality and Climate Change Distinct impacts occur during construction and operation of a transmission line and substation. Potential impacts to air quality during construction would be intermittent, localized, short-term, and minimal. Impacts are associated with fugitive dust and exhaust. Impacts 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.

Construction activities will result in short-term increases in GHG emissions because of the combustion of fossil fuels in construction equipment and vehicles. These emissions would be short-term and dispersed over the region of influence; therefore, total emissions would be minimal and not result in a direct impact to any one location. Maintenance activities would result in impacts like construction, but to a much lesser extent. Operational impacts from formation of nitrous oxide and release of sulfur hexafluoride are minimal. Impacts are unavoidable but can be minimized.

Groundwater Potential impacts to domestic water supplies are not expected, because the city of Chaska wellhead protection area and drinking water supply management area are outside any of the studied route widths and are in a location that has very low vulnerability to human caused contaminants. There are several wells within the route widths of all routing options. Subsurface activity would likely penetrate shallow water tables; however, subsurface disturbance is expected to be above well-depth used for potable water. Potential impacts for all routing options are anticipated to be minimal. Impacts will be short-term (years) and localized. Impacts can be mitigated in part.

Rare and Unique Resources Rare and unique features were identified within the project area, but no animal or plant species intersect any of the route options. Thus, potential impacts are anticipated to be minimal for all routing options. These long-term, localized, impacts would affect a unique resource. Potential impacts can be mitigated in part and avoided in part.

Soils Common soil impacts include rutting, compaction, and erosion. Potential impacts will be short-term and localized. Impacts can be minimized.

Surface Water Potential impacts to surface waters are anticipated to be minimal for all routing options. Direct impacts to other resource elements can cause indirect impacts to surface waters, for example, construction activities near surface waters could cause riparian vegetation disturbance and surface erosion. Petroleum-based fluid leaks or fuel spills from construction equipment in the ROW might reach surface waters. The project does not cross any impaired waters; therefore, impacts to these resources will not occur. Potential impacts can be mitigated.

Vegetation Potential impacts, such as clearing, compacting, or otherwise disturbing vegetation, are expected to be moderate for the Applicants' Proposed Route and minimal for all other routing options. This is because more than twice as much tree clearing would be necessary to construct the project along the Applicants' Proposed Route. Invasive species might establish. Potential impacts will be both short- and long-term. Impacts are localized, but unavoidable. Potential impacts can be minimized.

Wetlands Overall, potential impacts to wetlands are anticipated to be greater along Route Alternatives A and C and Alignment Alternative D. These are predominantly emergent wetlands, so the potential impacts are anticipated to be minimal. Potential impacts will be short- and long-term and of a relatively small size when compared to total wetland acres in Carver County. Impacts will affect a unique, but common resource. Impacts can be minimized; however, the conversion of forested wetlands to a different wetland type and function is unavoidable.

Wildlife and Habitat Wildlife using the route width 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.

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 short-term, localized impacts can be minimized. Operational impacts are expected from continued maintenance of the ROW. These intermittent but long-term impacts will be of a small size.

Potential impacts to avian species include those described above. Additionally, birds—especially large-bodied birds—are susceptible to electrocution from, and collision with, HVTLs during operation. Potential impacts to avian species are expected to be minimal but might impact unique resources. These short- and long-term, localized impacts can be minimized.

What's next?

An in-person public hearing will be held followed by a virtual public hearing. The public can provide comments at either hearing or as part of an associated public comment period. An administrative law judge (ALJ) will preside at the hearings. The ALJ will prepare a report and make a recommendation for the Commission to consider. The Commission will review the record and decide whether to grant a route permit, and, if so, which route to use for the project and what conditions should apply.

An administrative law judge (ALJ) from the Office of Administrative Hearings will hold an in-person public hearing in the project area. After the in-person hearing, a virtual hearing will be held. At either hearing you may ask questions or submit verbal comments about the project. An associated public comment period provides an opportunity to provide written comments. After the public comment period closes, the ALJ will provide a written report to the Commission summarizing the public hearings 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, and, if so, what route should be used. The ALJ might recommend ways to mitigate potential impacts.

The Commission then reviews the record and decides whether to grant a route permit. If the Commission issues a route permit for the project, it may identify measures to mitigate potential impacts. The Commission is expected to make a route permit decision in summer 2025.

Chapter 1 Introduction

The Department of Commerce (Commerce) prepared this environmental assessment (EA) for the Laketown Transmission Line Project (project), which consists of approximately 4.3 miles of new 115 kilovolt (kV) high voltage transmission line (HVTL) in Carver County and a new substation—the Laketown Substation—in Laketown Township. The project is proposed by Great River Energy (GRE) and Minnesota Valley Electric Cooperative (MVEC) referred to herein as the "applicants."

This EA describes the project, highlights resources affected by the project and discusses potential human and environmental impacts to those resources.[1] It also discusses ways to mitigate potential impacts. These mitigation strategies can become enforceable conditions of the Commission's route permit. In addition to the route proposed by the applicant, this EA studies three route alternatives and one alignment alternative.

An EA is not a decision document, but rather an information document. It is intended to facilitate informed decisions by the Minnesota Public Utilities Commission (Commission), particularly with respect to the goals of the Minnesota Power Plant Siting Act to "minimize adverse human and environmental impacts while insuring continuing electric power system reliability and integrity and insuring that electric energy needs are met and fulfilled in an orderly and timely fashion."[2]

What is the public's role?

Minnesota needs your help to make an informed decision.

During scoping you told us what concerns you most 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.

What is the state of Minnesota's role?

The Commission will make a permit decision, which is informed by this EA and a public hearing and comment period.

Before building the project, the applicants need a route permit from the Commission. A route permit says where the project will be located, and how impacts must be mitigated. The project will also require approvals from other state agencies, for example, a stormwater permit. If the Commission grants a route permit, other federal and local permits might be required. Applicants must obtain these permits before construction.

To ensure a fair and robust airing of the issues, the Minnesota Legislature set out the process the Commission must follow when considering route permit applications.[3] This is called environmental review. In this instance, Energy Environmental Review and Analysis staff within Commerce prepared this EA. Next, an administrative law judge (ALJ) with the Office of Administrative Hearings will hold a public hearing and comment period. The ALJ will consolidate information from you, other interested stakeholders, and government agencies into a written report. The ALJ will submit this report and a

[1] In this document the words "effect" and "impact" are synonymous and could be beneficial or detrimental.
[2] Minnesota Statute 216E.02, subd. 1.

recommendation to the Commission. The record developed during this process—including all public input—will be available to the Commission when it makes a permit decision.

The EA describes potential human and environmental impacts of the project (*the facts*), whereas the public hearing allows interested persons the opportunity to advocate, question, and debate what the Commission should decide about the project (*what the facts mean*).

How is this document organized?

The EA addresses the matters identified in the scoping decision.

This EA addresses the matters identified in the February 5, 2025, scoping decision (**Appendix A**). The scoping decision was made by Commerce and is based on public input gathered at a public meeting and associated comment period, as well as the Commission's consideration of the different route alternatives. The EA is organized as follows:

Chapter 1 Introduction provides an overview of this document and the project.

Chapter 2 Regulatory Framework summarizes the regulatory framework, including the route permit and environmental review processes, and the other approvals that might be required for the project.

Chapter 3 Proposed Transmission Line and Alternatives describes the project—its design, construction, and operation—as well as two route segment alternatives.

Chapter 4 Potential Impacts and Mitigation Across the Applicants' Proposed Route and Route Alternatives A, B and C defines how potential impacts and mitigative measures are described in this EA. It discusses the environmental setting, and highlights topics dismissed from detailed analysis. This chapter details potential human and environmental impacts and mitigative measures between the four full routes.

Chapter 5 Potential Impacts and Mitigation Across the Applicants' Proposed Alignment and Alignment Alternative D details potential human and environmental impacts and mitigative measures between the two alignment options.

Chapter 6 Unavoidable, Irreversible, and Cumulative Impacts lists unavoidable impacts and irreversible and irretrievable commitments of resources and summarizes the cumulative potential effects of the project and other projects.

Chapter 7 Application of Routing Factors applies the information available in the route permit application and this EA to the routing factors listed in Minnesota Rule 7850.4100.

Chapter 8 Resources used for this EA.

Chapter 2 Regulatory Framework

Chapter 2 discusses necessary authorizations from the Commission, and what these authorizations mean. It describes the environmental review process and highlights the factors the Commission must consider when making a route permit decision. This chapter also discusses required approvals from federal and state agencies, local units of government, and others with permitting authority for actions related to the project.

What Commission approvals are required?

A route permit is required.

The project requires a route permit from the Commission because it meets the definition of "high voltage transmission line" under Minnesota Statute.[4] A transmission line qualifies as an HVTL when it is longer than 1,500 feet and capable of operating at a voltage greater than 100kV. 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.

What is environmental review?

Environmental review informs the Commission's route permit decision. It calls attention to potential impacts and possible mitigation measures associated with the project and provides opportunities for public involvement.

Minnesota law requires that potential human and environmental impacts be analyzed before the Commission decides whether to grant a route permit. This analysis is called environmental review. The Commission is reviewing the project under Minnesota Statute 216E.04 and Minnesota Rules 7850.2800 to 7850.3900.

What permitting steps have occurred to date?

The Commission accepted the route permit application as complete on October 1, 2024. Public information and scoping meetings were held online on October 23, 2024, and in Chaska, Minnesota on October 28, 2024.

Application Filing and Acceptance

GRE filed a route permit application on August 19, 2024.[5] The Commission accepted the route permit application as substantially complete in its order dated October 1, 2024.[6] The order also referred the matter to the Office of Administrative Hearings for appointment of an administrative law judge (ALJ) to conduct a public hearing for the project. Commission staff provided a *Sample HVTL Route Permit* on October 10, 2024.[7]

Figure 1 outlines the permitting process as it has unfolded for this project.

---

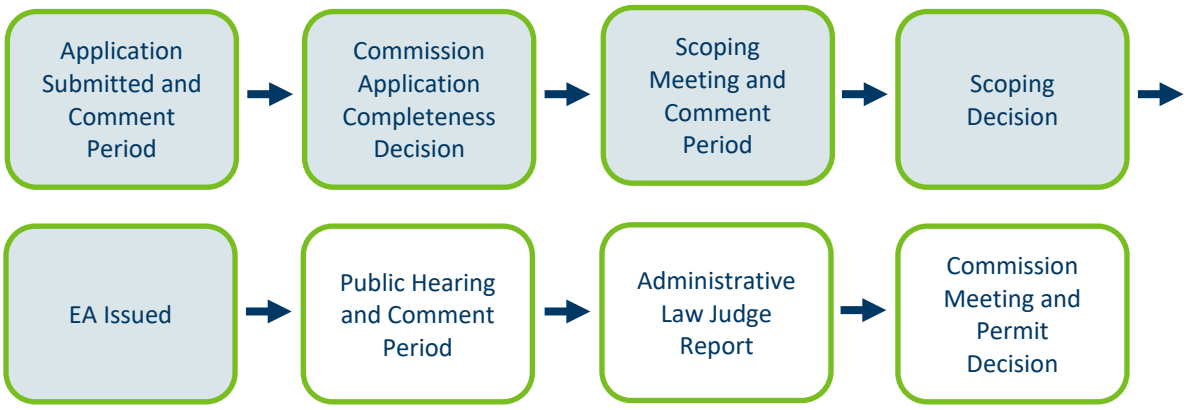
[4] Minnesota Statute 216E.01, subd. 4.

[5] Great River Energy, *Route Permit Application*, August 19, 2024, eDocket Nos. 20248-209604-01 (through -10), 2048-209605-01 (through -07), and 20248-209606-01 (through -04).

[6] Commission, *Order*, October 1, 2024, eDocket No. 202410-210617-01.

[7] Commission, *Sample HVTL Route Permit*, October 22, 2024, eDockets No. 202410-210863-01.

Figure 1 Permitting Process Summary[8]



Scoping Process

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

On October 10, 2024, Commission staff issued a joint *Notice of Public Information and Environmental Assessment Scoping Meetings.*

Commerce and Commission staff, along with the applicants, held a virtual public information on October 23, 2024, and an in-person meeting on October 28, 2024. The purpose of the meetings was to provide information about the permitting process and the project, answer questions, and gather input regarding potential impacts and mitigation measures that should be studied in the EA. The meeting also provided an opportunity to solicit potential route or route segment alternatives to mitigate potential impacts. EERA staff provided multiple handouts, including a process summary and comment form. A court reporter was present at both meetings to document verbal statements.

In addition to the verbal comments received at the public meeting, a public comment period, ending on November 12, 2024, provided an opportunity for interested persons to provide written comments identifying issues, mitigation measures, and alternative routes or route segments for consideration in the scope of the EA. Eight written comments were received.

Scoping Comments Received

Scoping comments are compiled and available to view or download.[9] [10]

The public expressed concern about the project. These concerns included but were not limited to impacts resulting from the construction and operation of the project to aesthetics, wildlife, agriculture, road use (traffic and damage to road), cultural values, property values, wildlife and their habitats, including mature tree removal. Commenters also indicated concern with impacts related to a sense of place in Augusta.

[8] Read from left to right, top to bottom; shaded steps are complete.
[9] Commerce, *Oral Public Meeting Comments on the environmental Assessment Scoping*, November 25, 2024, eDocket No. 202411-212355-01.
[10] Commerce, *Written Public Meeting Comments on the environmental Assessment Scoping*, November 25, 2024, eDocket No. 202411-212355-02.

Agency comments were received from the Minnesota Department of Natural Resources (DNR).[11] DNR made comments regarding calcareous fens, federally listed species and species of special concern, water appropriation, licenses to cross public lands and waters, facility lighting, dust control, wildlife-friendly erosion control.

Commission Consideration of Alternatives

The Commission reviewed routing alternatives studied in the EA.

On December 12, 2024, EERA staff provided the Commission with a summary of the scoping process.[12] EERA staff recommended four routing alternatives be included in the scope of the EA. On February 4, 2025, the Commission agreed with EERA staff's recommendations.[13]

Scoping Decision

The scoping decision identified the topics studied in this EA.

After considering public comments, input from the Commission, and recommendations from staff, Commerce issued a scoping decision on February 5, 2025 (**Appendix A**).[14] The scoping decision identified the issues and routing alternatives to be evaluated in this EA. EERA staff provided notice of the scoping decision to those persons on the project mailing list and posted the notice to eDockets, the EERA website, and the EQB Monitor.[15] [16]

Staff also provided a letter to newly affected landowners, informing them that a route or alignment alternative identified in the scoping decision has the potential to impact their property.[17]

Public Hearing

A public hearing will be held. You can provide comments at the hearing or submit written comments 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. You will have the opportunity to speak at the hearing, ask questions, and submit comments. EERA staff will respond to your questions and comments about the EA at the public hearing, but staff is not required to revise or supplement the document.[18] Comments received during the hearing and the associated comment period become part of the public record.

After the comment period closes, the ALJ will provide the Commission with a written report summarizing the public hearing and comment period, and all comments received. The ALJ will also provide the

[11] DNR, *Letter of comments in regard to the Environmental Assessment*, November 11, 2024, eDocket Nos. 202411-211858-01 and -02.
[12] Commerce, *Scoping Summary and Recommendation*, December 12, 2024, eDocket No. 202412-212935-01.
[13] Commission, *Order*, February 4, 2025, eDocket No. 20252-214891-01.
[14] Commerce, *Environmental Assessment Scoping Decision*, February 5, 2025, eDocket No. 20252-214984-01.
[15] Commerce, *Notice of Environmental Scoping Decision*, February 7, 2025, eDocket No. 20252-215089-01.
[16] Commerce, *Notice of Environmental Scoping Decision on EQB Monitor*, February 2025, eDocket No. 20252-215589-02.
[17] Commerce, *Letter to Newly Affected Landowners Regarding the Environmental Scoping Decision*, February 5, 2025, eDocket No. 20252-214985-01.
[18] Minnesota Rule 7850.3800, subp. 4.

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.

What criteria does the Commission use to make decisions?

The Commission will make a route permit decision after the public hearing. Minnesota statute and rule identify the factors the Commission must consider when deciding to grant a route permit.

The Minnesota Legislature directed the Commission to select HVTL routes that minimize adverse human and environmental impacts while insuring continuing electric power system reliability and integrity. An HVTL route must be compatible with environmental preservation and the efficient use of resources while also ensuring that electric energy needs are met and fulfilled in an orderly and timely fashion.[19]

Minnesota Statute 216E.03, subdivision 7(b), identifies 12 considerations that the Commission must weigh when designating a HVTL route. These considerations are further clarified and expanded by Minnesota Rule 7850.4100, which identifies 14 factors the Commission must weigh 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.

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.[20] The Commission must also make specific findings that it has considered locating a route for a new HVTL along an existing HVTL route

[19] Minnesota Statute 216E.02, subd. 1.
[20] Minnesota Rule 7850.3900, subp. 2.

or parallel to existing highway right-of-way (ROW) and, to the extent these are not used, the Commission must state the reason(s).[21]

The Commission must make a final decision on the route permit within 60 days of receiving the ALJ report. A final decision must be made within six months after the Commission's determination the application is complete; however, this time limit may be extended.[22] A route permit decision for this project is anticipated in August 2025.

What does the Commission approve in a route permit?

The Commission approves a route and anticipated alignment. The HVTL must be constructed within the route. The permit also authorizes permittees to obtain permanent ROW for the HVTL and any associated facilities.

When the Commission issues a route permit it designates a route and an anticipated alignment.[23] The ROW is the area required for safe operation of the HVTL. It must be within the designated route and is the area for which the permittee may obtain easements to construct and operate the HVTL. The route width is typically wider than the actual ROW 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. 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. **Figure 2** illustrates the difference between alignment, right-of-way, and route.

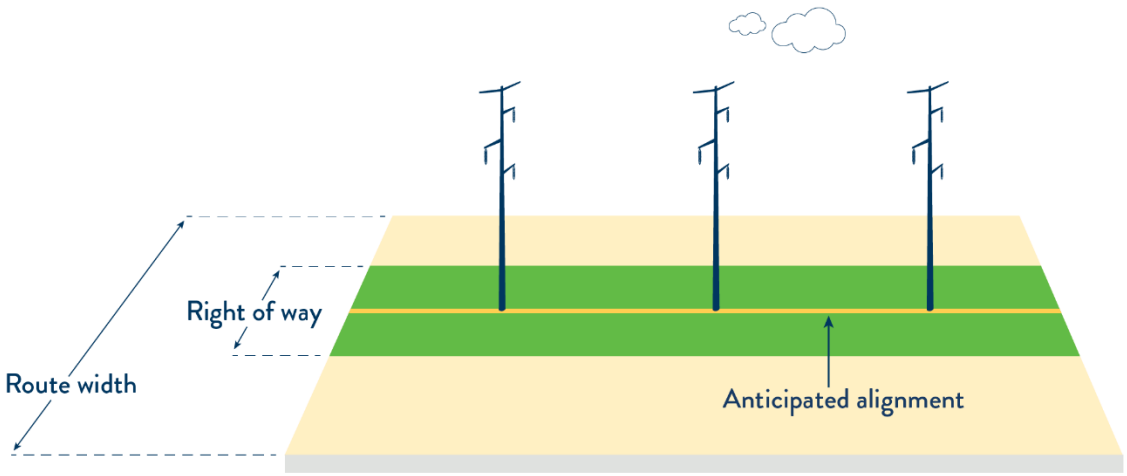
The HVTL must be constructed within the Commission's designated route and along the anticipated alignment. The anticipated alignment is the anticipated location of the structures and HVTL within the ROW and route. It is NOT the final alignment. The anticipated alignment is considered the centerline of the project for review purposes only—the structures and HVTL might ultimately be located 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 or alignment modifications within the Designated Route shall be located so as to have comparable overall impacts relative to the factors in Minn. R. 7850.4100, as does the right-of-way and alignment identified in this route permit and shall be specifically identified and documented in and approved as part of the plan and profile submitted"[24] Modifications to the anticipated alignment generally result from landowner requests or unforeseen conditions.

The route permit also outlines conditions specifying construction and operation standards. A draft route permit (DRP) is included in **Appendix B**.

[21] Minnesota Statute 216E.03, subd. 7(e).
[22] Minnesota Rule 7850.3900, subp. 1.
[23] Minnesota Statute 216E.01, subd. 8.
[24] Appendix B, *Draft Route Permit*, Section 4.

Figure 2 Route and Right-of-Way Illustration



Can the applicants use eminent domain?

The applicants may exercise the power of eminent domain.

At times, negotiated easement agreements for permanent ROWs—the land needed for the construction, maintenance, and operation of a HVTL—cannot be reached. Should this occur, the applicants 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 applicants are bound by this determination. If the eminent domain process is used, the applicants must obtain at least one appraisal for the property proposed to be acquired.[25]

Are other permits or approvals required?

Yes, other permits and approvals will be required for the project.

A route permit from the Commission is the only state permit required for routing the project; that is, the Commission's route permit determines where the HVTL will be located. The route permit supersedes local planning and zoning, and binds state agencies; however, the Commission can and does consider impacts to zoning and land use when considering route permit applications.

Minnesota Statute 216E.10, subdivision 3, requires state agency participation in the permitting process to identify whether proposed projects—if constructed—would be "in compliance with state agency standards, rules, or policies" meaning the agency must indicate whether a route is or is not permittable. Agency participation also informs the Commission about areas of agency interest or concern.

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. Section of 5.5.2 of the DRP (**Appendix B**)

[25] Minnesota Statute 117.036, subd. 2.

requires that these subsequent permits (commonly referred to as "downstream" permits) must be obtained prior to construction. **Table 1** lists permits and approvals that could be required for the project.

Federal

The United States Army Corps of Engineers (USACE) "regulates the discharge of dredged or fill material into waters of the United States, including wetlands."[26] 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 exists. The USACE is also charged with coordinating with Indian tribes regarding potential impacts to traditional cultural properties.

A permit is required from the United States Fish and Wildlife Service (USFWS) for the incidental taking of any threatened or endangered species.[27] As a result, USFWS encourages project proposers to consult with the agency to determine if a project has the potential to impact federally-listed threatened or endangered species. Additionally, consultation can lead to the identification of measures to mitigate potential impacts associated with the project.

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.[28] Projects affecting the course, current, or cross-section of lakes, wetlands, and streams that are public waters may require a *Public Waters Work Permit*.[29] Not unlike the USFWS, DNR encourages project proposers 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.

Construction projects that disturb one or more acres of land require a general *National Pollutant Discharge Elimination System (NDPES)/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."[30] 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.

[26] USEPA, *Permit Program Under CWA Section 404*, (February 26, 2025), http://www.epa.gov/cwa-404/section-404-permit-program.
[27] 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).
[28] Minnesota Statute 84.415.
[29] DNR, *Requirements for Projects Involving Public Waters Work Permits*, (n.d.), http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/requirements.html.
[30] MPCA, *Construction Stormwater*, (n.d.), https://www.pca.state.mn.us/business-with-us/construction-stormwater.

Table 1 Potential Permits

Unit of Government	Type of Application	Purpose
Federal		
US Army Corps of Engineers	Section 404 Clean Water Act – Dredge and Fill	Protects water quality through authorized discharges of dredged and fill material
	Section 10 – Rivers and Harbor Act	Protects water quality through authorized crossings of navigable waters
US Fish and Wildlife Service	Threatened and Endangered Species Consultation	Consultation to avoid, minimize, and mitigate impacts to federally-listed species
	Special Use Permit	For work in Waterfowl Production Areas
State of Minnesota		
Department of Natural Resources	License to Cross Public Lands and Waters	License to prevent impacts associated with crossing public lands and waters
	State Threatened and Endangered Species Consultation	Consultation to avoid, minimize, and mitigate impacts to state-listed species
Pollution Control Agency	Construction Stormwater Permit	Minimizes temporary and permanent impacts from stormwater
	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 Transportation	Utility Permit	Authorizes accommodation of utilities along highway ROWs
	Driveway Access	Authorizes access to driveways along highways
	Oversize/Overweight Permit	Authorizes the use of roads for oversize or overweight vehicles
Board of Water and Soil Resources	Wetland Conservation Act	Coordination with BWSR and local governments to ensure conservation of wetlands
Local		
Local Governments	Utility Permit	Needed to construct or maintain electrical lines along or across county highway ROW
	Road Crossing, Driveway, Oversize or weight, and Land use	Permits from local governments to ensure proper use of local roads and lands
Other		
Utilities, BNSF, and MISO	Crossing Permits and Agreements, Electrical Interconnection	Needed to ensure safe crossing of existing utilities (not owned by applicants) and railways; To ensure a reliable electric grid

Projects with net increases of one acre or more to impervious surface must be designed so that stormwater discharged after construction does not violate state water quality standards. Specifically, projects must be designed to treat water volumes of one-inch times 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."[31] The certification becomes a condition of the federal permit. Additionally, MPCA regulates generation, handling, and storage of hazardous wastes.

A permit from MnDOT is required for construction, placement, or maintenance of utility lines adjacent or across trunk highway ROWs.[32] Coordination would be required to construct access roads or driveways from trunk highways.[33] These permits are required to ensure that use of the ROW does not interfere with free and safe flow of traffic, among other reasons.[34]

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

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

Local

Commission route permits preempt local zoning, building, and land use rules, regulations, or ordinances promulgated by regional, county, local, and special purpose governments; however, permittees must obtain all approvals necessary for the project that are not preempted by the Commission's route permit. Coordination with local governments could be required for the issues listed below.

Access/Driveway Coordination may be required to construct access roads or driveways from county or township roads.

Public Lands Coordination would be required to occupy county or township lands such as forest lands, park lands, watershed districts, and other properties owned by these entities.

Overwidth Load Coordination may be required to move over-width or heavy loads on county or township roads.

Road Crossing and ROW Coordination may be required to cross or occupy county or township road ROWs.

Do electrical codes apply?

Yes, if constructed the HVTL must meet electrical safety code requirements.

All power lines must meet requirements of the National Electrical Safety Code (NESC).[35] 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 and overhead and underground

[31] MPCA, *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.
[32] Minnesota Rule 8810.3300, subp. 1.
[33] MnDOT, *Land Management*, (n.d.), https://www.dot.state.mn.us/utility/forms.html.
[34] MnDOT, *MnDOT Policies*, (n.d.), http://www.dot.state.mn.us/policy/operations/op002.html.
[35] Minnesota Statute 326B.35; Minnesota Rule 7826.0300, subp. 1

electric supply . . . lines."[36] They also ensure that power lines 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 routine operational maintenance is performed. Utilities must also comply with North American Electric Reliability Corporation standards, which define the reliability requirements for planning and operating the bulk power system (electrical grid) in North America.

[36] IEEE Standards Association, *2017 – National Electrical Safety Code Brochure*, (2017), https://standards.ieee.org/wp-content/uploads/import/documents/other/nesc_2017_brochure.pdf.

Chapter 3 Proposed Transmission Line and Alternatives, Construction and Maintenance

Chapter 3 explains how the project and four routing alternatives will be studied in the remainder of this EA. It describes how the new 115 kV overhead HVTL and substation would be constructed, operated, and maintained. Unless otherwise noted, the source of information for this chapter is the route permit application and supplemental information provided by the applicants.

What routing alternatives does this EA study?

Five routing alternatives are studied. The applicants' proposed route and four alternatives.

For the purposes of this EA, the applicants' proposed route as well as all alternatives begin at the proposed new substation, the Laketown Substation, at the corner of Jersey Avenue and County State Aid Highway (CSAH) 10. **Appendix D** contains detailed maps for all routing alternatives.

Applicants' Proposed Route

The Applicants' Proposed Route is the route requested in the permit application. It begins at the Laketown Substation and connects to the grid at a GRE-owned 115 kV transmission line along Guernsey Avenue.

The Applicants' Proposed Route begins at the Laketown Substation. It then crosses County Highway 10, runs slightly east, and then continues south along Jersey Avenue, crossing from west to east side of the road more than halfway down the length of the road. It then turns east at Augusta Road, on the opposite side of the road from local MVEC distribution lines. The proposed route then travels south through private property, before turning east along private property as well. Just before Hampshire Road, the proposed route then cuts back northeast, perpendicular to Hampshire Road, then turns southeast and runs along Hampshire Road. The proposed route follows Hampshire Road until it reaches the connection point along a GRE-owned 115 kV transmission line on the west side of Guernsey Avenue. The route width for this proposed route ranges from 1,400 feet to 4,500 feet wide depending on the location.

Route Alternative A

Route Alternative A was proposed by the public through the scoping process. The route begins at the Laketown Substation and travels along CSAH 10, connecting to the grid at a GRE-owned 115 kV transmission line along Guernsey Avenue.

Traveling north to south, Route Alternative A begins at the Laketown Substation then follows the applicant's proposed route across CSAH 10 and then east. The proposed route then continues east and south along CSAH 10, crossing the road several times at various locations. It reaches a connection point along a GRE-owned 115 kV transmission line on the west side of Guernsey Avenue. The route width for this route alternative is approximately 1,400 feet wide.

Route Alternative B

Route Alternative B was proposed by the public through the scoping process. The route alternative begins at the Laketown Substation and connects to an Xcel-owned 115 kV transmission line along County Road 140.

Traveling north to south, Route Alternative B begins at the Laketown Substation then follows the Applicant's Proposed Route until it reaches Augusta Avenue. Rather than turning east, this route alternative would turn west until it reaches Kelly Avenue. It will then travel south until it connects to the grid via an Xcel-owned 115 kV transmission line running east to west along County Road 140. The route width for this route alternative is approximately 1,400 feet wide.

Route Alternative C

Route Alternative C was proposed by the public through the scoping process. The route begins at the Laketown Substation and travels south then east, connecting at a GRE-owned 115 kV transmission line along Guernsey Avenue.

Traveling north to south, Route Alternative C begins at the Laketown Substation then follows the Applicant's Proposed Route until it reaches an Xcel-owned 230 kV transmission line that crosses Jersey Avenue. It will then collocate with the 230 kV transmission line, traveling east until it connects with the GRE-owned 115 kV transmission line along Guernsey Avenue. This route alternative would require a switch modification and a connection to the transmission line on the eastern side of Guernsey Avenue. The route width for this route alternative is approximately 1,400 feet wide.

Alignment Alternative D

Alignment Alternative D was proposed by the public through the scoping process. The route follows the Applicants' Proposed Route, differing only at a portion south of August Road and west of CSAH 43.

Alignment Alternative D separates from the Applicants' Proposed Route at Augusta Avenue. Rather than traveling east along Augusta Road, it would bypass the road and travel south into private property, before turning east and meeting again with the original Applicant's Proposed Route. This alignment alternative remains in the original route width of the Applicants' Propose Route width.

How is the project designed?

The project will help maintain electrical reliability in the area and is sized to accommodate electric demand growth to provide a reliable electrical system.

Both the HVTL and substation will be designed in compliance with all applicable standards regarding clearance to ground, clearance to existing utilities, clearance to buildings, strength of materials, and ROW widths. Crews will follow standard construction practices; GRE and MVEC procedures; and industry safety procedures.

HVTL

Alternating current transmission lines, such as the proposed project, consist of three separate phases, each phase requiring a conductor to carry the electrical power. This project is using single-conductor phase wires, or one wire per conductor. This project is double-circuited, requiring six separate phase wires, or six separate powerlines. A typical conductor is a cable consisting of aluminum wires stranded around a core of steel wires. There will be a shield wire strung above the phases to prevent damage from lightning strikes.

Transmission lines are usually either single-circuit (carrying one three-phase conductor set) or double-circuit (carrying two three-phase conductor sets). There are three conductors per circuit because power plants generate electricity such that each of the three conductors operates at a different phase.

A 100-foot ROW is necessary for the project. Structures will generally be 70 to 95 feet tall, made of steel, and will be 300 to 400 feet apart. The average diameter of the steel structures at ground level will be 30 inches. Portions of the project may have distribution lines "underbuilt" onto the pole structures. These distribution lines are owned by MVEC, and any work done on their lines is not a part of this project or in the scope of this EA.

The expected service life is about 40 years, although it is possible the line and structures will last longer than 40 years. During this time, GRE expects the HVTL should not be out of service for any extended period except for the rare times when scheduled maintenance is required or when a natural event, such as a tornado, thunderstorm, or ice storm causes an outage. GRE will own the transmission line throughout the life of the structures.

Substation

The Laketown Substation will include a 115/12.47 kV transformer, as well as room for a second transformer for future load growth. The fenced area for the substation will be approximately 1.5 acres on an 8.9-acre parcel of land, which is owned by MVEC. The substation will house system protections for the 115 kV transmission line, which include a 0.3-acre electrical equipment enclosure, bus work, circuit breaker, high side structures and switches. MVEC will own the substation and the land it is on while GRE will own the transmission line equipment within the substation.

How would the applicants acquire land rights?

The applicants would negotiate with landowners for easement rights.

In addition to long-term easements for the operation and maintenance of the HVTL, agreements for the use of temporary workspace might be obtained from some landowners. Temporary workspace generally includes a laydown yard(s) used to stage or store structures, vehicles, equipment, and supplies. Laydown yards are generally sited on previously disturbed or developed areas.

How would the project be constructed?

HVTL construction practices are similar for all routing options. Substation construction procedures are also explained. More detailed descriptions are found in the route permit application at Chapter 5.

GRE will design, construct, own, and operate the HVTL. MVEC will design, construct, own and operate the Laketown Substation.

HVTL

Construction will not begin until the applicants obtain necessary approvals and land rights. Activities must comply with easement agreements. Construction in areas where approvals are not needed or where already obtained could proceed while approvals for other areas were in progress. The companies will notify landowners of the anticipated construction schedule, which might ultimately vary due to permit conditions, weather, and available workforce and materials.

GRE 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. Construction would progress, generally, as follows:

- Survey marking of the ROW,
- ROW clearing and access preparation,
- Grading or filling as necessary,
- Installation of foundations,
- Installation of poles and related equipment,
- Conductor stringing, and
- Installation of any required aerial markers.

Typical construction equipment includes tree-removal equipment, concrete trucks, backhoes, cranes, boom trucks and assorted small vehicles.

Laydown yards for the temporary storage of materials and equipment storage might be established along or near the ROW. Portions of the ROW might also be used for this purpose.

ROW Preparation Before ground disturbance occurs, surveyors will mark the anticipated alignment and ROW boundary. Construction begins by removing trees and other vegetation from the ROW that will interfere with safe construction and operation of the HVTL. Section 5.3.7 and Section 5.3.10 of the DRP (**Appendix B**) require that permittees minimize tree removal to the maximum extent practicable and leave undisturbed low growing species that will not interfere with operation or construction.

Where clearing is required, all materials will either be chipped or shredded on site and spread on the ROW, stacked in the ROW for use by the property owner, or removed and disposed of depending on the agreement with the property owner during easement negotiations. Prior to structure installation, the HVTL alignment might again be surveyed and marked 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 delivered to the installation location either directly from the manufacturer or from the marshaling yard. Crews will install hardware while the structure is on the ground. The structure is then lifted, placed, and secured.

The process of securing a structure depends on its type. This project proposes to use steel pole structures which will mostly be installed directly into the ground. This is done by auguring holes 10 to 20 feet deep and 36 to 60 inches in diameter. In poor soil conditions, a galvanized steel culvert will be vertically installed with the pole set inside of the culvert. Some poles may also require a concrete foundation to be poured for added support. The concrete foundations will be approximately 5 to 7 feet in diameter and usually one foot above grade. Any soil removed from the ground will be spread and leveled near the site or removed from the site if requested by the property owner. Section 5.3.9 of the DRP (**Appendix B**) requires that if a structure is located within a wetland, excess soil must be placed in uplands. Any backfill required will be crushed rock.

Once structures are installed conductors are strung along the line. Setup areas can require 15,000 square feet for linear segments or up to 30,000 square feet for angled segments. Puller-tensioner sites are locations where crews will set up equipment to pull in and tension the conductor. Exact locations are unknown but will be about two miles apart. Locations are often located at major obstacles such as turns in the alignment. Conductors and a shield wire will be strung, tightened, and, once appropriate tension is obtained, secured to each structure. Crews will use temporary guard or clearance structures to provide adequate clearance over roads, existing power lines, railways, or other potential obstructions, as well as to protect the conductor.

Restoration Removal of equipment and debris from the ROW and laydown yard(s) is the first step in restoring the ROW. Crews will repair disturbed areas to pre-construction contours to the greatest extent practicable so that all surfaces drain naturally, blend with natural terrain, and facilitate revegetation. Restoration includes removal of debris and all temporary facilities, implementing erosion control measures, and reseeding with appropriate seed mixes, that is, seed mixes approved by MnDOT. Soil compaction is alleviated as negotiated by landowners.

After construction is complete a ROW agent will contact landowners to determine if restoration has been completed to their satisfaction and to identify damages that might have occurred during construction. GRE will compensate landowners for any damages or hire a contractor to restore damaged property per the terms of individual easement agreements.

Substations

Site preparation includes installation of erosion and sediment control BMPs, stripping topsoil, and bringing in fill to build up the subgrade for the substation foundation. Once the foundation has been laid, it will set for one freeze/thaw cycle to ensure the ground settles properly.

Construction will consist of drilled pier foundations 3 to 5 feet in diameter and 8 to 15 feet deep. These foundations will support dead-end structures, static masts, and bus and equipment support structures. The 115 kV circuit breakers will be placed upon 8- by 8-foot slabs that are two feet thick. The control building will be placed upon a 20- by 40-foot slab that is one foot thick. A concrete lined pot will be built for secondary oil containment and underground conduit and communication cables will be installed before a final layer of crushed rock is laid on the ground. A ground grid will be installed 18 inches below the subgrade surface and extend up to four feet outside of the substation security wall.

Restoration Upon completion of construction activities, disturbed areas outside the fence will be restored and temporary erosion control measures removed. Post-construction reclamation activities include removing and disposing debris, dismantling all temporary facilities (including staging areas), implementing any necessary permanent stormwater management system, and reseeding areas disturbed by construction activities to establish permanent vegetation cover similar to the surrounding area.

How would the project be operated and maintained?

GRE would be responsible for the operation, maintenance, and, when necessary, repair of the HVTL; MVEC would be responsible for the substation.

HVTL

GRE will perform periodic inspections of the ROW and HVTL yearly. If problems are found during inspection, repairs will be completed. Generally, vegetation within the ROW that has the potential to

interfere with the operation of the HVTL will be removed. Native shrubs that will not interfere with the safe operation of the HVTL will be allowed to reestablish in the ROW. Clearing needs are determined from annual ROW inspection. When necessary, problem vegetation will be cleared through a combination of mechanical and hand clearing, along with targeted application of herbicide, to remove or control vegetation growth.

Substation

Regular maintenance and inspections will be performed during the life of the Laketown Substation to ensure its continued integrity.

If a permit is issued when will construction start?

The applicants anticipate beginning construction of the substation in spring of 2027 and on the HVTL in fall 2027.

The Applicants anticipate starting construction on the Laketown Substation in spring 2027 and on the transmission line in fall 2027 and energizing the Project in the summer of 2028.

How much would the project cost?

Costs for the project vary by routing option and range from $15 million to $18 million.

Costs are dependent upon routing option. **Table 2** provides cost estimates. These estimates are engineering estimates. Substation cost estimates do not change based on the route selected.

Table 2 Estimated Project Costs ($)

Project Component	Applicants' Proposed Route	Route Alternative A	Route Alternative B	Route Alternative C	Alignment Alternative D	Substation *
Planning/Permitting ‡	950,000	1,003,536	945,316	945,316	946,124	8,500
Acquisition/Permits #	1,915,000	2,340,717	1,661,202	1,863,962	1,882,009	605,500
Design	442,000	527,807	438,298	510,055	444,143	407,500
Procurement	2,689,000	2,312,448	1,868,876	2,145,107	2,639,874	4,253,000
Construction	4,891,500	5,015,182	3,581,849	4,115,819	4,709,848	1,627,500
Close Out	156,000	210,024	132,946	180,445	152,946	19,500
Total	**11,043,500**	**11,409,714**	**8,628,487**	**9,786,749**	**10,774,944**	**6,921,500**
Total Project Cost	**17,965,000**	**18,331,214**	**15,549,987**	**16,708,249**	**17,696,444**	—

* Substation costs do not change based on the route segment selected.
‡ State permitting costs.
# Land acquisition and miscellaneous "downstream" permits.

Chapter 4 Potential Impacts and Mitigation Across the Applicants' Proposed Route and Route Alternatives A, B and C

Chapter 4 defines how potential impacts and mitigative measures are described. It discusses the environmental setting, and highlights topics dismissed from detailed analysis. This chapter details potential human and environmental impacts and mitigative measures across the different routes that have been identified.

Describing 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 and short- or long-term. Impacts vary in duration and size, by resource, and across locations. In certain circumstances, potential impacts can accumulate incrementally meaning that impacts from the project would be in addition to on-the-ground impacts already occurring.

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 further 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.

Potential Impacts and Mitigation

To provide appropriate context, the following terms and concepts are used to describe and analyze potential impacts:

> **Duration** Impacts vary in length. Short-term impacts are generally associated with construction. Long-term impacts are associated with the operation of the project. Permanent impacts extend beyond project decommissioning and reclamation.
>
> **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 are different. Common resources occur frequently, while uncommon resources are not ordinarily encountered.
>
> **Location** Impacts are location dependent. For example, common resources in one location might be uncommon in another.

The context of an impact—in combination with its anticipated on-the-ground effect—is used to determine an impact intensity level, which can range from highly beneficial to highly harmful. Impact intensity levels are described using a qualitative scale, which is explained below. These terms are not intended as value

judgments, but rather a means to ensure common understanding among readers and to compare potential impacts between 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. 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 potential impacts by avoiding, minimizing, or correcting the on-the-ground effect. Collectively, these actions are referred to as **mitigation**.

> To **avoid** an impact means to eliminate it altogether, for example, by not undertaking part or all the 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 impact 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 the geographic area where the project might exert some influence and is used as the basis for assessing potential impacts. ROIs vary by resource. 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: anticipated **ROW** (50 feet plus substation area); **Route Width** (700 feet to 2,750 feet wide, depending on location); **Local Vicinity** (1,600 feet); **Project Area** (one mile); and **Carver**

County. The ROIs are based on a distance from an anticipated alignment developed by the applicants and extend on both sides of the centerline. **Table 3** summarizes the ROIs used in this EA by resource element.

Table 3 Regions of Influence

Resource Type	Resource Element	Region of Influence
Human Settlement	Displacement, Land Use and Zoning	ROW
	Electrical Interference	Route Width
	Aesthetics, Noise, Property Values, Recreation	Local Vicinity
	Cultural Values, Environmental Justice	Project Area
	Socioeconomics	Carver County
Public Services	Airports, Roads, Emergency Services, Public Utilities	Project Area
Public Health and Safety	Electric and Magnetic Fields, Implantable Medical Devices, Stray Voltage, Worker and Public Safety	ROW
Land-based Economies	Agriculture, Forestry, Mining	ROW
	Tourism	Local Vicinity
Archaeological and Historic Resources		Project Area
Natural Environment	Geology, Soils, Vegetation, Wetlands	ROW
	Water Resources, Wildlife (except birds), Wildlife Habitat	Route Width
	Wildlife (birds)	Local Vicinity
	Air Quality, Climate Change, Rare and Unique Resources	Project Area

Environmental Setting

The project area is rural open space, with light development throughout. It is more developed to the northeast of the project area in the city of Victoria. Agricultural land, trees and water bodies, including wetlands, streams, and lakes, are present throughout the project area, as are homesteads.

The project area is in Laketown and Dahlgren Townships, in Carver County, southwest of the city of Victoria, and northwest of the city of Carver.

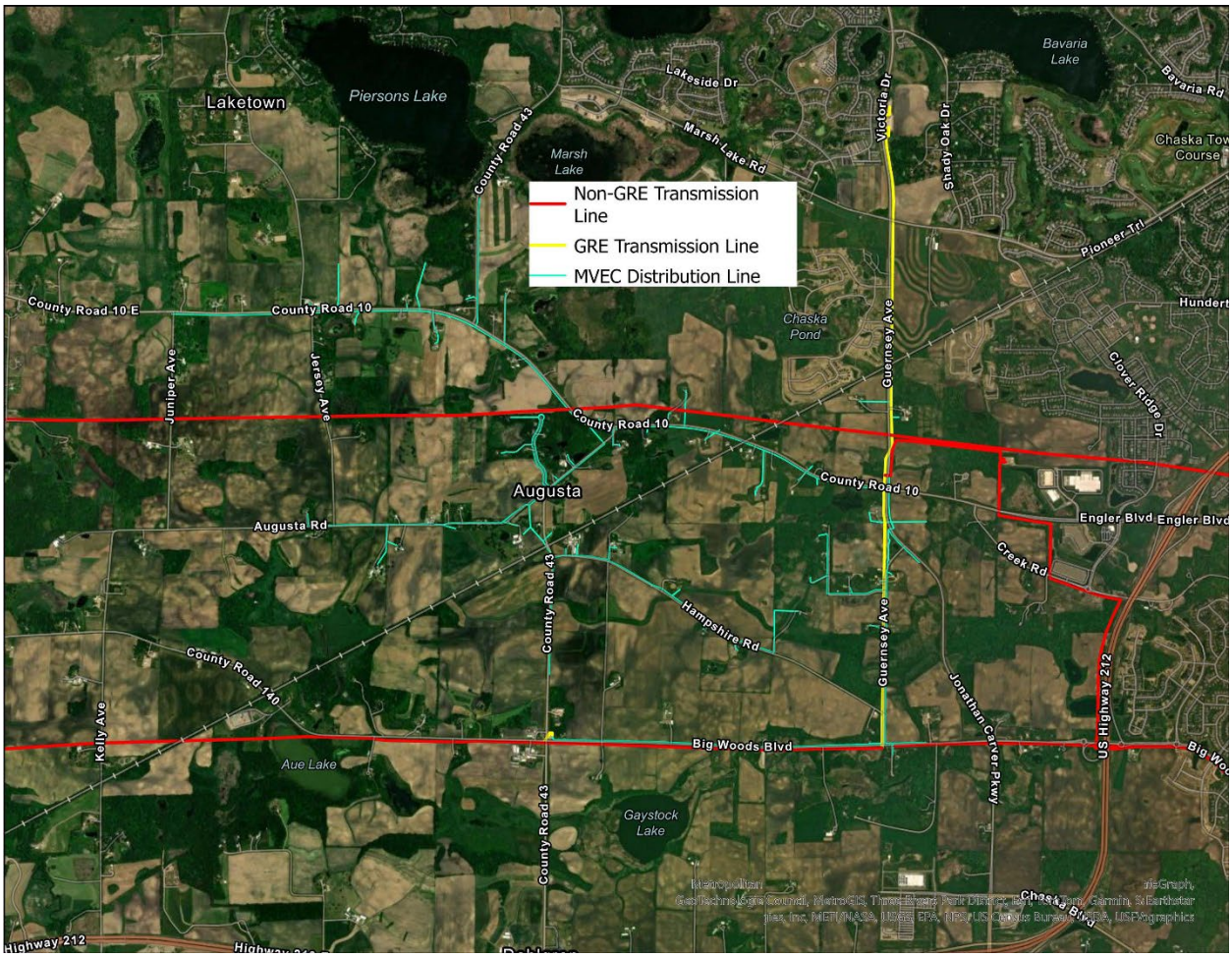
The project area is within the Minnesota and NE Iowa Morainal, Big Woods Subsection (222Mb) of the Eastern Broadleaf Forest Province.[37] Topography of the area is characteristically gently to moderately rolling across this subsection. Soils are formed in thick deposits of gray limey glacial till left by the Des Moines lobe. Northern red oak, sugar maple, basswood, and American elm were most common in this dominantly forested region. Presently, most of the region is farmed.

[37] DNR, *Big Woods Subsection*, (n.d.), https://www.dnr.state.mn.us/ecs/222Mb/index.html.

Pre-settlement vegetation consisted primarily of oak woodland and maple-basswood forests on the irregular ridges of this subsection. More than 75% of the subsection is cropland, with an additional 5 to 10% pasture. The remaining 10 to 15% of the subsection remains as either upland forest or wetland. Although fire occurred within the subsection, it was much less common than on prairies to the west. This is primarily due to irregular topography and presence of lakes.

Land use in the project area is predominantly agricultural but includes residential buildings and transportation corridors. Built features common to the area include residences and buildings and roads. There are several existing transmission lines in the project area. **Figure 3** shows the location of these existing transmission lines.

Figure 3 Existing Infrastructure



Resource Topics for which Impacts are Anticipated to be Negligible

Select resource topics received abbreviated study because impacts to these resources are anticipated to be negligible and of relatively minor importance to the Commission's route permit decision.

Potential impacts to the resources in this subsection are anticipated to be negligible. This determination is based on information provided by the applicants, field visits, scoping comments received, environmental analysis, and staff experience with similar projects. Additional information regarding these topics is provided in the route permit application.

Displacement

For all routing options, the proposed alignments are not within 50 feet of any residence. The route widths and design of the project have enough flexibility to ensure minimum clearance requirements are met without displacing any residents or buildings.

Electrical Interference

Interference associated with electrical infrastructure is related with a phenomenon known as corona. Corona is the result of small electrical discharges at discrete locations along the surface of a conductor that ionize surrounding air molecules. These discharges generate radio frequency noise. If the radio frequency noise is excessive relative to the strength of the broadcast signal it can interfere with signal reception. Additionally, structures might block line-of-sight communication signals.

Radio interference would likely occur in the AM frequency range directly underneath the conductors or close to them within the ROW. Negligible impacts might occur when vehicles or equipment pass underneath the HVTL at road crossings. Interference is not expected to FM radio signals, emergency services signals (Allied Radio Matrix for Emergency Response (ARMER), television, wireless internet, or cellular phones as these operate at frequencies higher than corona generated noise.

Impacts to AM radio frequencies can be avoided by increasing the distance between the receiver and the HVTL or by increasing signal strength through antenna modifications. In situations where a HVTL does cause electronic interference, Section 5.4.3 of the DRP (**Appendix B**) requires that any "interference with radio or television, satellite, wireless internet, GPS-based agriculture navigation systems or other communication devices is caused by the presence or operation of the Transmission Facility, the Permittee shall take whatever action is necessary to restore or provide reception equivalent to reception levels in the immediate area just prior to the construction of the Transmission Facility."

Floodplains and Topography

The project area has only one area identified as having a flooding potential. FEMA has identified an area along Guernsey Avenue as a flood zone A, which has a 1 percent chance of flooding in a calendar year. The proposed connection points of all routing alternatives and alignments are not located in this area. Even so, if they were to be built, the structures of the poles do not create enough impermeable surfaces, or change the topography of the area, such that it will affect the floodplain in any significant way.

Airports

According to the application and GIS desktop review the closest airports to the project area are the Flying Cloud Airport and the Minneapolis-St. Paul International Airport. They are 9 miles and 20 miles northeast

of the project area, respectively. At its closest point the project is over 7 miles away from these airports' area of influence. Impacts to airports will not occur; mitigation is not proposed.

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 ARMER system is used across Minnesota. Broadcast frequencies range from 851 MHz to 859 MHz; therefore, the ARMER system will not be impacted .[38] Regardless of the route segment chosen, 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.

Forestry

Cutting tall growing vegetation (trees) is required to allow for the safe operation of the transmission line or to clear land for the substation. Tree clearing can impact current and future forestry operations. Desktop research indicates that active forestry operations, such as commercial timber harvest, are not occurring in the route width.

While personal use timber harvest likely does occur, potential impacts can be mitigated. The applicants indicate that landowners may keep any timber cut for clearing, and easement agreements can compensate for impacts to future timber harvest. These agreements are outside the scope of this EA.

Mining

The *Aggregate Source Information System,* maintained by MnDOT, shows no aggregate sources within the route width of all alternative routing segments.[39] Impacts to mining resources are not anticipated; mitigation is not proposed.

Geology

Bedrock depth in this subregion varies from 100 to 400 feet.[40] Neither the substation foundations nor the HVTL structures/foundations will reach bedrock; therefore, impacts will not occur.

[38] Radio Reference, *Allied Radio Matrix for Emergency Response (ARMER)*, (March 22, 2025), https://www.radioreference.com/apps/db/?sid=3508.
[39] MnDOT, *Aggregate Source Information System*, (January 24, 2023), https://www.dot.state.mn.us/materials/asis_GE.html.
[40] DNR, *Big Woods Subsection,* (n.d.), https://www.dnr.state.mn.us/ecs/222Mb/index.html.

Potential Impacts to Human Settlement

Aesthetics

The ROI for aesthetics is the local vicinity. Aesthetic impacts are subjective. Thus, potential impacts are unique to the individual and can vary widely. 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 moderate to significant. 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.

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 subjective, meaning their relative value depends upon the perception and philosophical or psychological responses unique to individuals. Impacts to aesthetics are equally subjective and depend upon the sensitivity and exposure of an individual. How an individual values aesthetics, as well as perceived impacts to a viewshed, can vary greatly.

A viewshed includes the natural landscape and built 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.

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, affect the aesthetic impact.

Potential Impacts

The project will introduce new built features—structures, conductors, and a substation—on the landscape. These features will create aesthetic impacts. To the extent these subjective 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 the proximity to:

- 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.

The presence of terrain and vegetation can screen views of newly constructed infrastructure. These features are also important when determining potential aesthetic impacts. Screening is not discussed here but is left to individual landowners to consider. This is because landowners are the best judge of the ability of the terrain and vegetation on their property to screen a project from view based on their daily activities and routine.

There are no scenic overlooks or scenic byways near the project. The closest scenic byway is the Grand Rounds Scenic Byway to the northeast or the Minnesota River Valley Scenic Byway to the south. While

impacts to these byways will not occur, there is potential that recreationalists engaged in a scenic drive might be in the local vicinity of the project.

There are no schools within the local vicinity of any route segment. There are two churches within the local vicinity of the Route Alternative A. The number of residences within 200 feet of the route alignments is shown in **Table 4**.

Table 4 Local Residences

Route Segment	Distance from alignment (ft)			Total Receptors
	0-50	50-100	100-200	
Applicant's Proposed Route	0	0	8	8
Route Alternative A	0	1	12	13
Route Alternative B	0	1	4	5
Route Alternative C	0	0	3	3

The number of residences along all routes is similar. Route Alternative C is near the fewest residences; Route Alternative A is near the greatest number of residences. On whole, Route Alternative C minimizes aesthetic impacts.

In addition to residents and recreational users, travelers along the local roads may also experience visual impacts from the project. Impacts to recreational activities and other scenic views are anticipated to be similar for all routing options.

Substation A new substation will be constructed. This will introduce an industrial structure to an otherwise rural space. The substation, including a control house, will be enclosed in an approximately 1.5-acre fenced area.

Mitigation

Section 5.3.7 of the DRP (**Appendix B**) requires that "The Permittee shall consider input pertaining to visual impacts from landowners or land management agencies prior to final location of structures, rights-of-way, and other areas with the potential for visual disturbance."

Along with routing a transmission line away from residents or visual receptors, aesthetic impacts can also be minimized by choosing routes and alignments that are, to the extent practicable, consistent with the existing viewshed or reduce viewer exposure. Routing a transmission line with existing infrastructure ROWs can mitigate potential impacts because the new built feature would be consistent with previous human modification and an incremental increase. **Table 5** shows where impacts can be mitigated by

following existing infrastructure. Route Alternatives A, B and C are significantly more collocated with existing infrastructure than the Applicants' Proposed Route.

Table 5 Routes Paralleled with Existing Infrastructure ROW

Route Segment	% Collocation with Utilities and Roads
Applicants' Proposed Route	55%
Route Alternative A	97%
Route Alternative B	94%
Route Alternative C	97%

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 an HVTL. 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 ROW in wooded areas.

For the substation, site-specific landscaping plans can identify ways to minimize visual impacts to adjacent land uses. Techniques could include vegetation screening, berms, or fencing should the existing landscape lack appropriate screening. Any lighting at the substation should be downlit to eliminate impacts to night sky and nearby residents.

The applicants committed to working with landowners to "identify concerns related to Project aesthetics."[41] Potential mitigation measures may include:

- Location of structures, ROW, and other disturbed areas will be determined by considering input from landowners or land management agencies to minimize visual impacts.
- Care will be used to preserve the natural landscape. Construction and operation shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work.
- Landowners will be compensated for the removal of trees and vegetation during easement negotiations.
- Structures will be placed at the maximum feasible distance from road, trail, and water crossings, within limits of structure design.

[41] Application, Section 6.2.3.

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. For those residents that place high value on rural character and a sense of place, impacts are anticipated to be minimal. These impacts will be localized, short- and long-term, but might diminish over time depending on the individual. Impacts to community unity are likely to occur regardless of the route segment selected. These impacts are anticipated to be minimal and long-term. Impacts are unavoidable.

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 individual and community thought and action. Infrastructure projects believed inconsistent with these values can deteriorate community character. Those found consistent with these values can strengthen it. Projects often invoke varying reactions and can pit neighbor against neighbor, which weakens shared beliefs and attitudes deteriorating a community's shared sense of self, that is, weakens community unity.

Cultural values can be informed by ethnic heritage. Residents of Dahlgren and Laketown Townships derive primarily from European ancestry. Cultural values are also informed by work and leisure pursuits, for example, fishing, boating, swimming, biking, hunting, golfing and snowmobiling. Cultural values are also informed by land use, such as agricultural cropland. Community events in the project area are usually tied to seasonal/municipal events, and national holidays.

Potential Impacts

The value residents put 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 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. Individuals living along Augusta Road have requested that the Applicant's Proposed Route not be built and have offered alternatives, such as Route Alternative A (CSAH 10 Route). Carver County has also requested that Route Alternative A not be built as it will be widening CSAH 10 in the coming years, creating disagreement within the project area.

While negative impacts will occur to specific resource elements, for example, aesthetics, the construction and operation of the project is not anticipated to impact or alter the work and leisure pursuits of residents in the project area or land use in such a way as to impact the underlying culture of the area. Impacts to cultural values are anticipated to be minimal.

Mitigation

There are no conditions included in the DRP that directly mitigate impacts to cultural values, sense of place, or community unity. Impacts on the aspects of work and leisure pursuits related to cultural values are not anticipated; no mitigation is proposed.

Environmental Justice

The ROI for environmental justice includes the census tracts intersected by the route widths of the different routing options. The project will not have a disproportionately high and adverse human health or environmental effects on low-income, minority, or tribal populations.

Environmental justice (EJ) refers to the "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income in the development, implementation, and enforcement of environmental laws, regulations, and policies, and is intended to ensure that all people benefit from equal levels of environmental protection and have the same opportunities to participate in decisions that might affect their environment or health.

Potential Impacts

Utility infrastructure can adversely impact low-income, minority or tribal populations. To identify potential environmental justice concerns in the project area, the DNR's EJ Tool was used to consider the composition of the affected area to determine whether low-income, minority or tribal populations are present and whether there may be disproportionately high and adverse human health or environmental effects on these populations.[42]

Minnesota Statute defines environmental justice areas as census tracts:[43]

- in which at least 40 percent of the population is nonwhite
- in which at least 35 percent of households have income at or below 200 percent of the federal poverty level
- in which at least 40 percent of the population has limited proficiency in English
- which are located within Indian Country, which is defined as federally recognized reservations and other Indigenous lands

There are no environmental justice areas impacted by the project (**Table 6**). The project census tracts do not contain populations that meet Minnesota's definition of an environmental justice area.

[42] MPCA, *Environmental Justice*, (n.d.), https://www.pca.state.mn.us/about-mpca/environmental-justice.
[43] Minnesota Statute 116.065

Table 6 Low-Income and Minority Population Characteristics

Area	% Population Below 200% Poverty Level	% Nonwhite Population‡	% Population with Limited English
Region of Comparison			
Minnesota	22.0	21.6	2.2
Carver County	11.1	22.2	0.9
Project Census Tract			
Census Tract 904.01	3.4	8.3	0.3
Census Tract 904.02	4.5	19.1	1.5
Census Tract 910.02	7.5	15.6	2.9
Census Tract 911	7.3	9.1	2.3

Sources: U.S. Census Bureau, 2023 American Community Survey 5-year Estimate & DNR EJ Tool

‡ Nonwhite population includes all persons who do not self-identify as white alone.

Mitigation

The project area is not within any census tracts which Minnesota statute deems an environmental justice area; therefore, disproportionate and adverse impacts to these populations are not expected, and mitigation is not proposed.

Land Use and Zoning

The ROI for land use and zoning is the anticipated ROW. Impacts to zoning ordinances for Carver County are expected to be minimal. Comprehensive Plans for Carver County, the city of Victoria, and the city of Carver may be impacted depending on which route may be selected. Constructing the HVTL is not expected to change the underlying land use. The substation, however, will permanently change the underlying land use from developed vegetation to an industrial use.

Land use is the use of land by humans, such as residential, commercial, or agricultural uses, and often refers to zoning. Zoning is a regulatory tool used by local governments (cities, counties, and some townships) to promote or restrict certain land uses within specific geographic areas. Power lines have the potential to impede current and future land use.

A route permit supersedes local zoning, building, and land use rules.[44] The Commission's route permit decision must be guided, in part, however, 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."[45] Thus, the Commission can and does consider impacts to zoning and land use when considering route permit

[44] Minnesota Statute 216E.10, subd. 1.
[45] Minnesota Statute 216E.03, subd. 7.

applications. The applicants are vested with the power of eminent domain, which means they can acquire ROW for the project whether a landowner is a willing participant or not.[46]

Zoning The project area lies within the zoning jurisdiction of Carver County. The project area consists largely of agricultural and rural/transitional development land use sections.[47] The Applicant's Proposed Route, Alternative Route A, and Alternative Route C will cross from the agricultural section to the rural/transitional section. Only Alternative Route B would remain in the agricultural land use section for the entirety of the route.[48] Route Alternative C will briefly cut through a residential cluster land use section.

Carver County has an ordinance that allows state and federal projects to be permitted in all zones. The ordinance states the following[49]

> The following are permitted uses in all districts:
>
> (A) Transmission systems designed for en-route consumption are permitted uses in all zoning districts and may be installed within the public right-of-way and easements according to the standards of the responsible authority and after receiving approval from the responsible road authority.

The applicants have been in contact with Carver County during the initial planning of this project. During the planning, Carver County requested the applicants not go forward with Route Alternative A, as they are planning to conduct a highway improvement project along CSAH 10 in the coming years.[50] The applicants did not carry this route alternative forward in their application.[51]

The applicants were also in contact with the city of Victoria during the initial planning of this project. During the planning, the city of Victoria notified the applicants that the city was expanding through an annexation agreement with Laketown Township and that Route Alternative C would go through land that would be a part of the annexation. The city of Victoria has a comprehensive plan that would zone the area north of CSAH 10 and east of the TCWR railroad as a commercial and industrial area in the future.[52] They requested the line not go through this area as it is highly anticipated to become a commercial hub for the city. The applicants did not carry this route alternative forward in their application.[53]

During the comment period for the scoping of this EA, the city of Carver submitted a comment stating that the applicants did not include them in the initial planning of this project and that the Applicants' Proposed Route would negatively impact their future expansion. Along with their comments, they

[46] Minnesota Statute 216E.12.
[47] Application, Section 6.4.
[48] Application, Figure 6-4.
[49] Carver County Code of Ordinances, § 152.051 PERMITTED USES.
[50] Application, Appendix E.
[51] Application, Chapter 4.
[52] Application, Appendix E.
[53] Application, Chapter 4.

submitted a Future Land Use map which plans to zone the area east of County Road 43 and north of County Road 140 as residential, commercial and industrial.[54]

Land Use According to the 2019 National Land Cover Dataset (NLCD), land cover types within the project area are approximately 70 percent agricultural (row crops and pasture), 10 percent forest (primarily deciduous), 6 percent wetlands (herbaceous and woody). Developed space, for example, homesteads and roads, accounts for approximately 8 percent.

Potential Impacts

Impacts can occur to zoning ordinances and land uses.

Zoning The existence of a power line easement restricts certain activities on a property, which might interfere with the underlying zoning designation. Interference with county ordinances for all routes, however, is not expected to occur. There may be some interference with planning of future development along CSAH 10, should Route Alterative A be permitted by the Commission.

Impacts to local planning of the Cities of Carver and Victoria could also occur, should the Applicants' Proposed Route or Route Alternative C be permitted by the Commission. Route Alternative B will have no known impacts to planning in terms of the County or local cities.

Land Use Constructing the HVTL is not expected to change the underlying land use. For example, planting agricultural crops or using the ROW for grazing land is generally not precluded. Substations, however, will permanently change the underlying land use from agricultural to an industrial use. Changes in the underlying land use are unavoidable.

Mitigation

Potential impacts to current and future land use can be mitigated by selecting routes and alignments that are compatible, to the extent possible, with current and future land use and zoning. Route Alternative B best minimizes impacts to future land use and zoning. Route Alternative C also minimizes impacts to future land use and zoning, as it is fairly compatible with industrial development in the city of Victoria.

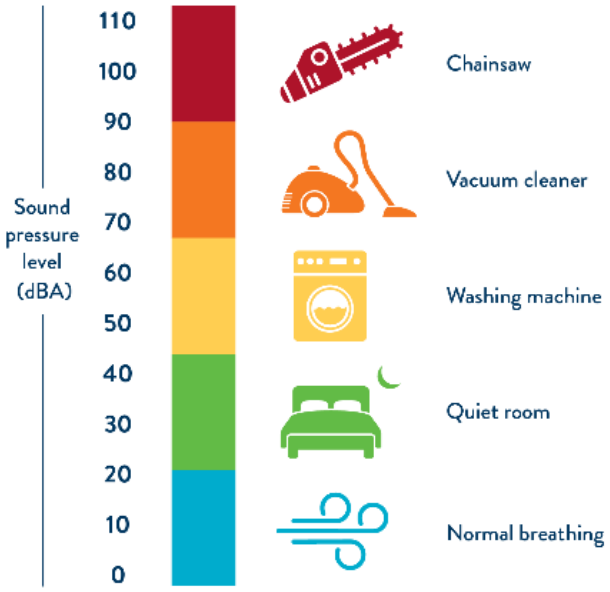
[54] Commerce, *Written Public Meeting Comments on the Environmental Assessment Scoping*, November 25, 2024, eDocket No. 202411-212355-02.

Noise

The ROI for noise is the local vicinity. Distinct noises are associated with construction and operation. Noise created by construction activities are anticipated to be minimal for all routing options. Construction activity and crews would be present at a particular location during daytime hours. 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 period, potential impacts are expected to be minimal.

Noise can be defined as any undesired sound.[55] 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.[56] 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: wind speed, wind direction, humidity, and natural and built features between the noise source and the listener. **Figure 4** provides decibel levels for common indoor and outdoor activities.

Figure 4 Noise Levels from Common Sources



Noise standards in Minnesota are based on *noise area classifications* (NAC), which 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. Household units, designated camping and picnicking areas, resorts and group camps are assigned to NAC 1; recreational activities (except designated camping and picnicking areas) and parks are

[55] MPCA, *Noise Pollution*, (n.d.), https://www.pca.state.mn.us/air/noise-pollution.
[56] MPCA, *A Guide to Noise Control in Minnesota*, (November 2015), https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf.

assigned to NAC 2; agricultural and related activities are assigned to NAC 3. A complete list is available at Minnesota Rule 7030.0050.

Noise standards are expressed as a range of permissible dBA over one hour. 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 7** shows current Minnesota noise standards for the various classifications.

The project is in a rural area. "Quiet daytime noise levels in rural areas with no significant noise sources might be in the 30 to 40 dBA range,".[57] 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.

The primary noise receptors within the local vicinity are residences and farmsteads. These receptors are assigned to NAC 1. **Table 4** shows the number of residences within the local vicinity.

Table 7 Noise Area Classifications (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

Source: MPCA

Potential Impacts

Distinct impacts from construction and operation of the project will occur.

Construction 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 ROW clearing and final restoration. Intermittent construction noise will occur and is dependent upon the activity. Major noise producing activities are associated with clearing and grading, material delivery, auguring foundation holes, setting structures, and stringing conductors.

Noise from heavy equipment and increased vehicle traffic will be intermittent and occur during daytime hours. Noise associated with heavy equipment can range between 80 and 90 dBA at full power 50 feet from the source.[58] Heavy equipment generally runs at full power up to 50 percent of the time.[59] Point source sounds decrease six dBA at each doubling of distance; therefore, a 90 dBA sound at 50 feet is perceived as a 72 dBA sound at 400 feet and a 60 dBA sound at 1,600 feet.

[57] Federal Highway Administration, *Techniques for Reviewing Noise Analyses and Associated Noise Reports, Figure 1-1*, (June 1, 2018), https://www.fhwa.dot.gov/Environment/noise/resources/.
[58] Federal Highway Administration, *Noise: Construction Noise Handbook*, (August 24, 2017), https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm.
[59] Id.

Construction noise might exceed state noise standards for short intervals at select times and locations. An exceedance of noise standards need not occur for a negative impact to occur. For example, "interference with human speech begins at about 60 dBA."[60] A 70 dBA sound interferes with telephone conversations, and an 80 dBA sound interferes with normal conversation.

Operation Audible noise from power lines 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 sounds like 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 from construction. 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.

Based on results from the Bonneville Power Administration Corona and Field Effects Program, a 115 kV transmission line in heavy rain conditions (one inch per hour) is anticipated to produce L_5 and L_{50} noise levels of 17.7 dBA and 14.2 dBA at the edge of ROW, respectively.[61] The Center for Hearing and Communication indicates that rainfall is commonly measured at 50 dBA,[62] meaning rainfall covers the corona noise it creates.

Substation noise is associated with the transformer and cooling fans. Transformers produce a consistent humming sound, resulting from magnetic forces within the transformer core. This sound does not vary with transformer load and are expected to be constant throughout the night and day. Noise levels will meet day and nighttime noise standards at 50 feet from the transformer (50 dBA). The substation will have the potential for a second transformer, which will increase the noise level to 50 dBA at a distance of 75 feet. The closest residence is approximately 200 feet from the from the edge of the property on which the substation is planned to be built. With this distance, the noise level will be within state standards.

Mitigation

Section 5.3.5 of the DRP (**Appendix B**) requires that "The Permittee shall comply with noise standards established under Minn. R. 7030.0010 to 7030.0080. The Permittee shall limit construction and maintenance activities to daytime working hours to the extent practicable." Sound control devices on vehicles and equipment, for example, mufflers; conducting construction activities during daylight hours, and, to the greatest extent possible, during normal business hours; and running vehicles and equipment only when necessary are common ways to mitigate noise impacts. Impacts to state noise standards can be mitigated by timing restrictions. During operation, permittees are required to adhere to noise standards and all appropriate locations. No additional mitigation is proposed.

[60] US Bureau of Reclamation, *Navajo Reservoir RMP/FEA, Appendix E Noise*, (June 2008), https://www.usbr.gov/uc/envdocs/ea/navajo/appdx-E.pdf.
[61] Application, Section 6.2.2.
[62] Center for Hearing and Communication, *Common Environmental Noises*, (n.d.), http://chchearing.org/noise/common-environmental-noise-levels/.

Property Values

The ROI for property values is the route width. A property's value is influenced by a complex interaction of factors. The presence of a HVTL or substation becomes one of these factors. 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 almost always less than ten percent, and usually in the range of three to six percent. On whole, impacts are anticipated to be negative, of a small size, and dissipate rapidly with distance. However, impacts to specific properties could vary widely. Smaller properties are generally more vulnerable to value impacts. Long-term impacts might or might not occur. Impacts are anticipated to be minimal to moderate. Potential impacts to these unique resources can be mitigated.

Impacts to property values that result from power line construction have been studied extensively. 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 indicate that HVTLs have "no significant impact or a slight negative impact on residential properties."[63]

The impact to property values from the presence of a HVTL can be measured in three ways: sale price, marketing time, and sales volume.[64] These measures are influenced by a complex interaction of factors. Most of these factors are parcel specific: 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."[65] The presence of a HVTL becomes one of many interacting factors that could affect a specific property value.

Generally, impacts to property values resulting from the existence of an HVTL 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]."[66] The use and size of a property also influences potential 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."[67] Smaller properties are 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.[68] Whether or not an HVTL would

[63] Pitts, Jennifer, and Jackson, Thomas, *Power Lines and Property Values Revisited*, (2007), https://www.researchgate.net/publication/316674821_Power_Lines_and_Property_Values_Revisited.

[64] Kinnard, William and Dickey, Sue Ann, *A Primer on Proximity Impact Research: Residential Values Near High-Voltage Transmission Lines,* (April 1995), https://cre.org/real-estate-issues/primer-proximity-impact-research-residential-property-values-near-high-voltage-transmission-lines/.

[65] Pitts and Jackson (2007).

[66] Roddewig, Richard and Brigden, Charles, *Power Lines and Property Prices*, (2014), https://cre.org/wp-content/uploads/2014/10/Real-Estate-Issues-Power-Lines-and-Property-Prices.pdf.

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

[68] Id.

encumber future land use,[69] and the "existence of close substitutes unaffected by transmission lines" can increase the likelihood of value impact.[70]

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.[71] However, survey research presents inherent disadvantages; for example, respondents might not give realistic or truthful responses. Additionally, conducting a survey regarding the relationship between HVTLs and property values in and of itself might trigger negative responses from respondents. [72]

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 HTVLs.[73]

The use of multiple regression statistical analysis is 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, for example, home size.[74] 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.[75] This type of research requires large data sets; therefore, it is less subjective and more reliable than paired sales studies.[76] 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.[77]

[69] Chalmers, James and Voorvaart, Frank, *High-Voltage Transmission Lines: Proximity, Visibility, and Encumbrance Effects*, (2009), http://www.atc-projects.com/wp-content/uploads/2012/11/Chalmers-Appraisal-Journal-Article-Q2-2009-HVTLs-Proximity-Visibility-Encumbrance-Effects.pdf.
[70] Chalmers (2012).
[71] Jackson, Thomas and Pitts, Jennifer, *The Effects of Electric Transmission Lines on Property Values: A Literature Review*, (2010), http://www.real-analytics.com/Transmission%20Lines%20Lit%20Review.pdf.
[72] Electric Power Research Institute, *Transmission Lines and Property Values: State of the Science*, (November 2003), http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000000001005546.
[73] Chalmers and Voorvaart (2009).
[74] Kinnard and Dickey (April 1995), Chalmers and Voorvaart (2009).
[75] Kinnard and Dickey (April 1995); Jackson and Pitts (2010).
[76] Chalmers and Voorvaart (2009); Kinnard and Dickey (April 1995).
[77] Electric Power Research Institute (November 2003).

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

- 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.[78]

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 the whole, impacts are anticipated to be minimal and dissipate quickly at distances greater than 400 feet from the HVTL. However, impacts to specific properties could vary widely. Smaller properties are generally more vulnerable to value impacts. Long-term impacts might or might not occur.

Table 4 shows the number of residences within 200 feet of the anticipated alignment of all routing options. Property value impacts might be greater based on the number of homes; however, given this is simply a house count and mitigating factors such as topography, vegetation, lot size, etc. are not considered, this might not be the case. The presence of a home does not necessarily translate into greater potential for impacts to a property's value—property value impacts can occur whether a home is present or not.

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 judgements, 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. Staff acknowledges this section does not and cannot consider or address the fear and anxiety felt by landowners when facing the potential for negative impacts to their property's value.[79]

[78] Chalmers and Voorvaart (2009).

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

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. Property value impacts can also be mitigated through inclusion of specific conditions in easement agreements with landowners along the ROW. These agreements are outside the scope of this EA.

Recreation

The ROI for recreation is the local vicinity. Potential impacts to recreational opportunities are anticipated to be minimal for all routing options. During construction, unavoidable short-term impacts will occur. Construction equipment and vehicle traffic will create noise, dust, and visual impacts. These impacts will be intermittent and localized. Operational impacts will be long-term and are primarily associated with visual impacts caused by new built features introduced to the landscape. Because direct long-term impacts are primarily aesthetic in nature, indirect long-term impacts to recreation are expected to be subjective and unique to the individual. These unavoidable impacts will affect unique resources. Potential impacts can be minimized.

Multiple recreational opportunities exist in the local vicinity including sports, fishing, swimming, biking, hunting, and snowmobiling. There is a snowmobile trail that generally runs west to east through the project area. Pierson Lake Public Water Access Site is located 0.8 miles northeast of the proposed Laketown Substation. Marsh Lake Hunting Preserve is located just northeast of the route width of Alternative Route A. Augusta Ballfield is located along Hampshire Road just outside of the route width of the Applicants' Proposed Route.

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. Alternatively, a power line might increase recreational opportunities, for example, ROW clearing might provide increased opportunities for wildlife viewing or hunting.

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. While visual impacts will occur, the HVTL and substation is not anticipated to impede recreational activities.

Mitigation

Impacts to recreation can be mitigated by selecting routes and alignments that avoid resources utilized for recreational purposes. Impacts can also be mitigated by reducing impacts to natural landscapes during construction. Various sections of the DRP (**Appendix B**) indirectly address impacts to recreation, such as noise, aesthetics, soils, etc.

Socioeconomics

The ROI for socioeconomics is Carver County. 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 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.

Table 8 provides information about total population and household income, and individuals below the poverty level. Carver County is part of Economic Development Region 11, the metro area, as defined by the Department of Employment and Economic Development.

In terms of unemployment rates for the Region 11, "the Metro Area has had a historically lower unemployment rate than Minnesota and the nation, regardless of the state of the economy."

Table 8 Population and Economic Profile

Location	Total Population	Median Household Income ($)	% Poverty Rate
Minnesota	5,706,494	84,313	9.6
Carver County	106,992	116,308	4.5
Laketown Township	1,966	153,500	2.7
Dahlgren Township	854	82,708	2.5

* Source: U.S. Census Bureau, QuickFacts

Potential Impacts

Positive economic impacts include increased expenditures, for example, food and fuel, at local businesses during construction. The applicants anticipate the project to employ between 22 and 35 daily contract workers. The applicants indicate that GRE has a "buy local" policy that will give preference to local (Minnesota, Wisconsin and North Dakota) suppliers and contractors for materials and labor for the project.[80]

Mitigation

Adverse impacts are not expected; therefore, mitigation is not proposed.

[80] Application, Section 3.7

Public Utilities and Infrastructure

The ROI for public utilities and infrastructure is the project area. Potential impacts to the electrical grid, roads and railroads, and other utilities are anticipated to be short-term, intermittent, and localized during construction. Impacts to water (wells and septic systems) and pipelines are not expected to occur. Construction impacts are expected to be minimal and are associated with short electrical outages and possible traffic delays. Operation of the project will provide a more reliable electrical grid. Negative impacts, such as traffic delays, should be negligible. Impacts are unavoidable but can be minimized.

Public utilities in project area are as follows:

Electricity MVEC provides electrical service in the project area and distribution lines are located throughout. Several planned outages along these distribution lines may be necessary to construct the HVTL, given the routing options. These lines could be paralleled, underbuilt, or crossed which may also contribute to the planned outages. Additionally, the proposed transmission line will potentially connect to an Xcel-owned or GRE-owned 115 kV transmission line, which may cause a planned outage while the interconnection is performed.

Roads and Highways State routing policy indicates a preference for consolidating HVTLs with existing infrastructure, including transportation ROWs. 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 ROW and, to the extent those are not used for the route, the Commission must state the reasons."

The project area includes County Highways 10, 43 and 140. The project could also parallel or cross several local roads. The *Traffic Mapping Application*, maintained by MnDOT, provides average daily traffic counts.[81] County Highway 10 between Laketown Road and Guernsey Avenue averaged 9,790 trips per day (2023). County Road 43 averaged 553 trips per day (2023). Daily trips on County Road 140 averaged approximately 745 (2023).

Utilities It is assumed that local utilities such as telephone and cable television are buried in the project area. These utilities, along with fiber optic cables, are often buried along road ROWs. Thus, they might intersect the route width of any routing option.

Water The different routing options are outside city limits; therefore, it is assumed that residences within the route width are not serviced by city water supply or sanitary sewer; these services are provided by individual wells and septic systems.

Pipelines There are no natural gas transmission pipelines or hazardous liquid (oil) pipelines near the project area.

Railroad The project could potentially cross the Twin City & Western Railroad (TCWR) railway in the central or northeastern portion of the project area, depending on which route may be selected.

[81] MNDOT, *Traffic Mapping Application*, (n.d.), https://www.dot.state.mn.us/traffic/data/tma.html.

Potential Impacts

Power lines have the potential to damage or interfere with public utilities or preclude construction and operation of new utility infrastructure.

Electricity Construction of the project will require planned power outages to the existing MVEC customers. These electrical outages will be intermittent and short-term. Outages are generally not necessary when crossing perpendicular to local distribution lines—using temporary protective guards or clearance structures alleviates electrical clearance concerns. No customer is expected to lose electrical service for an extended period. All outages will be coordinated with MVEC. Impacts are unavoidable. No negative long-term impacts are anticipated. Long-term positive impacts associated with operation of the project include a more reliable electrical grid.

Roads and Highways During construction short-term localized traffic delays and re-routes might occur. These delays, should they occur, would most likely be associated with material delivery and worker transportation. Road crossings might also necessitate short-term impacts to traffic when stringing conductors. GRE does not intend to locate structures within road ROW, though the HVTL ROW will overlap with road ROW. Because NESC clearances must be met, this will not affect the safety of the traveling public or road and highway operations. Additional costs to maintain road ROWs will not be incurred because of the project.

Utilities The location of underground utilities can be identified using Gopher State One Call during engineering surveys once a route is selected. If a utility is identified within the ROW a structure or the utility itself might need to be relocated. Relocating a utility would need to be coordinated with the affected utility company. Typically, these issues do not cause significant modifications to the HVTL or affected utility. Impacts to underground utilities, should they exist, are not expected.

Water Potential impacts to water utilities could occur if structures damage, or impede the use of, wells and septic systems. No residences are located within the ROW of any routing option; therefore, impacts to wells and septic systems are not expected to occur. No long-term impacts are anticipated.

Pipelines Transmission pipelines are not located in the project area. Impacts will not occur. No long-term impacts are anticipated.

Railroad The project may cross the railway and may require a crossing permit from (TCWR). Given the applicants must follow the terms and conditions established in the crossing permit developed by TCWR, and will coordinate any potential power outages with them, no impacts are expected.

Mitigation

Impacts from electrical outages can be minimized by informing customers of the outage well in advance.

Section 5.3.4 and Section 5.3.14 of the DRP (**Appendix B**) addresses utilities and roads, respectively. Permittees are required to restore any disruptions to public utilities and services. Permittees are also required to inform road authorities of roads that will be used during construction and acquire necessary permits and approvals for oversize and overweight loads. Additionally, 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 the railway).

Potential impacts can be avoided by marking underground utilities prior to construction and avoiding these areas during construction. Also, the applicants can coordinate with landowners to identify the location of wells and septic systems to avoid potential impacts.

Potential Impacts to Human Health and Safety

Electromagnetic Fields

The ROI for EMF is the anticipated ROW. Impacts to human health from possible exposure to EMFs are not anticipated. The HVTL will be constructed to maintain proper safety clearances. The substation site 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 of a small size. Impacts can be mitigated.

Electromagnetic fields (EMFs) are invisible forces that result from the presence of electricity. EMF occurs naturally and is caused by weather or the geomagnetic field. EMFs are also caused by all electrical devices and is found wherever people use electricity. EMFs are characterized and distinguished by their frequency, which 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. EMF at this frequency level 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 strength of the electric field is measured in kilovolts per meter (kV/m). Electric fields decrease rapidly as they travel from the conductor and are 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, 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.

Table 9 provides examples of electric and magnetic fields associated with common household items. "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…"[82]

Table 9 Electric and Magnetic Field Strength of Common Household Items

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

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

Health Studies In the late-1970s, epidemiological studies indicated a weak association between childhood leukemia and ELF-EMF levels. "Epidemiologists observe 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."[83]

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.[84] Nevertheless, they are fields of energy and thus have the potential to produce effects.

[82] World Health Organization, *Radiation: Electromagnetic Fields, What are typical exposure levels at home and in the environment?*, (August 4, 2016), https://www.who.int/news-room/q-a-detail/radiation-electromagnetic-fields.

[83] 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.

[84] National Cancer Institute, *Magnetic Field Exposure and Cancer*, (May 30, 2022), http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/magnetic-fields-fact-sheet.

> "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."[85]
>
> "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."[86]
>
> "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."[87]

The Minnesota State Interagency Working Group on EMF Issues, comprised of staff from state agencies, boards, and Commission, was tasked to study issues related to EMF. In 2002, the 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.
>
> The Department of Health 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.[88]

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 ROW for 161 kV transmission lines.[89] Additionally, international organizations have adopted standards for exposure to electric and magnetic fields.

---

[85] National Institute of Environmental Health Sciences, *Electric and Magnetic Fields*, (March 20, 2024) http://www.niehs.nih.gov/health/topics/agents/emf/index.cfm.

[86] World Health Organization, *Extremely Low Frequency Fields*, (2007), https://iris.who.int/bitstream/handle/10665/43646/9789241572385_eng.pdf?sequence=1.

[87] 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.

[88] Id.

[89] Florida Department of State, *Rule 62-814.450 Electric and Magnetic Field Standards*, (June 1, 2008), https://www.flrules.org/gateway/ruleNo.asp?id=62-814.450.

Section 5.4.2 of the DRP (**Appendix B**) limits the maximum electric field under HVTLs in Minnesota to 8.0 kV/m. This condition was designed to prevent serious hazard from shocks when touching large objects, such as semi-trailers or large farm equipment under "extra" high voltage transmission lines of 500 kV or higher. The Commission has not adopted a standard for magnetic fields. EMF standards are shown in **Table 10**.

Table 10 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[a]
National Radiological Protection Board	4.2	—	830	4,200

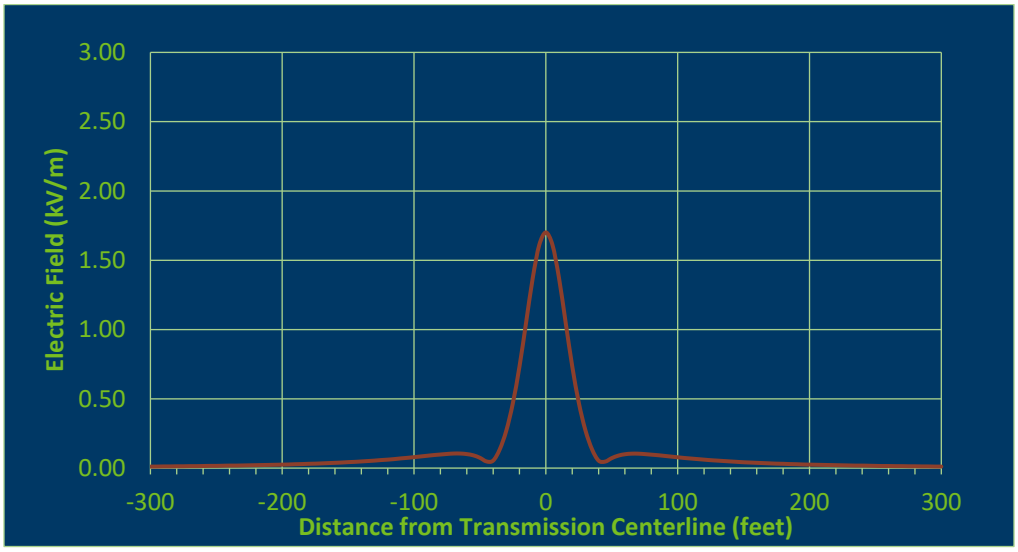
[a] For persons with cardiac pacemakers or other medical electronic devices

Potential Impacts

In the route permit application, the applicants calculated electric fields associated with the project (**Figure 5**). These calculations are based on the maximum operating voltage of the transmission line (121 kV). The applicants indicate that "because the magnitude of the voltage on a transmission line is near-constant (ideally within +/- five percent of design voltage), the magnitude of the electric field will be near-constant regardless of the power flowing on the line."[90] The maximum electric field is approximately 1.7 kV/m. This field strength is well below the Commission permit standard of 8.0 kV/m.

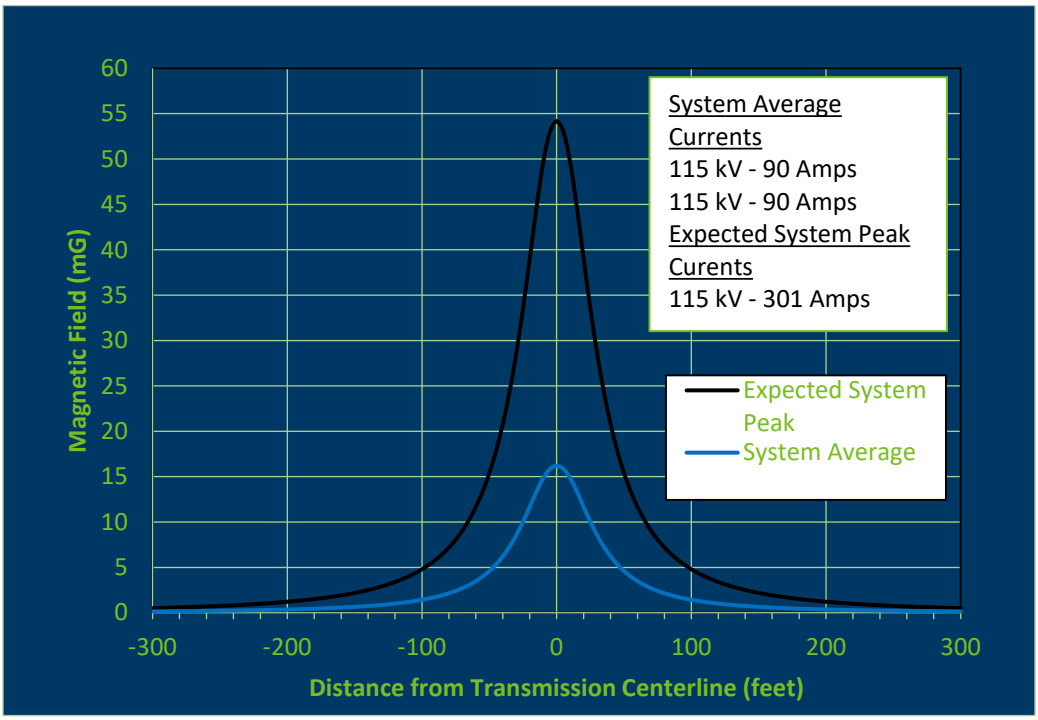
[90] Application, Section 6.3.1.

Figure 5 Calculated Electric Fields at Maximum Voltage (kV/m)



In the route permit application, the applicants also calculated magnetic fields associated with the project (**Figure 6**). These field strengths are below the standards identified in **Table 10**.

Figure 6 Calculated Magnetic Fields at Average and Peak Currents (mG)



EMF fields for the substation were not calculated; however, potential impacts are not anticipated. The Laketown Substation will be equipped with protective breakers and relays, as well as be protected by locked gates to avoid public access.

Mitigation

No health impacts due to EMF are anticipated; therefore, no mitigation is proposed. The HVTL will be constructed to maintain proper safety clearances, etc. The substation site will not be accessible to the public. EMF diminishes with distance; therefore, EMF exposure can be minimized by routing HVTLs away from residences and other locations where people congregate to the extent practicable.

Implantable Medical Devices

The ROI for implantable medical devices is the anticipated ROW. Magnetic fields produced by HVTLs are not high enough to interfere with these devices; however, electric fields potentially can. 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. Should interference occur, moving away from the transmission line will mitigate the interference. Electric fields are easily shielded. Potential impacts are expected to be minimal across routing options. Impacts to human health are not anticipated. Potential impacts, if they occur, would be short-term, intermittent, and localized. Impacts would affect a unique resource (people). Impacts 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.[91] 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.[92] As a result, research has focused on electric field impacts.

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.

"While the present-day units are better shielded against electromagnetic interference than their earlier counterparts, sensitivity to electric field exposure is inevitable."[93] 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.[94] In general, electric interference must be at levels above 5.0 kV/m to interfere with modern, bipolar pacemaker behavior.[95] Some models appear unaffected at 20 kV/m.[96]

---

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

[92] Electric Power Research Institute, *Susceptibility of Implanted Pacemakers and Defibrillators to Interference by Power-Frequency Electric and Magnetic Fields*, (1997), https://www.epri.com/research/products/tr-108893.

[93] Id.

[94] Id.

[95] Pinski, Sergio L. and Trohman, Richard G., *Interference in Implanted Cardiac Devices,* (2002), http://www.sarasotaanesthesia.com/reading/literature/Interference%20AICD%20Review%20Part%201.pdf.

[96] Electric Power Research Institute (1997).

There are no sensitive receptors such as hospitals or nursing homes located within the route width of any routing option. Therefore, once constructed, the regular presence of implantable medical devices within the ROW is not expected.

Potential Impacts

The calculated maximum electric field strength directly underneath the proposed 115 kV HVTL is 1.70 kV/m. 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. Therefore, impacts to unipolar pacemakers might occur directly underneath the HVTL.

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. "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."[97] Mitigation is not proposed.

Public and Worker Safety

The ROI for public and worker safety is the anticipated ROW. Like any construction project, there are risks. These include potential injury from falls, equipment and vehicle use, electrical accidents, etc. Public risks involve electrocution. Electrocution risks could also result from unauthorized entry into the substation. Potential impacts are anticipated to be minimal for all routing options. Impacts would be short-and long-term and can be minimized.

The data available for injuries and fatalities associated with North American Industry Classification System Code No. 237130 *Power and Communication Line and Related Structures Construction* show that in 2019 there were 2,250 reported nonfatal occupational injuries and illnesses involving days away from work.[98] 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).[99] 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.[100]

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

[98] US Bureau of Labor Statistics, *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*, (2019), https://www.bls.gov/iif/oshwc/osh/case/cd_r1_2019.htm#iif_cd_r1p.f.2.

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

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

Potential Impacts

The presence of workers will depend on the anticipated schedule for construction and future operation, maintenance, and repair of the project. Like any construction project, there are risks. These include potential injury from falls, equipment and vehicle use, electrical accidents, etc. Construction might disturb existing environmental hazards on-site, for example, contaminated soils.

Public risks involve electrocution. "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."[101] When working near power lines, for example, using heavy equipment, an electrical contact can occur "even if direct physical contact is not made, because electricity can arc across an air gap."[102] Electrocution risks could also result from unauthorized entry into the substation. Potential impacts to emergency services are anticipated to be negligible.

Mitigation

The applicants point out that proper safeguards will be implemented for construction and operation of the transmission line and substation. The project will be designed to meet or exceed local, state, GRE, and OTP standards regarding clearance to the ground, clearance to crossing utilities, strength of materials, and ROW distances. Section 5.5.1 of the DRP (**Appendix B**) requires that the project comply with the NESC.

The HVTL will be designed to automatically trip out-of-service (become de-energized) if it falls or contacts trees resulting from a weather event (severe thunderstorm or tornado) or being struck by a vehicle (large truck). The HVTL will also be constructed with a grounded shield wire placed along the top of the structures, above the conductors. This protects the transmission line from a lightning strike. "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."[103]

The substation will be fenced and locked. Appropriate signage will be posted that identifies the hazards associated with the substation.

Stray Voltage

The ROI for stray voltage is the anticipated ROW. 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 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 mitigates this concern. Therefore, potential impacts from stray voltage are anticipated to be minimal for all routing options. Potential impacts can be mitigated.

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

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

Neutral-to-Earth Voltage NEV is a type of stray voltage that can occur where distribution lines enter structures. "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."[104] 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), a small current will flow through the livestock to the ground because the animal completes the electrical circuit.[105]

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. Likewise, a number of factors also determine the extent to which livestock are grounded, for example, if the animal is standing on wet or dry ground. 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 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.

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

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

[105] Michigan Agricultural Electric Council, *Stray Voltage: Questions and Answers*, (October 2008), https://www.maec.msu.edu/application/files/4216/4555/7484/Stray_Voltage_Q__A.pdf.

field limit of 8 kV/m is designed to prevent serious shock hazards due to induced voltage. 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 ROW; however, Section 5.4.2 of the DRP (**Appendix B**) 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. As a result, impacts due to induced voltage are not anticipated to occur.

Mitigation

The DRP (**Appendix B**) requires the project meet electrical performance standards. Thus, no additional mitigation is proposed.

Any person with questions about a new or existing metal structure can contact GRE for further information about proper grounding requirements. If other problems exist, GRE recommends contacting either the company or the local electric provider to discuss the situation with technical staff, including the possibility of an on-site investigation to identify possible solutions.

Potential Impacts to Land Based Economies

Agriculture

The ROI for agriculture is the ROW. Potential impacts to agricultural producers are anticipated to be of small-size and minimal across all routing options. This is because HVTLs generally do not interfere with future farming or grazing operations. Potential on-the-ground impacts can be mitigated. Short- and long-term financial impacts, such as crop losses, can be mitigated through easement agreements.

Farming occurs in Carver County; however, it constitutes a small percentage of overall state agriculture sales at approximately one percent.[106] The following summary is based on information from the Census of Agriculture, which is conducted by the United States Department of Agriculture (USDA). The agricultural census is a complete count of farms and ranches and the people who operate them, including small plots with at least $1,000 in annual sales.[107] In 2022 there were 606 individual farms using 156,676 acres of farmland in Carver County—a 12 percent decrease in numbers and 1 percent decrease in acres from 2017. The value of the products sold, both crop sales and livestock sales, increased 55 percent.

Prime farmland is defined by Federal regulation at 7 C.F.R. 657.5(a)(1) as "land that has the best

[106] US Department of Agriculture, *2022 Census of Agriculture County Profile: Carver County*, (n.d.), https://www.nass.usda.gov/Publications/AgCensus/2022/Online_Resources/County_Profiles/Minnesota/cp27019.pdf.

[107] US Department of Agriculture, *Census of Agriculture*, (2022), https://www.nass.usda.gov/AgCensus/.

combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses."

Although prime farmland characteristics are the same nationwide, certain soils that do not meet these specific characteristics are nevertheless important at a statewide level. Farmland of statewide importance is land, in addition to prime and unique farmlands, that is of statewide importance to produce food, feed, fiber, forage, and oil seed crops.[108]

Criteria for defining and delineating farmland of statewide importance are determined by the appropriate state agency or agencies. Generally, additional farmlands of statewide importance include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some soils might produce as high a yield as prime farmlands if conditions are favorable. In some states, additional farmlands of statewide importance may include tracts of land that have been designated for agriculture by law.[109]

The Soil Survey Geographic Database (SSURGO) contains soil information collected by the USDA National Cooperative Soil Survey. **Table 11** shows soils classified as either prime farmland or farmland of statewide importance for each route option.

Table 11 Farmland Classifications by Route

Route Segment	Prime Farmland	Prime Farmland if Drained	Farmland of Statewide Importance	Not Prime Farmland
Applicants' Proposed Route	38.8%	32%	17.4%	11.8%
Route Alternative A	29%	18.8%	32.9%	19.3%
Route Alternative B	35.1%	29.9%	22.1%	12.9%
Route Alternative C	23.3%	20.2%	32.8%	23.7%

Potential Impacts

Distinct impacts to agricultural lands and operations will occur during construction and operation of the project. Construction impacts are short-term and limit land use generally. These include soil rutting and compaction because of repeated access to the ROW—especially during spring or when wet conditions are

[108] US Department of Agriculture, *NRCS Field Office Technical Guide*, (March 2015), https://efotg.sc.egov.usda.gov/references/public/CO/5a_Prime_Farmland_Definition.pdf.
[109] Id.

present. Drain tile might be struck when auguring structure holes. Lands within the route width may not be available for agricultural use during construction; lands within marshaling yards or set-up areas will not be available for agricultural use during construction. All of these impacts have the potential to result in crop losses.

Impacts from the operation of a transmission line involve the long-term presence of structures and conductors. These impacts can remain within the immediate footprint or may extend beyond it if the transmission line impedes the use of farm or irrigation equipment or interferes with aerial spraying. Improper soil restoration practices could lead to drainage concerns or topsoil erosion. Like construction impacts, these operational impacts have potential to result in crop losses.

The physical impacts described above can lead to financial impacts, for example, loss of farm revenue or decreases to farm value. While short-term impacts to farming operations will occur during construction, long-term operational impacts are not expected.

There are no organic farms that will be impacted by the project.[110]

Mitigation

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. Impacts can also be minimized through appropriate construction and remediation practices. There are several sections in the DRP (**Appendix B**) that directly and indirectly mitigate agricultural impacts.

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.
- Compensating the landowner for any crop or property damage.
- Repairing ruts that are hazardous to agricultural operations.
- Alleviating soil compaction.
- Restoring the land and facilities as nearly as practicable to their original conditions.
- 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.

[110] MDA, Organic Farm Directory by County, (n.d.), https://www.mda.state.mn.us/organic-farm-directory-county.

The applicants committed to working with landowners "to minimize impacts to agricultural activities" and compensating landowners "for any crop damage/loss and soil compaction that may occur during construction."[111] Further measures are described in Section 6.5.1 of the route permit application. Lastly individual easement or purchase agreements can compensate farmers for loss of agricultural production or lands. These agreements are outside the scope of this document.

Tourism

The ROI for tourism is the local vicinity. Indirect impacts to tourism are associated with direct impacts to recreational opportunities. These unavoidable impacts will be short-term and intermittent during construction, and long-term and localized during operation. The project will not preclude future tourist activities. Potential impacts are unavoidable but can be minimized.

In 2023 the leisure and hospitality industry accounted for about $227 million in gross sales in Carver County.[112] Tourist activities within the project area are primarily associated with the recreational activities discussed in *Recreation*. Electrical infrastructure can impact tourism if it affects visitor experiences at tourism sites, primarily through aesthetic or noise impacts, or degrades natural or human-made resources that provide tourist-type activities.

Potential Impacts

Tourism in the project area is associated with the recreational activities previously described. Noise impacts from construction will be short-term and intermittent. Operational noise will be below ambient noise levels. Aesthetic impacts vary by routing alternative but are not expected to significantly impact recreational activities. Aesthetic impacts are subjective, and unique to the individual. The project will not preclude future tourist activities.

Impacts to tourism from this project are expected to be long-term, but localized, for all route options as they avoid public lands and places designated as tourist areas.

Mitigation

Impacts to tourism can be mitigated by selecting locations that avoid natural and human-made resources utilized for tourist-type activities. Potential impacts to tourism can also be mitigated by reducing noise and aesthetic impacts, as well as impacts to natural landscapes. Various sections of the DRP (**Appendix B**) indirectly address impacts to recreation, such as noise, aesthetics, soils, etc., and, as a result, also indirectly mitigate impacts to tourism. No additional mitigation is proposed.

Potential Impacts to Archaeological and Historic Resources

The ROI for archaeological and historic resources is the project area. Because of the collocation of existing ROW and because the project area is actively cultivated, impacts to archaeological resources are not anticipated. Additional surveys will be conducted in accordance with a request from SHPO.

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

[111] Application, Section 6.5.1.
[112] Explore Minnesota, *2023 Leisure and Hospitality Industry Data*, (n.d.), https://mn.gov/tourism-industry/assets/2023%20MN%20L%26H%20Data_tcm1135-665060.pdf.

remains.[113] Historic resources are sites, buildings, structures or other antiquities of state or national significance.[114]

Potential Impacts

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

The applicants hired Merjent to conduct a *Phase 1A Cultural Resource Background Literature Review* for the project. This review covers a buffer area of one-half mile in each direction from the Applicants' Proposed Route.

Three previously documented archeological sites were identified in the study area. Two of these sites are considered *alpha sites*, which means they were identified by historic documentation, but were not verified in the field. For all routes, the transmission lines are projected to run along existing ROW or cultivated fields. As such, impacts to these resources are not anticipated. Fifteen historic buildings and structures were identified within the study area. None of the routes examined in this EA will displace any of these buildings and given the collocation of the proposed routes, the viewshed is not expected to change for these sites.

The Phase 1a survey was conducted solely for the Applicants' Proposed Route. Based on review of the Office of the State Archaeologist Portal[115] and the MnDOT MnModel,[116] there is low potential for precontact sites within one mile of all additional routing alternatives.

The State Historical Preservation Office concluded that "due to the nature and location of the proposed project, we recommend that a Phase I archaeological survey be completed."[117] The applicants responded in their application, "given the lack of previous survey, Great River Energy will conduct a Phase I Archaeological Reconnaissance of the final route and Laketown Substation location, which is consistent with SHPO's conclusion in its May 14, 2024".[118]

Mitigation

Prudent routing can avoid impacts to archaeological and historic resources. This is the preferred mitigation. Section 5.3.15 of the DRP (**Appendix B**) addresses archeological resources. If previously unidentified archaeological sites are found during construction, the applicants would be required to stop construction and contact SHPO to determine how best to proceed. Ground disturbing activity will stop, and local law enforcement will be notified should human remains be discovered.

[113] Minnesota Statute 138.31, subd. 14.
[114] Minnesota Statute 138.51.
[115] Minnesota Department of Administration, *Office of the State Archaeologist Portal,* (n.d.), https://osaportal.gisdata.mn.gov/.
[116] MnDOT, *Minnesota Statewide Archaeological Predictive Model,* (n.d.), https://www.dot.state.mn.us/mnmodel/.
[117] Application, Appendix E.
[118] Application, Section 6.6.

According to SHPO, a Phase 1 survey is recommended for the permitted route. The DRP includes a special permit condition regarding this survey in Section 6.1 of the DRP (**Appendix B**).

Potential Impacts to the Natural Environment

Air Quality and Climate Change

The ROI for air quality and climate change is the project area. Distinct impacts occur during construction and operation of a transmission line and substation. Potential impacts to air quality during construction would be intermittent, localized, short-term, and minimal. Impacts are associated with fugitive dust and exhaust. Impacts 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.

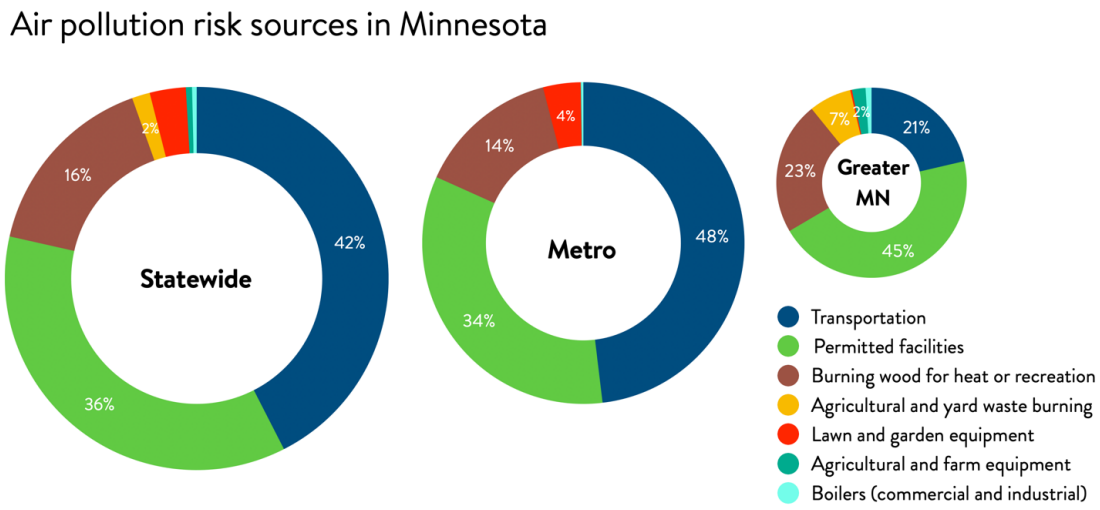
Construction activities will result in short-term increases in GHG emissions because of the combustion of fossil fuels in construction equipment and vehicles. These emissions would be short-term and dispersed over the ROI; therefore, total emissions would be minimal and not result in a direct impact to any one location. Maintenance activities would result in impacts like construction, but to a much lesser extent. Operational impacts from formation of nitrous oxide are minimal. Impacts are unavoidable but can be minimized.

"Air quality is better now. Not only is smoke from industries and vehicles less obvious to us, but it is also measurably reduced. Concentrations of fine particles and other pollutants are lower than they were twenty, thirty, forty years ago." "Over many years, the Air Quality Index (AQI) showed an encouraging, positive trend, but a concerning picture has emerged in recent years. Wildfire smoke is more often interrupting our clear skies, coming into Minnesota from the western U.S. and Canada, driven by changes in our climate. And, while smoky tailpipes are less common, vehicle pollution is still a significant contributor to overall air emissions."[119]

Air pollution in Minnesota is driven primarily by transportation with permitted facilities being the second driving factor (**Figure 7**).

[119] MPCA, *The Air We Breathe: The State of Minnesota's Air Quality 2025*, (January 2025), https://www.pca.state.mn.us/sites/default/files/lraq-1sy25.pdf.

Figure 7 Air Pollution Sources by Type[120]



The nearest air quality monitor to the project is in Shakopee, Minnesota, which falls within the South Metro region of the AQI monitor from the MPCA. Air quality in the area has been considered "good" between 167 and 257 days of the year from 2017-2023. During the same period, the number of days classified as moderate occurred varied between 108 and 178. Air quality was considered unhealthy for sensitive groups on two days in 2018, one day in both 2020 and 2021 and 15 days in 2023. Air quality was classified as unhealthy on two days in 2021 and 5 days in 2023.[121] The increase in the number of days of moderate or worse air quality in 2023 was statewide and largely attributable to wildfire smoke.[122]

Climate change refers to any significant change in measures of climate lasting for an extended period. Greenhouse gases (GHG) are gaseous emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The most common GHGs emitted from human activities include carbon dioxide, methane, and nitrous oxide.

Potential Impacts

Distinct impacts occur during construction and operation of a transmission line and substation.

Air Quality 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.

[120] Id.
[121] MPCA, *Annual AQI Days by Reporting Region*, (2024), https://data.pca.state.mn.us/views/Minnesotaairqualityindex/AQIExternal?%3Aembed=y&%3AisGuestRedirectFromVizportal=y.
[122] DNR, *Smoke Event of Jun 14, 2023*, (n.d.), https://www.dnr.state.mn.us/climate/journal/smoke-event-june-14-2023.html.

All projects that involve movement of soil, or exposure of erodible surfaces, generate some type of fugitive dust emissions.[123] Construction activities will generate fugitive dust from travel on unpaved roads, grading, foundation excavation, and setting structures. Clearing vegetation might create exposed areas susceptible to wind erosion. Most of the fugitive dust emission associated with the project are expected to be along gravel roads during worker and material transport.

Fugitive dust is a particulate air pollutant. "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."[124]

The Applicants' Proposed Route would require the most travel along an unpaved road. Without mitigation, travel along the Applicants' Proposed Route would generate greater amounts of fugitive dust, thus creating increased negative impacts to air quality. However, after applying the mitigations outlined below potential impacts are anticipated to be similar for all routing options.

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. These compounds contribute to smog and adverse health effects.[125] Minnesota has an ozone standard of 70 parts per billion measured over a daily eight-hour average of the three-year average of the annual fourth-highest daily maximum.[126] The national ozone standard is 0.070 parts per million over a 3-year average of the annual fourth-highest daily maximum eight-hour average concentration.[127] Ozone and nitrous oxide emissions are anticipated to be well below these limits.[128] Air emissions associated with maintenance of the HVTL are, like construction emissions, dependent upon weather conditions and the specific activity occurring.

Climate Change Construction activities will result in short-term increases in GHG emissions because of the combustion of fossil fuels in construction equipment and vehicles. Some tree clearing may be required. Deforestation is another 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 trees releases most of the stored carbon stock, either through burning or decay. In addition, deforestation eliminates future carbon dioxide capture.

Operational GHG emissions would occur from vehicle usage to and from the transmission line and substation for regular maintenance activities as well as emergency maintenance. Operational emissions would be considerably less than construction.

---

[123] USEPA, *Compilation of Air Pollutant Emissions Factors: Western Surface Coal Mining*, (January 1995), https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors.

[124] USEPA, *Compilation of Air Pollutant Emissions Factors: Miscellaneous Sources*, (January 1995), https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors.

[125] USEPA, *Ground-Level Ozone Basics*, (April 28, 2021), https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics#effects.

[126] Minnesota Rule 7009.0080.

[127] USEPA, *National Ambient Air Quality Standards (NAAQS) Table*, (December 20, 2016), https://www.epa.gov/criteria-air-pollutants/naaqs-table.

[128] Application, Section 6.7.1.

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. 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.

Mitigation

Watering exposed surfaces, covering disturbed areas, and reducing speed limits are all standard construction practices. The applicants indicate they will use appropriate measures to minimize fugitive dust emissions during construction. "Reduced speed limits on gravel/unpaved roads, and use and water or other non-chloride-containing dust suppression applications; Water application to the ROW or Laketown Substation site if erosion occurs during dry weather; Street sweeping where soils are tracked onto paved roads; and If the earth is wet during construction activities, vehicle tracking of soil from work areas will be minimized by using wooden or plastic matting at access points."[129]

Direct impacts to soils can cause indirect impacts to air quality through erosion. Section 5.3.8 of the DRP (**Appendix B**) requires permittees to "implement reasonable measures to minimize erosion and sedimentation..." This includes protecting exposed soils by promptly planting and seeding, using erosion control blankets, protecting soil stockpiles, and controlling vehicle tracking.

Exhaust emissions can be minimized by keeping vehicles and equipment in good working order, not running equipment unless necessary, minimizing the number of driving trips, and restricting idling vehicles except during extreme cold weather. 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.

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 substation to address the possibility of more frequent extreme storm events.

[129] Application, Section 6.7.1.

Groundwater

The ROI for groundwater is the route width. Potential impacts to domestic water supplies are not expected, because the Chaska wellhead protection area and drinking water supply management area are outside any of the studied route widths and are in a location that has low vulnerability to human caused contaminants. While there are several wells documented within all route widths, there are no documented wells within the ROW of any routing option. Subsurface activity could penetrate shallow water tables; however, subsurface disturbance is expected to be above well-depth used for potable water. Potential impacts for all routing options are anticipated to be minimal. Impacts will be short-term and localized. Impacts can be mitigated in part.

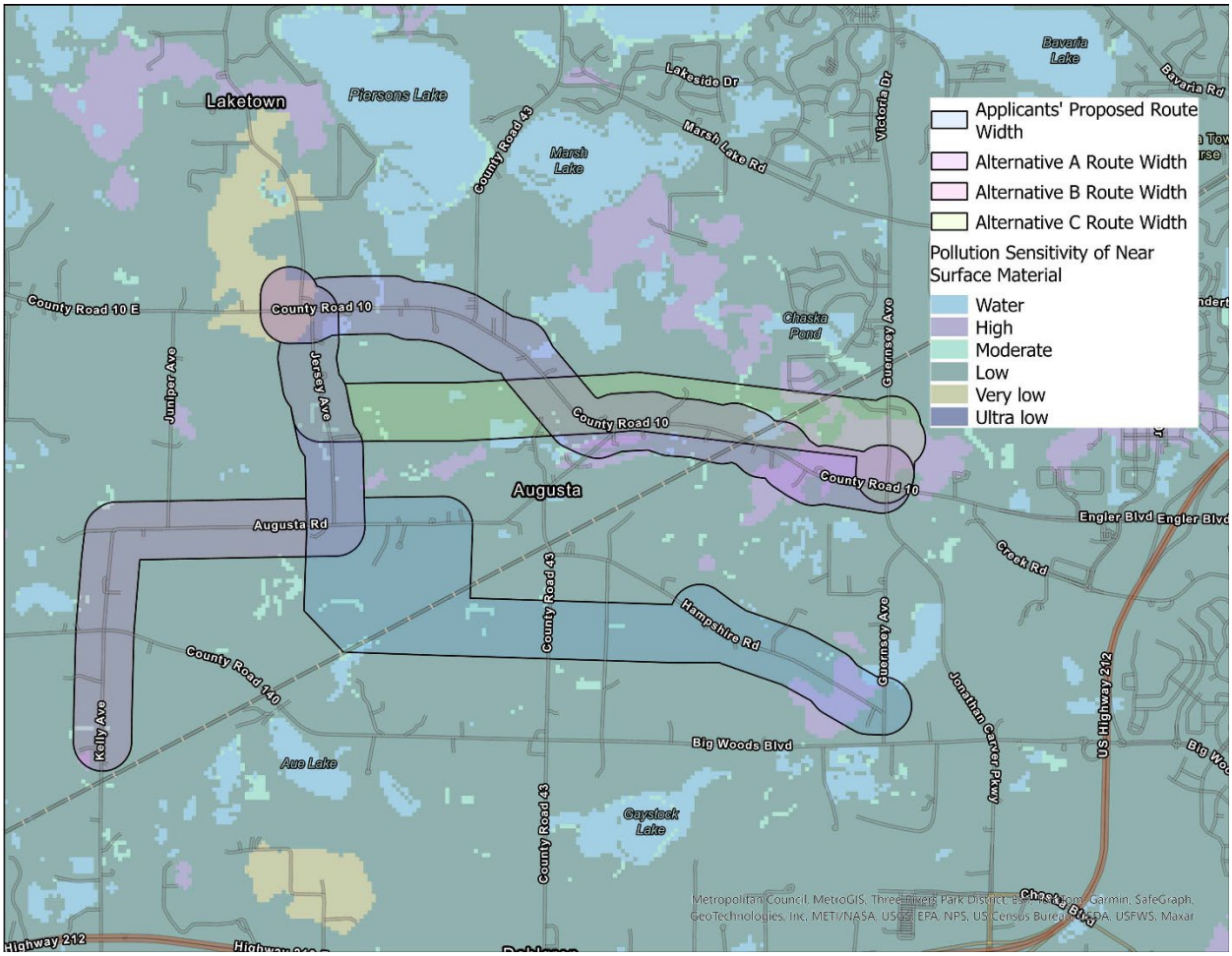
The project is within the Central Groundwater Province, which is "characterized by buried sand aquifers and relatively extensive surficial sand plains, part of a thick layer of sediment deposited by glaciers overlying the bedrock," because of this, the province is "underlain by sedimentary bedrock with good aquifer properties."[130] Springs and karst are not present in the project area. The water table is high along portions of the project.

According to the Pollution Sensitivity of Near-Surface Materials,[131] areas of high, moderate, and low sensitivity are present in the project area; however, most of the project is within areas of low sensitivity (**Figure 8**). 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 is assumed to be 10 feet below the land surface. A rating was applied across the state, defined as the vertical travel time of water to reach a depth of 10 feet. Water travels through an area of "high" sensitivity to a depth of 10 feet in less than 170 hours (hours to a week); between 170 and 430 hours to reach that same depth in areas rated as "moderate" (a week to weeks); and 430 to 1,600 hours to reach that same depth in areas rated as "low" (weeks to months). [132] These models do not provide the detail necessary for regulation or other activities, but are useful for region-wide assessments.

Wellhead protection areas exist "to prevent contaminants from entering public wells."[133] Chaska has an established wellhead protection area (WPA) and an established drinking water supply management area (DWSMA). Both the WPA and the DWSMA are east of the project area and will not be affected by the project.

[130] DNR, *Minnesota groundwater provinces 2021*, (n.d.), https://www.dnr.state.mn.us/groundwater/provinces/index.html.
[131] Adams, R., *Pollution Sensitivity of Near-Surface Materials*, (June 2016), https://www.leg.state.mn.us/docs/2017/other/170839.pdf.
[132] Id.
[133] MDH, *Wellhead Protection Area Delineation Fact Sheet*, (April 6, 2018), https://www.health.state.mn.us/communities/environment/water/docs/swp/delineation.pdf.

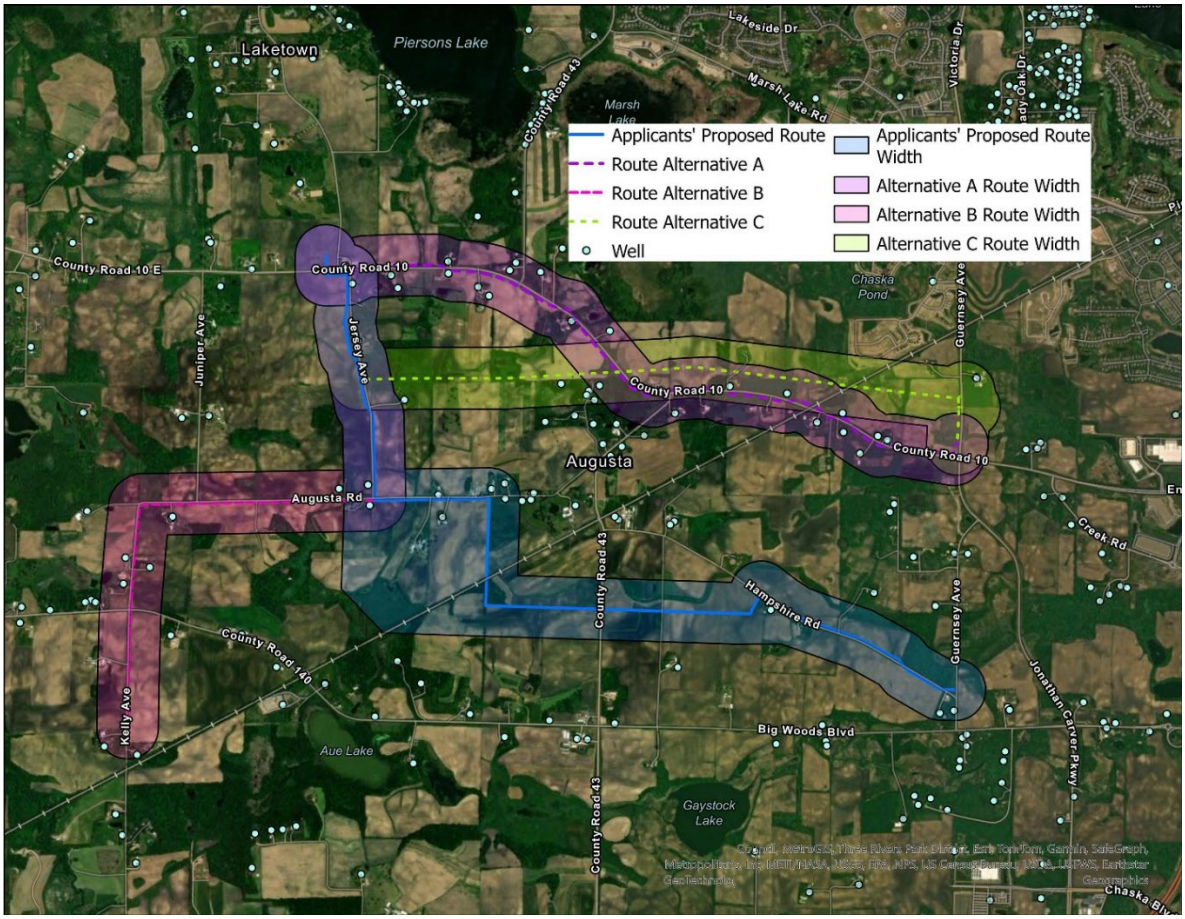
Figure 8 Pollution Sensitivity of Near-Surface Materials



Private Wells Domestic wells exist throughout the project area (**Figure 9**). "The Minnesota Well Index provides basic information about location, depth, geology, construction and static water level, for many wells and borings drilled in Minnesota. It by no means contains information for all the wells and borings and the absence of information about a well on a property does not mean there is no well on that property."[134] Fourteen wells are within the route width of the Applicants' Proposed Route segment and vary in depth from 130 to 525 feet deep; twenty-four wells are within the Alternative A route width and range from 127 to 525 feet deep; Alternative B also has 14 wells within the route width ranging from 130 to 525 feet; and Alternative C route width contains 15 wells ranging from 127 to 525 feet. None of the studied routes have any wells within their ROW.

[134] MDH, *Minnesota Well Index*, (n.d.), https://mnwellindex.web.health.state.mn.us/.

Figure 9 Private Well Locations



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."[135]

Most of the proposed structures will be embedded directly into the ground or set on a concrete foundation. Most of the structures will be steel poles will be embedded approximately 13 feet below grade, depending on soil conditions. There is potential for these structures to come into contact with shallow water tables.

When concrete foundations are used some portion of the soluble components of the cement paste can leach into groundwater prior to the setting and hardening of the concrete. This can change the pH of groundwater around the surface of the concrete but should not extend far from the concrete foundation.

[135] Maryland Department of Natural Resources, *Impacts of Power Generation and Transmission: Water Resources*, (n.d.), http://pprp.info/ceir17/HTML/Chapter4-2-2.html.

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, any surface water pollutant, such as oil, can reach groundwater. Potential impacts to surface waters are discussed in the next section.

Mitigation

Indirect impacts to groundwater can be mitigated by avoiding or minimizing impacts to surface waters. Direct impacts to groundwater, that is, leaching from concrete foundations where groundwater is present is difficult to mitigate. Should dewatering be used it should be directed away from wetlands and done in a manner to prevent erosion, that is, using an appropriately sized dewatering containment system that is carefully monitored.

As directed by the MDH, the applicants stated that they will coordinate with landowners regarding well locations and access, should it be necessary, if a route is permitted.[136]

Soils

The ROI for soils is the anticipated ROW. Common soil impacts include rutting, compaction, and erosion. Potential impacts will be short-term and localized. Impacts can be minimized.

"Soils differ in size and shape of their areas, in degree of contrast with adjacent soils, and in geographic relationships."[137] A soil association consists of "two or more dissimilar components occurring in a regularly repeating pattern on the landscape."[138] Associations are named after their major soils. The different routing options intersect only one soil association. Lester-Kilkenny-Houghton (s3573). These soils are very deep, well drained soils that formed in calcareous, loamy till.[139]

Potential Impacts

Soil compaction and rutting may occur from movement of construction vehicles along the ROW and near the substation. Installing structures requires removing and handling soils, which, along with vegetation clearing and grading, will expose soils to wind and water erosion. Topsoil could be lost to improper handling or erosion at the substation location. Potential impacts to prime farmland and farmland of statewide importance were discussed in *Agriculture*.

Structures will be embedded directly into the ground or on concrete foundations. Soluble components of concrete may leach into soils prior to the setting and hardening when drilled pier foundations are used.

Construction of the substation will result in a new impervious surface. Until permanent stormwater controls are in place, this could lead to increased erosion through stormwater runoff.

---

[136] Application, Section 7.6.2.
[137] United States Department of Agriculture, Soil Survey Division, *Soil Survey Manual (4th Ed.)*, (March 2017), https://www.nrcs.usda.gov/sites/default/files/2022-09/The-Soil-Survey-Manual.pdf.
[138] Id.
[139] Application, Section 6.8.3.

Mitigation

Potential impacts to soils can be mitigated by using BMPs and standard construction practices. A variety of methods can be used to minimize soil erosion. Common mitigation measure 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 will control runoff at the substation.

Additionally, winter construction can reduce potential impacts such as rutting and compaction because soils are frozen. 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. Section 5.3.8 of the DRP (**Appendix B**) has permit requirements the permittee must follow to mitigate impacts to soil.

Surface Water

The ROI for surface water is the route width. Direct impacts to other resource elements can cause indirect impacts to surface waters, for example, construction activities near surface waters could cause riparian vegetation disturbance and surface erosion. Petroleum-based fluid leaks or fuel spills from construction equipment in the ROW might reach surface waters. Potential impacts to surface waters are anticipated to be minimal for all routes. The project does not cross any impaired waters; therefore, impacts to these resources will not occur. Potential impacts can be mitigated.

The majority of all routes are within the Lower Minnesota River watershed, which is part of the Minnesota River Basin. A small portion of Alternative Route A is located in the Twin Cities Mississippi River watershed, located in the Mississippi River Basin.[140] "The Lower Minnesota River watershed includes the lowest reach of the Minnesota River and flows into the Mississippi at Fort Snelling. The second-largest watershed in the Minnesota River Basin, it covers 1,760 square miles, divided by the Minnesota River itself."[141]

[140] MPCA, *Basins and Major Watersheds in Minnesota*, (n.d.), https://www.pca.state.mn.us/sites/default/files/wq-ws1-01.pdf.

[141] MPCA, *Minnesota watershed information*, (n.d.), https://www.pca.state.mn.us/water/watersheds.

Public Waters Certain waters in Minnesota are classified as public waters under Minnesota Statute 103G.005. A public waters designation means that DNR has regulatory jurisdiction over use of the water, meaning waterbody (lakes, ponds, larger wetlands) and watercourse (rivers, streams, creeks, and drainage ditches), or public water wetlands. Utilities are required to obtain a license to cross state lands and waters. The alignment for the Applicants' Proposed Route would cross an unnamed creek delineated as a public watercourse. The route widths of Route Alternatives A and C, as well as the alignment for Route Alternative C, cross an unnamed public water wetland along the eastern portion of the routes, bisected by the railroad. This public water wetland is discussed briefly due to its classification as a public water, but is discussed in greater detail in the *Wetland* section.

Lakes and Ponds All the studied routes have a lake within their route width near the proposed Laketown substation, at the southeast corner of the CSAH 10 and Jersey Avenue intersection. None of the alignments are currently planned to span that lake. Alternative Routes A and C have each an additional water basin within their route widths, but the alignments do not span the water bodies.

Rivers, Creeks and Streams The Applicants' Proposed Route would cross an intermittent stream once, a perennial stream three times, and a wetland connector once. Alternative Route A crosses three different intermittent streams. Alternative Route B crosses an intermittent stream once and a perennial stream twice. Alternative Route C crosses six separate intermittent streams seven times and has an additional intermittent stream within its proposed alignment's ROW.

Impaired Waters 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 project does not cross any impaired waters.[142]

Potential Impacts

Potential impacts along all routes are expected to be minimal. The project does not cross any impaired waters; therefore, impacts to these resources will not occur. Indirect impacts to public waters might occur. Potential impacts can be mitigated.

If equipment crosses a watercourse or enters a waterbody, direct impacts, for example, bottom disturbance or petroleum-based products washing into the water would occur.

Direct impacts to other resource elements can cause indirect impacts to surface waters. 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. Petroleum-based fluid leaks or fuel spills from construction equipment in the ROW might reach surface waters.

[142] MPCA, *Impaired Waters Viewer (IWAV)*, (2020), https://www.pca.state.mn.us/water/impaired-waters-viewer-iwav.

Figure 10 Unnamed Public Water Wetland

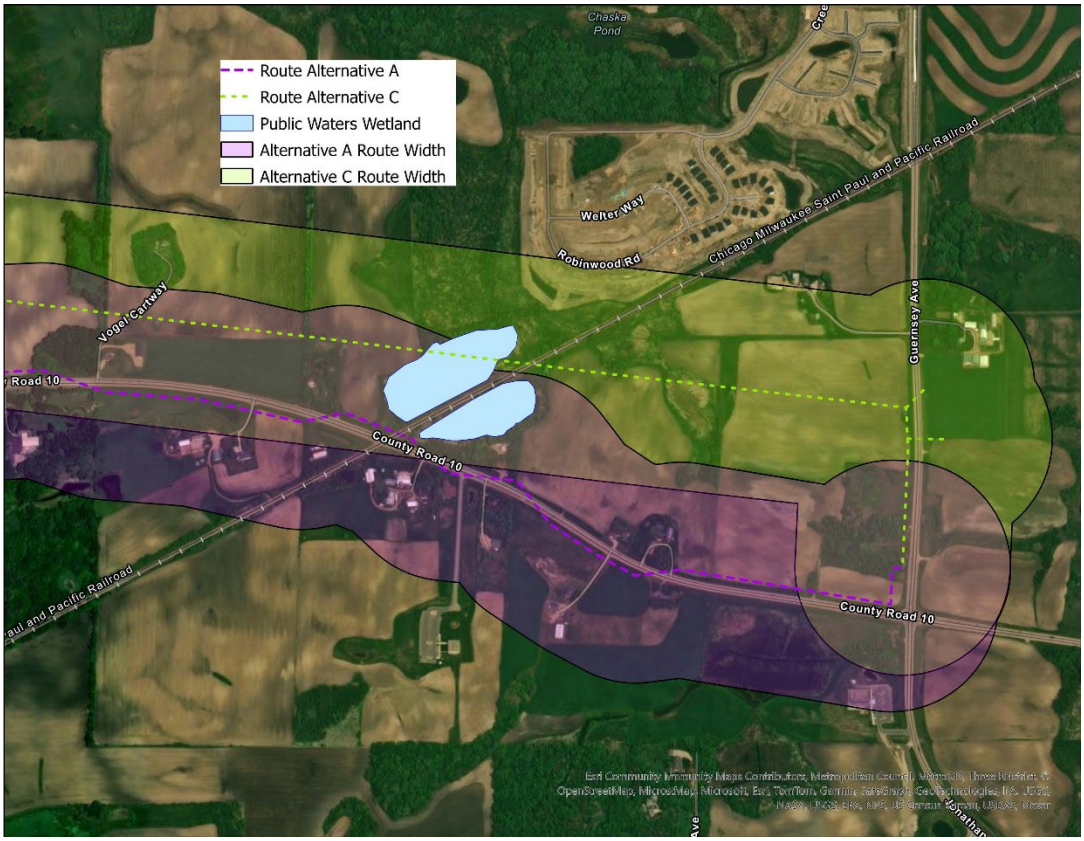


Figure 10 highlights the area of greatest potential for indirect surface water impacts. Should either Route Alternative A or C be permitted, they would need to acquire a license for crossing the public water wetland from MDNR.

All routes will need to cross watercourses, with the Applicants' Proposed Route having to cross a public watercourse. Should this route be permitted, they would also need to acquire a license for crossing the public watercourse from MDNR. Given the short expanse of these watercourses and the ability to span the poles large distances, the applicants will be able to position the poles at such distances that they can avoid the watercourses. Thus, potential impacts to surface waters along these route segments are anticipated to be minimal.

If dewatering is necessary, water removed from foundation locations could contain sediments or pollutants that might be introduced into surface waters. The applicants do not anticipate that dewatering will be necessary, but should it be, they will acquire the proper permit from MDNR.

Mitigation

Potential impacts to surface waters can be avoided by selecting routes, alignments, and structure placements outside of surface waters. Additionally, spanning waterbodies avoids direct impacts to surface waters within the selected route. 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.

Use of the wire/border zone vegetation clearing method could help to stabilize shorelands by allowing certain low growing woody vegetation and trees to persist along the outside edges of the ROW. This method allows for different types and heights of vegetation based on whether the vegetation is directly underneath the conductor (wire zone) or elsewhere in the ROW (border zone). This type of vegetation management could be required near the public water wetland and other waterbody and watercourse crossings.

Section 5.3.9 of the DRP (**Appendix B**) requires the Permittee to restore water resource areas disturbed by construction activities.

Vegetation

The ROI for vegetation is the anticipated ROW. Potential impacts, such as clearing, compacting, or otherwise disturbing vegetation, are expected to be minimal for Route Alternatives A, B and C, and moderate for the Applicants' Proposed Route. Invasive species might establish. Potential impacts will be both short- and long-term. Impacts are localized, but unavoidable. Potential impacts can be minimized.

Pre-settlement vegetation consisted primarily of oak woodland and maple-basswood forests on the irregular ridges of this subsection. More than 75% of the subsection is cropland, with an additional 5 to 10% pasture. The remaining 10 to 15% of the subsection remains as either upland forest or wetland.

Land cover types within the project area are approximately 70 percent agricultural (row crops and pasture), 10 percent forest (primarily deciduous), 6 percent wetlands (herbaceous and woody). Developed space, for example, homesteads and roads, accounts for approximately 8 percent.

Tall growing vegetation within the anticipated ROW n shown in.

Table 12 Acres of Tall Growing Vegetation within the ROW

Route	Total Acres
Applicants' Proposed Route	1.78
Route Alternative A	0.39
Route Alternative B	0
Route Alternative C	0.62

The information **Table 12** is based on 2019 NLCD spatial data and includes all forested cover types and woody wetlands. The applicants note in their application that using satellite imaging, they approximate they will remove approximately five acres worth of trees along their proposed route.[143]

[143] Application, Section 6.7.3.

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.[144] The purpose of the law is to protect residents of Minnesota from the injurious effects of these weeds. MDA lists four categories of noxious weeds with differing levels of eradication, control, reporting, transport, sales, and propagation requirements. There are 16 weeds on the eradicate list, 16 on the control list, and 15 restricted weeds.[145] None of the weeds on these lists are to be transported, propagated, or sold in the state.

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. Site preparation and structure installation might remove, disturb, or compact vegetation. Establishing and using access roads and staging and stringing areas will concentrate surface disturbance and equipment use causing short-term impacts to vegetation. Construction of the substation will permanently remove approximately three and one-half acres of vegetation.

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.

Long-term impacts include removal of woody vegetation within the ROW, which will result in conversion to low-stature vegetation (shrubs and grasses) throughout its length. GRE would routinely clear woody vegetation from the ROW to ensure it does not interfere with the safe operation of the HVTL. Removal of woody vegetation will widen existing corridors through wooded areas or remove wooded areas from the landscape. Conversion of wooded landscapes to open landscapes could indirectly affect native vegetation by increasing potential for spread of invasive and non-native species. More clearing of tall growing vegetation would occur along the Applicants' Proposed Route.

Maintenance and emergency repair activities 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 route—or alignments within selected routes—that avoid important vegetation resources. Collocating with existing infrastructure ROW, for example, roadways or transmission lines, might limit tree removal. Plant communities can be spanned. Additionally, new plantings within the ROW of compatible cover types, or planting of tall-growing trees in areas outside the ROW can mitigate impacts. Use of the wire/border zone

[144] MDA, *Minnesota Noxious Weed List*, (n.d.), https://www.mda.state.mn.us/plants-insects/minnesota-noxious-weed-list.
[145] Id.

method of vegetation clearing and management can reduce impacts to tall growing species at the edge of the ROW.

Mitigation measures to reduce the spread of invasive and non-native plant species during construction include the regular and frequent cleaning 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; conducting field surveys of the ROW prior to construction to identify areas containing noxious weed (weed surveys during construction would identify infestations of the ROW and staging areas); and eradicating new infestations as soon as practicable in conjunction with landowner input.

Lastly, impacts can be mitigated by compensating individual landowners through negotiated easement agreements. There are several sections of the DRP (**Appendix B**) that directly and indirectly address mitigation to vegetation impacts.

- Section 5.3.10 has conditions that mitigate direct vegetation impacts.
- Section 5.3.11 has conditions that mitigate impacts to vegetation by limiting the application of pesticides.
- Section 5.3.12 has conditions that mitigate impacts to vegetation requiring the Permittee to implement an Invasive Species Prevention Plan.

Wetlands

The ROI for wetlands is the ROW. Route Alternatives A and C cross the most acres of emergent wetlands. Emergent wetlands are spanned to the greatest extent possible. Where structures are placed in wetlands, vegetation at these locations is expected to regenerate around the structure within a matter of years, thus, impacts to emergent wetlands are anticipated to be short-term, of a small size, and localized. Impacts can be mitigated.

Impacts to forested wetlands are permanent whether structures are located within the wetland or outside the wetland. This is because tall growing vegetation must be cleared to facilitate the safe operation of the transmission line. Route Alternatives A and C cross the most acres of forested wetlands.

Overall, potential impacts to wetlands are anticipated to be short- and long-term and of a relatively small size when compared to total wetland acres in Carver County. Impacts will affect a unique, but common resource. Impacts can be minimized; however, the conversion of forested wetlands to a different wetland type and function is unavoidable.

"Wetlands are areas where the frequent and prolonged presence of water at or near the soil surface drives the natural system meaning the kind of soils that form, the plants that grow, and the fish and/or wildlife communities that use the habitat. Swamps, marshes, and bogs are well-recognized types of wetlands. However, many important specific wetland types have drier or more variable water systems…."[146]

[146] USACE, *Section 404 of the Clean Water Act: How Wetlands are Defined and Identified*, (April 15, 2019), http://www.epa.gov/cwa-404/section-404-clean-water-act-how-wetlands-are-defined-and-identified.

Wetlands provide many ecological benefits, such as erosion and flood control, fish and wildlife habitat, and groundwater recharge and discharge.[147] They also serve as a "natural filter" by trapping and absorbing sedimentation and some pollutants. Approximately 10.62 million acres of wetlands are found across Minnesota.[148] Wetlands vary by soil, hydrology, and vegetation, and are typically seasonal in their extent.

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.[149] This permit is administered by USACE 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.[150] 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.

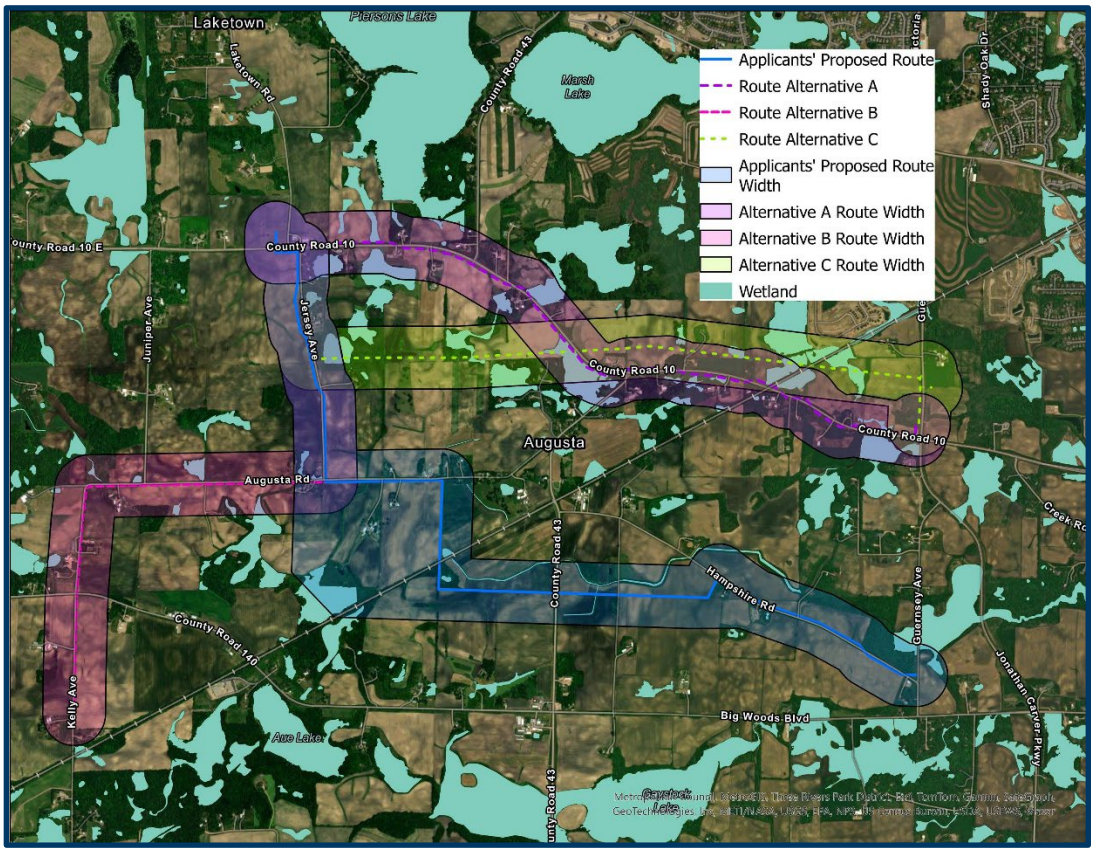
In Minnesota, wetlands are also protected under the WCA, which is administered by the BWSR. Carver County's Water Management Organization oversee local implementation of the WCA in the project area. The WCA requires that any person "proposing to impact a wetland to first, attempt to avoid the impact; second, attempt to minimize the impact; and finally, replace any impacted area with another wetland of at least equal function and value."[151] There are no wetland banking easements within the project area.

USFWS began producing wetland maps, known as the National Wetland Inventory (NWI), based on aerial photographs and Natural Resources Conservation Service soil surveys starting in the 1970s. DNR led a multi-agency collaborative effort to update and replace the original 1980s NWI maps. The updated NWI data are primarily based on spring aerial imagery acquired in 2010 and 2011, elevation data, and other more modern data. Field checking was performed on a limited subset of data.

Figure 11 shows the wetlands as reported by the NWI.

[147] DNR, *Wetlands*, (n.d.), https://www.dnr.state.mn.us/wetlands/index.html.
[148] DNR, *Status and Trends of Wetlands in Minnesota: Wetland Quantity Trends from 2006 to 2011*, (May 2013), https://files.dnr.state.mn.us/eco/wetlands/wstmp_trend_report_2006-2011.pdf.
[149] USEPA, *Section 404 of the Clean Water Act: Section 404 Permit Program*, (June 17, 2020), https://www.epa.gov/cwa-404/section-404-permit-program.
[150] MPCA, *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.
[151] Minnesota Rule 8420.0100, subp. 2.

Figure 11 Non-delineated Wetlands (NWI)



Acres of non-delineated wetlands within the ROW and within the route width of the different routing options are identified in **Table 13** and **Table 14**.

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.[152] However, crossing a wetland does not necessarily mean it will be impacted; in some cases, it can be spanned.

Table 13 Acres of Non-Delineated Wetland within the ROW (NWI)

Route Segment	Total Acres	Wetland Type (in Acres)		
		Emergent	Forested	Riverine/Pond/Lake
Applicants' Proposed Route	0.03	0	0	0.03
Route Alternative A	3.5	2.43	1.07	<0.01
Route Alternative B	0	0	0	0
Route Alternative C	5.19	4.36	0.32	0.51

[152] Public Service Commission of Wisconsin (July 2013).

Table 14 Acres of Non-Delineated Wetland within the route width (NWI)

Route Segment	Total Acres	Wetland Type (in Acres)		
		Emergent	Forested	Riverine/Pond/Lake
Applicants' Proposed Route	38.5	29.60	2.92	5.98
Route Alternative A	78.95	58.83	9.70	10.42
Route Alternative B	21.53	17.39	2.97	1.17
Route Alternative C	81.17	57.7	16.93	6.54

The proposed Laketown substation is outside any wetland areas.

When a wetland cannot be spanned, construction must occur within the wetland. Commission route permits require use of construction mats when winter construction is not possible. The applicants indicate that they will adhere to this practice when possible.[153] Additionally, permits require that access to wetland and riparian areas be the shortest route possible to minimize travel through the wetland.

Temporary impacts are associated with access to wetlands with construction equipment. While construction mats reduce soil compaction, laying construction mats 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.

Additionally, 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.

The applicants indicate that dewatering will be unlikely. Nevertheless, should dewatering occur 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.

Regardless of whether a power line can span a wetland, safe operation of the line will necessitate removal of woody vegetation. In areas where forested/shrub wetlands exist this will result in wetland conversion, that is, tree or shrub clearing will change the function of a forested/shrub wetland to a different wetland type within the ROW. 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.

Forested wetlands within the ROW are greatest along the Route Alternatives A and C (**Table 13**). These routes appear to follow existing distribution lines and/or roads or an HVTL in the immediate area of the forested wetland. As such, potential impacts would be incremental. Given the size of the new ROW

[153] Application, Section 6.7.2.

required compared to the existing distribution line ROW, however, a large percentage of the impact would be new for all routing options.

Route Alternative C alignment would cross a public water wetland (**Figure 10**), approximately 500 feet in length. This span would require a pole to be installed within the wetland. Route Alternative A has the same public water wetland within its route width and adjacent to the ROW.

Wetland impacts 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.

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 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 ROW; assembling structures on upland areas prior to installation; and transporting crews and equipment, to the greatest extent possible, over improved roads and via routes which minimize travel over wetlands.

Underbuilding existing distribution lines instead of burying them through wetlands would minimize the amount of disturbance necessary within wetlands.

Section 5.3.9 of the DRP (**Appendix B**) requires the Permittee to construct within wetlands in frozen ground conditions when possible and to use wooden or composite mats when frozen construction conditions are not possible.

The applicants committed to the following in section 6.7.2 of the route permit application, in reference to crossing a wetland:

> When possible, construction will be scheduled during frozen ground conditions. When construction during frozen ground conditions is not possible, construction mats (wooden or composite) will be used to protect wetland vegetation. Additionally, low ground pressure construction vehicles may be used, which are designed to minimize impact to soils in damp areas. Construction crews will attempt to access wetlands with the least amount of physical impact to the wetlands. Staging or stringing setup areas will not be placed within or adjacent to water resources to the extent practicable. Once construction of the Project is completed, Great River Energy will restore disturbed areas within wetlands to pre-construction conditions.

Wildlife and Habitat

The ROI for wildlife is the route width, except that the ROI for avian species is the local vicinity. Wildlife using the route width 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 and avian species may occur.

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 short-term, localized impacts can be minimized. Operational impacts are expected from continued maintenance of the ROW. These intermittent but long-term impacts will be of a small size.

Potential impacts to avian species include those described above. Additionally, birds—especially large-bodied birds—are susceptible to electrocution from, and collision with, HVTLs during operation. Potential impacts to avian species are expected to be minimal but might impact unique resources. These short- and long-term, localized impacts can be minimized.

Overall, potential impacts to wildlife and habitat are expected to be minimal for all routes. Potential impacts will be short- and long-term. These localized impacts can be minimized in part and are unavoidable in part.

Landscape types and vegetation communities vary within the local vicinity of the project. Agricultural lands and wetlands are spread throughout the area, as is existing road and power line ROWs.

Species 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. Wildlife species in the area include tundra swans during migratory periods, red-headed woodpeckers, raptors, trumpeter swans, mice, turtles, frogs, and snakes. Additional species include sandhill cranes, pheasants, deer, turkey, waterfowl, and other small game species.[154] Rare and unique wildlife species are discussed in the next section.

"Minnesota defines Species in Greatest Conservation Need (SGCN) as native animals, nongame and game, whose populations are rare, declining, or vulnerable to decline and are below levels desirable to ensure their long-term health and stability. Also included are species for which Minnesota has a stewardship responsibility."[155] The Wildlife Action Network is "mapped terrestrial and aquatic habitats, buffers, and connectors that represent a diversity of quality habitat . . . representing viable or persistent populations and 'richness hotspots' of SGCN."[156] There are no mapped Wildlife Action Network areas within the local vicinity or the project area.

Habitat There are no DNR Wildlife Management Areas, Scientific and Natural Areas, or Migratory Waterfowl Feeding and Resting Areas or National Audubon Society Important Bird Areas within the local vicinity of any routing option.

---

[154] Application, Section 6.7.3.

[155] DNR, *Minnesota's Wildlife Action Plan 2015 – 2025*, (2016), https://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/mnwap/wildlife-action-plan-2015-2025.pdf.

[156] DNR, *The Wildlife Action Network developed for the 2015-2025 MN Wildlife Action Plan*, (April 13, 2016), https://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/mnwap/mndnr_wildlife_action_network_description.pdf.

The Reinvest in Minnesota Reserve program (RIM Reserve) is administered by BWSR and establishes conservation easements on private lands utilizing state funds. RIM Reserve easements are intended to provide wildlife habitat, soil conservation, and water quality benefits by establishing permanent habitat and removing marginal crop lands from agricultural production. There are no RIM Reserve easements within the local vicinity, but one RIM Reserve easement is intersected by the project area, slightly less than one mile west of Route Alternative B.

Potential Impacts

Unique impacts will occur to terrestrial and aquatic species, avian species, and habitat.

Terrestrial and Aquatic Species Wildlife using the route width are expected to be displaced during construction due to increased human activity or 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. Should Route Alternative C be permitted, structures built within a wetland could directly impact fish or fish habitat.

Reptiles, such as snakes, move underground below the frost line and become inactive or hibernate over winter months.[157] Turtles and amphibians generally hibernate under pond bottoms, but will also hibernate on land underneath the frost line. "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.[158] Should winter construction occur, 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.

Potential long-term impacts to terrestrial and aquatic species are anticipated to be minimal along all route segments.

Avian Species Potential impacts to avian species (songbirds, raptors, and waterfowl) include those described above. Additionally, birds are susceptible to electrocution from, and collision with, HVTLs during operation.

Power lines electrocute all types of birds, including raptors, "because many designs of electric industry hardware place conductors and ground wires close enough together that raptors can touch them simultaneously with their wings or other body parts."[159] Electrocution is more common in large-bodied birds, but, again, any species can be electrocuted. Because of their smaller size, electrocution risk is

[157] DNR, *Snakes and Lizards of Minnesota*, (2010), http://files.dnr.state.mn.us/natural_resources/animals/reptiles_amphibians/snake_lizard_mn.pdf.
[158] DNR, *DNR Pollinator Best Management Practices*, (December 2014), https://files.dnr.state.mn.us/natural_resources/npc/2014_draft_pollinator_bmp_guidelines.pdf.
[159] Avian Power Line Interaction Committee, Edison Electric Institute, and Raptor Research Foundation, *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996*, (1996), https://law.resource.org/pub/us/cfr/ibr/002/aplic.raptor.1996.pdf.

greater with distribution lines and is most prevalent when the power line structure is the tallest feature on the landscape, such as on a bluff or prairie. [160]

Dry feathers provide insulation; therefore, "birds must typically contact electrical equipment with conductive fleshy parts for electrocution to occur. Fleshy parts include the feet, mouth, bill, and the wrists from which the primary feathers originate."[161] 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."[162]

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.

The incidence of birds colliding with transmission lines is also influenced by the number of horizontal planes in which the conductors are strung. Stringing the conductors in a single horizontal plane presents less of a barrier to birds crossing the transmission line ROW. A single horizontal plane, however, generally requires a wider structure (H-frame structure). Conversely, stringing the conductor wires in two or more planes creates a greater barrier to birds attempting to fly, not only across the lines, but over and potentially between them (monopole structure).

Mitigation

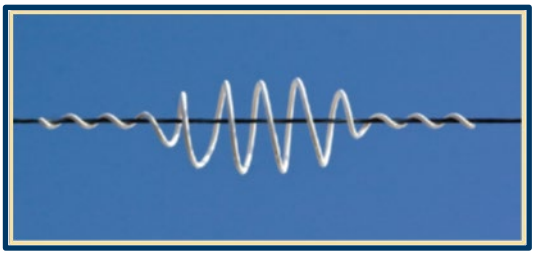
Potential impacts to wildlife can be avoided by routing power lines away from quality habitat or migratory corridors. Impacts can be minimized by spanning habitats and minimizing the number of structures to the extent practicable. Impacts to avian species can be mitigated by winter construction—nesting activities would not be occurring, and most species would have migrated out of the local vicinity.

[160] Avian Power Line Interaction Committee, Edison Electric Institute, and California Energy Commission, *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*, (2006), https://www.nrc.gov/docs/ML1224/ML12243A391.pdf.

[161] Id.

[162] Id.

Figure 12 Bird Diverter



Impacts to avian species can be minimized by diverting birds away from transmission lines using bird diverters placed on shield wires. Diverters are placed on the top shield wire because a of the natural tendency for birds to avoid obstacles in flight by increasing altitude. In select locations, however, bird diverters will be place on the conductors as well to further mitigate potential impacts. Additionally, section 5.3.16 of the DRP (**Appendix B**) requires that permittees "incorporate adequate spacing of conductors and grounding devices in accordance with Avian Power Line Interaction Committee standards to eliminate the risk of electrocution to raptors with larger wingspans that may simultaneously come in contact with a conductor and grounding devices." The applicants stated they will use Avian Safe Design recommendations and bird diverters, if needed.[163]

The applicants will survey the line prior to construction and report any eagle or migratory bird nests to the USFWS and adhere to any guidance provided by the agency. [164]

Rare and Unique Resources

The ROI for rare and unique resources is the project area. Rare and unique features were identified. Five listed species were found to have potential habitat impacts. Potential impacts to these species can be mitigated. Potential impacts should they occur, are anticipated to be direct impacts to individuals—population level impacts are not anticipated. Route Alternative B crosses an MBS Site of Biodiversity Significance ranked "moderate." Impacts to this location are avoidable. These long-term, localized impacts could affect a unique resource. Potential impacts can be mitigated in part and avoided in part.

DNR classifies rare plant or animal communities across the state. These include Scientific and Natural Areas, High Conservation Value Forest, Minnesota Biological Survey (MBS) Native Plant Communities (including native prairie), and MBS Sites of Biodiversity Significance. Native Plant Communities and MBS Sites of Biodiversity Significance exist in the project area.

Within the project area, there are four MBS Sites of Biodiversity Significance. These sites are: Marsh Lake, Marsh Lake Hunting Club, Laketown 32 and Dahlgren 9. Marsh Lake has a biodiversity rank of "below." The remaining three sites have biodiversity ranks of "moderate." While none of these sites are within the anticipated ROW of any routing option, the Laketown 32 site is within the route width of the Route Alternative B.

Sites ranked moderate "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," whereas sites ranked below "lack occurrences of rare species and natural features or do not meet MBS standards for outstanding, high, or moderate rank. These sites may include areas of conservation value at the local level, such as habitat for native plants and animals,

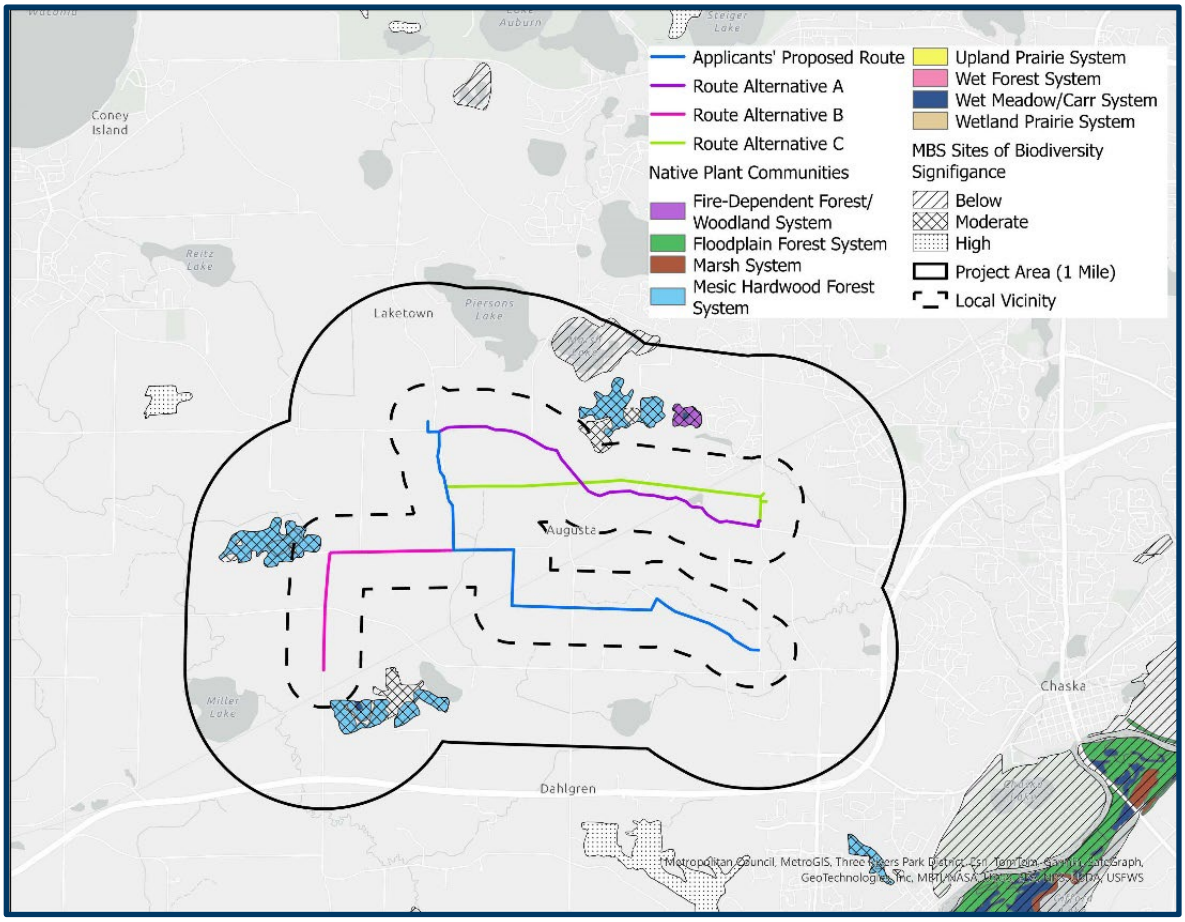
[163] Application, Section 6.7.5.
[164] Id.

corridors for animal movement, buffers surrounding higher-quality natural areas, areas with high potential for restoration of native habitat, or open space."[165]

The project area intersects ten MBS Native Plant Communities. Only one of these intersects the route width of Route Alternative B. These sites are from the following systems: Mesic Hardwood Forest System, Wet Meadow/Carr System, and Fire-Dependent Forest/Woodland System.

Figure 13 shows the MBS Native Plant Communities and Sites of Biodiversity within the project area.

Figure 13 MBS Native Plant Communities and Sites of Biodiversity Significance



The DNR conducted a Natural Heritage Review and found that a calcareous fen three miles east of the project area line. DNR recommends that the applicants refer to the MPCA's Stormwater Manual, as even construction projects a distance away from the fens could negatively impact them.

[165] DNR, *MBS Site Biodiversity Significance Ranks*, (n.d.), https://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html.

Staff reviewed the Natural Heritage Review from DNR and the USFWS Information for Planning and Consultation provided by the applicants.[166] One state-listed species of special concern, the least darter, was documented in the project area. Five federally protected species were identified as having a potential of being within the project area: the northern long-eared bat, the tricolored bat, the whooping crane, the monarch butterfly, and the rusty patch bumblebee.

Least Darter A state-listed species of special concern, it is the smallest vertebrate fish species native to Minnesota. Least Darters spend much of their time in deep pools of small rivers and streams, but migrate to shallow, weedy habitats within the littoral zone of lakes from March to May. "Habitat loss and degradation are the greatest threats to Least Darter populations. They are vulnerable to pollution, pesticides, agricultural and urban run-off, eutrophication, and loss of habitat elements such as low-velocity waters and aquatic vegetation."[167]

Northern long-eared bats A federally endangered species and a state-listed species of concern, it can be found throughout Minnesota. During the winter this species hibernates in caves and mines, and during the active season (approximately April-October) it roosts underneath bark or in cavities or crevices of both live and dead trees. The spread of white-nose syndrome across the eastern United States has become the major threat to the species. Activities that might impact this species include, but are not limited to, any disturbance to hibernacula and destruction or degradation of habitat (including tree removal). The project area is suitable habitat for this species.[168]

Tricolored bats A federally proposed endangered species, it can be found throughout Minnesota. The tricolored bat, also known as the easter pipistrelle, is proposed for listing under the Endangered Species Act and is a state-listed species of concern. The USFWS proposed listing the species as endangered in September 2022. The species has been found regularly, though in low numbers, in caves and mines int the southeastern part of the state. The species may roost in trees within the project area during their active season (April – September).[169]

Whooping Cranes A federally listed experimental population, non-essential species. The whooping crane occurs only in North America and is North America's tallest bird. The whooping crane breeds, migrates, winters, and forages in a variety of wetland and other habitats, including coastal marshes and estuaries, inland marshes, lakes, ponds, wet meadows and rivers, and agricultural fields.[170] The project area is suitable habitat for this species.

Monarch Butterflies A species listed as a federal candidate. The species is common throughout Minnesota during summer months and is most frequently found in habitats where milkweed and native plants are common, including roadside ditches, open areas, wet areas, and urban gardens. Due to the large amount of agriculture in the area, suitable habitat for this species is limited.

[166] Application, Appendix E.
[167] DNR, *Rare Species Guide*, (n.d.), https://www.dnr.state.mn.us/rsg/index.html.
[168] Id.
[169] Id.
[170] USFWS, *Environmental Conservation Online System*, (n.d.), https://ecos.fws.gov/ecp/species/758.

Rusty Patch Bumblebee A federally endangered species, it was once one of the most common bumble bees encountered in Minnesota. Workers and queens require consistent forage throughout the entire growing season, beginning with spring ephemerals when they first emerge around April, throughout the summer to provision their brood, and into the fall to build resources to overwinter. Workers have been observed in a variety of habitats, including forests, wetlands, grasslands, roadsides, agricultural fields, and residential lawns and parks.[171] The project area, specifically along Jersey Avenue, Guernsey Avenue, and the substation, is within a high potential zone of this species.[172]

Trumpeter Swan While trumpeter swans were not documented by the DNR in the area, comments and photos from the public have shown that they are in the area. During mating season, trumpeter swans prefer water bodies with vegetation. The most suitable area for this would be near Route Alternatives A and C.[173]

Bald Eagles and Golden Eagles Bald eagles in Minnesota have a nesting season generally January through early July. Bald eagles are primarily found near rivers, lakes, and other waterbodies in remote and, more recently, metropolitan areas.[174]

Bald eagles are not listed as endangered but are afforded additional protections under the Bald and Golden Eagle Protection Act, which is administered by the USFWS. Bald eagle incidental take permits and nest removal permits are considered to be voluntary permits, meaning a project proposer must make the determination to pursue a permit based on the respective risk of their project's potential to take a bald eagle.

Bald eagles typically nest in mature trees near large lakes or streams. Given the amount of deciduous forest within the area, there are likely bald eagles present in the project area.

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 ROWs can be managed to provide habitat, for example, nesting platforms can be built on top of transmission structures for use by rare avian species.

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

[171] DNR, *Rare Species Guide*, (n.d.), https://www.dnr.state.mn.us/rsg/index.html.
[172] USFWS, *Rusty Patched Bumble* Bee, (n.d.), https://www.fws.gov/species/rusty-patched-bumble-bee-bombus-affinis/map.
[173] DNR, *Rare Species Guide,* (n.d.), https://www.dnr.state.mn.us/rsg/index.html.
[174] DNR, *Bald Eagles in Summer*, (n.d.), https://www.dnr.state.mn.us/birds/eagles/summer.html.

raising young) in areas affected by white nose-syndrome.[175] USFWS determined that the project is "not reasonably certain to cause incidental take of the northern long-eared bat."[176]

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 applicants state that they will "obtain coverage under the MPCA Construction Stormwater General Permit for their respective portions of the Project and will follow applicable guidance in the Minnesota Stormwater Manual when designing SWPPPs. Once a final route has been selected, the Applicants will further coordinate with the MDNR to ensure that ground disturbance activities, such as pole placement, do not disrupt potential groundwater hydrology associated with the calcareous fen, as the easternmost portion of the Transmission Line is located within 5 miles of the Project…"

The following additional mitigation measures can help to avoid or minimize impacts to rare and unique resources:

- Minimize tree felling and shrub removal that are important to local wildlife.
- 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.

While rare plants are not expected in the anticipated ROW, conducting surveys for rare plants during appropriate periods to properly identify their presence along the selected ROW before clearing can help to minimize impacts to these species. If surveys identify these species individual avoidance and minimization measures can be developed in coordination with appropriate resource agencies.

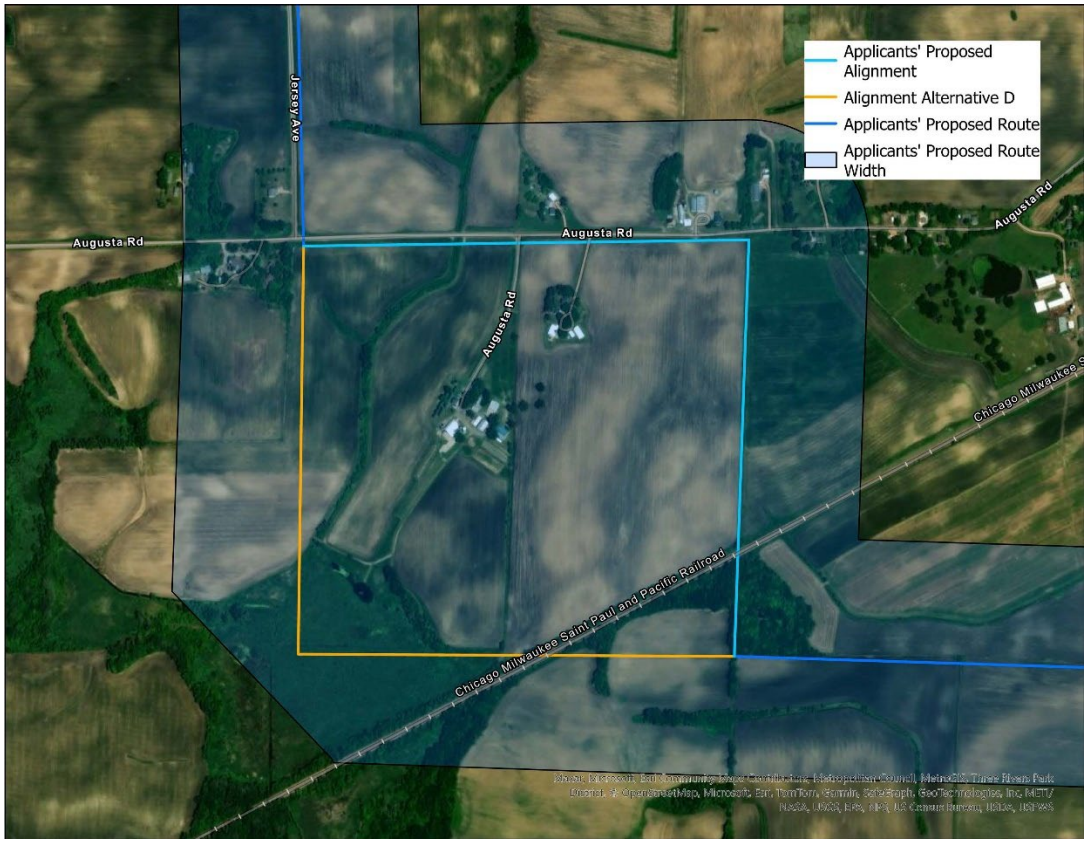
[175] USFWS, *Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat*, (January 14, 2016), https://www.federalregister.gov/documents/2016/01/14/2016-00617/endangered-and-threatened-wildlife-and-plants-4d-rule-for-the-northern-long-eared-bat.

[176] Application, Appendix E.

Chapter 5 Potential Impacts and Mitigation Across the Applicants' Proposed Alignment and Alignment Alternative D

Chapter 5 details potential human and environmental impacts and mitigative measures for the Applicants' Proposed Alignment and Alignment Alternative D (**Figure 14**). These impacts and mitigations are discussed here in a one-to-one comparison between two alignments of the Applicants' Proposed Route, and not the whole route. The full route analysis for the Applicants' Proposed Route is in Chapter 4.

Figure 14 Alignment Alternatives



Resource Topics Given Abbreviated Study

Select resource topics received abbreviated study because impacts to these resources are anticipated to be either negligible or to be the same as the full route analysis for both alignments.

Certain resources were not studied in this chapter. Some resources were given abbreviated study in Chapter 4, and other resources are anticipated to have no difference in impacts between the two alignments. This was generally considered when the ROI of the resource was the route width or larger, as the review would have covered both alignments in Chapter 4. Certain resources with larger ROIs were still reviewed with smaller areas of focus as there are differences that could affect the routing decision. The following resources are not discussed in this chapter:

- Displacement
- Cultural Values
- Electrical Interference
- Environmental Justice
- Floodplains and Topography
- Land Use and Zoning
- Noise
- Property Values
- Recreation
- Socioeconomics
- Airports
- Road
- Utilities
- EMF
- Emergency Services
- Medical Devices
- Public Safety
- Stray Voltage
- Worker Safety
- Forestry
- Mining
- Tourism
- Archaeological and Historic Resources
- Air Quality and Climate Change
- Geology
- Groundwater
- Soils
- Surface Water
- Wildlife and Habitat
- Rare and Natural Resources

Potential Impacts to Human Settlement

Aesthetics

The ROI for aesthetics for this chapter is the ROW. Aesthetic impacts are subjective. Thus, potential impacts are unique to the individual and can vary widely. Impacts will be short- and long-term and localized. Potential impacts are unavoidable but can be mitigated in part.

Potential Impacts

The number of residences within 200 feet of the route alignments is shown in **Table 15**.

Table 15 Local Residences Near Alignments

Route Segment	Distance from alignment (ft)			Total Receptors
	0-50	50-100	100-200	
Applicant's Proposed Alignment	0	0	3	3
Alignment Alternative D	0	0	1	1

The number of residences along the Applicants' Proposed Alignment is higher than the Alignment Alternative D.

Mitigation

Along with routing a transmission line away from residents or visual receptors, aesthetic impacts can also be minimized by choosing routes and alignments that are, to the extent practicable, consistent with the existing viewshed or reduce viewer exposure. Routing a transmission line with existing infrastructure ROWs can mitigate potential impacts because the new built feature would be consistent with previous human modification and an incremental increase. **Table 16** shows where impacts can be mitigated by following existing infrastructure. In the half mile span of both alternatives, the Applicants' Proposed Alignment is significantly more collocated than the Alignment Alternative D.

Table 16 Routes Paralleled with Existing Infrastructure ROW

Route Segment	% Collocation with Utilities and Roads
Applicants' Proposed Alignment	53%
Alignment Alternative D	0%

Potential Impacts to Land Based Economies

Agriculture

The ROI for agriculture in this chapter is the ROW. Potential impacts to agricultural producers are anticipated to be of small-size and minimal across both alignment options. This is because HVTLs generally do not interfere with future farming or grazing operations. Potential on-the-ground impacts can be mitigated. Short- and long-term financial impacts, such as crop losses, can be mitigated through easement agreements.

Potential Impacts

The two alignment alternatives both go through farmland to different extents. Referring to **Table 17**, the Applicants' Proposed Alignment will go through less farmland than Alignment Alternative D.

Table 17 Percentage of Agricultural Land Use for Each Alignment

Alignment	% of Alignment Going through Farmland
Applicants' Proposed Alignment	50%
Alignment Alternative D	97%

Mitigation

Mitigation can include routing the transmission line away from agricultural land, in this case, the Applicants' Proposed Alignment. Agriculture is not anticipated to be impacted on a high level in either case.

Potential Impacts to the Natural Environment

Vegetation

The ROI for vegetation is the anticipated ROW. Potential impacts, such as clearing, compacting, or otherwise disturbing vegetation, are expected to be minimal for both alternatives. Invasive species might establish. Potential impacts will be both short- and long-term. Impacts are localized, but unavoidable. Potential impacts can be minimized.

Tall growing vegetation within the anticipated ROW has been estimated. The Applicants' Proposed Alignment has less than one acre within the ROW, while Alignment Alternative D has zero. This information is based on 2019 NLCD spatial data and includes all forested cover types and woody wetlands.

Potential Impacts

Long-term impacts include removal of woody vegetation within the ROW, which will result in conversion to low-stature vegetation (shrubs and grasses) throughout its length. GRE would routinely clear woody vegetation from the ROW to ensure it does not interfere with the safe operation of the HVTL. Removal of woody vegetation will widen existing corridors through wooded areas or remove wooded areas from the landscape. Conversion of wooded landscapes to open landscapes could indirectly affect native vegetation

by increasing potential for spread of invasive and non-native species. More clearing of tall growing vegetation would occur along the Applicants' Proposed Alignment.

Mitigation

Impacts to vegetation, especially trees, can be avoided or minimized by selecting alignments that avoid important vegetation resources. In this case, Alignment Alternative D would require less tree clearing.

Lastly, impacts can be mitigated by compensating individual landowners through negotiated easement agreements. Mitigation and restoration measures for vegetation are standard Commission route permit conditions.

Wetlands

The ROI for wetlands in this chapter is the ROW. Alignment Alternative D would cross the most acres of emergent wetlands. Where structures are placed in wetlands, vegetation at these locations is expected to regenerate around the structure within a matter of years, thus, impacts to emergent wetlands are anticipated to be short-term, of a small size, and localized. Impacts can be mitigated.

Overall, potential impacts to wetlands are anticipated to be short- and long-term and of a relatively small size when compared to total wetland acres in Carver County. Impacts will affect a unique, but common resource. Impacts can be minimized.

Figure 15 Non-delineated Wetlands (NWI)

Potential Impacts

Alignment Alternative D contains 1.78 acres of emergent wetlands within its ROW (**Figure 15**). The Applicants' Proposed Alignment does not contain any wetlands. Crossing a wetland does not necessarily mean it will be impacted; in some cases, it can be spanned. When a wetland cannot be spanned, construction must occur within the wetland. Commission route permits require use of construction mats when winter construction is not possible.

Mitigation

Potential impacts to wetlands can be avoided by selecting routes, alignments, and structure placements outside of wetlands. The Applicants' Proposed Alignment would impact the least area of wetlands. When a wetland crossing is unavoidable spanning wetlands to the greatest extent possible is the preferred mitigation.

Chapter 6 Unavoidable, Irreversible, and Cumulative Impacts

Chapter 6 describes unavoidable impacts and irreversible and irretrievable commitments of resources and summarizes the cumulative potential effects of the project and other projects.

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.
- Potential impacts to agricultural operations, such as crop losses.
- Soil compaction and erosion.
- Vegetative clearing; changes to forested wetland type and function.
- Disturbance and temporary displacement of wildlife, as well as direct impacts to wildlife inadvertently struck or crushed during structure placement or other activities.
- Minor amounts of habitat loss.
- Converting the underlying land use to an industrial use (substation location).
- GHG emissions.

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

- Visual impact of structures, conductors, and substation.
- Change in landscape character at the substation location.
- Loss of land use for other purposes, such as agriculture, where structures and the substation are placed.
- Injury or death of avian species that collide with, or are electrocuted by, conductors.
- Interference with AM radio signals.
- Potential decrease to property values.
- Continued maintenance of tall-growing vegetation.
- GHG emissions.

Irreversible and Irretrievable Commitments of Resources

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 substation could be removed and the ROW restored to previous conditions, this is unlikely to happen in the reasonably foreseeable future (~50 years). The loss of forested wetlands is considered irreversible, because replacing these wetlands would take a significant amount of time. Certain land uses within the ROW will no longer be able to occur, especially at the 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, hydrocarbons, steel, concrete, wood, and other consumable resources. The commitment of labor and fiscal resources is also considered irretrievable.

Cumulative Impacts

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 are impacts to 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 actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects.[177]

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.

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.

Local governments were contacted (or websites reviewed) to identify foreseeable projects. This included the city of Victoria, city of Carver, and Carver County. Staff reviewed the MISO Generator Interconnection Queue and found no interconnection requests in the project area. The Environmental Quality Board interactive project database was searched; no relevant projects were found.

Current and reasonably foreseeable future projects are summarized in **Table 18**. One project is an infrastructure related project in and near the project area. Two are comprehensive plans that would involve expansion and development of city limits to the project area.

[177] Minnesota Rule 4410.0200, subp. 11a.

Table 18 Foreseeable Future Projects

Project	Location	Description
County State Aid Highway 10 Roadway Realignment Project[178]	CSAH 10	Realign and widen CSAH 10 to a four-lane highway from CSAH 11 to CSAH 43W.
Land Development[179]	Southeast Victoria, near Guernsey Avenue and the railroad	The city of Victoria has a comprehensive plan to develop the area along Guernsey Avenue into industrial and commercial zones.
Land Development[180]	Northwest Carver (future), near Guernsey Avenue and Big Woods Boulevard	The city of Carver has a comprehensive plan to develop the area along Guernsey Avenue into commercial and mixed zones.

When considering cumulative potential effects, the development of the local cities, along with the highway realignment, the area is going to see a large amount of development in the future. The addition of a transmission line would be small in comparison but would incrementally add to the planned development.

Human Settlement

Cumulative potential effects on human settlements during construction are anticipated to be minimal. Future projects will result in long-term aesthetic impacts. Most will occur in rural areas and transform them into developed area. These projects are expected to benefit local economies. The development of the rural areas might positively or negatively affect property values and cause additional impacts to aesthetics and rural character.

Public Health and Safety

Cumulative potential effects to public health and safety are expected to be positive. Several 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.

Land Based Economies

Cumulative potential effects on land-based economies are anticipated to be moderate. Most projects will transform agricultural land into developed land.

[178] Carver County, *2040 Comprehensive Plan*, (n.d.), https://www.carvercountymn.gov/home/showdocument?id=14307.
[179] City of Victoria, *Our Victoria Tomorrow*, (August 2019), https://cms3.revize.com/revize/victoriamn/documents/Development/Development%20Services/Comprehensive%20Plan/Our%20Victoria%20Tomorrow_10.27.21%20Update_202111091659521894.pdf.
[180] City of Carver, *Future Land Use*, (August 2018), https://www.cityofcarver.com/DocumentCenter/View/3272/2040-Land-Use-Map.

Natural Environmental

Cumulative potential effects on the natural environment are anticipated to be moderate. The projects are in rural areas that will expand development and ROW for the highway.

Rare and Unique Natural Resources

Cumulative potential effects on rare and unique natural resources are anticipated to be minimal to moderate. Projects might impact rare and unique resources during construction and operation. They may also benefit rare and unique natural resources given the inclusion of environmental consideration in the expansion of development.

Chapter 7 Application of Routing Factors

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.

The Minnesota Legislature has directed the Commission to select HVTL routes that minimize adverse human and environmental impacts while insuring continuing electric power system reliability and integrity. 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.[181]

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.

Some factors are described in just a few words, for example, effects on archaeological and historic resources. 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.

[181] Minnesota Statute 216E.02, subd. 1.

It is assumed that all routing options maximize energy efficiencies and accommodate expansion of transmission capacity (**Factor G**). **Factor I** (use of existing large electric power generating plant sites) does not apply to HVTLs. **Factor M** (unavoidable impacts) and **Factor N** (irreversible and irretrievable resource commitments) were discussed in Chapter 6. Other factors are ranked as follows:

●	Route alternative is consistent with the routing factor OR Impacts are anticipated to be negligible to minimal
○	Route alternative is consistent with routing factor but less so than the other options OR Impacts are anticipated to be minimal but the potential for impacts is greater than the other options or require special permit conditions OR Impacts are anticipated to be moderate
⊘	Route alternative is not consistent with routing factor or consistent only in part OR Impacts might be moderate but the potential for impacts is greater than the other options or require special permit conditions OR Impacts are anticipated to be significant

Analysis

This analysis applies the routing factors to the Applicants' Proposed Route and discusses the relative merits of the Routes A, B, and C and Alignment Alternative D.

Graphics (described above) are used to illustrate the application of the routing factors outlined in Minnesota Rule 7850.4100 to the Applicants' Proposed Route. These same graphics are used to explain the distinct impacts associated with the different routing options. A discussion highlighting differences follows **Table 19**.

Table 19 Application of Routing Factors/Relative Merits of Routing Options

Element	Application of Routing Factor	Relative Merits of Routing Factor			
	Applicants' Proposed Route	Route Alternative A	Route Alternative B	Route Alternative C	Alignment Alternative D
Factor A Human Settlement					
Aesthetics	●	●	●	●	○
Displacement	●	●	●	●	●
Cultural Values	●	●	●	●	●
Electric Interference	●	●	●	●	●
Environmental Justice	●	●	●	●	●

Element	Application of Routing Factor	Relative Merits of Routing Factor			
	Applicants' Proposed Route	Route Alternative A	Route Alternative B	Route Alternative C	Alignment Alternative D
Floodplains	●	●	●	●	●
Land Use and Zoning	○	○	●	○	○
Noise	●	●	●	●	●
Property Values	○	○	○	○	○
Recreation	●	●	●	●	●
Socioeconomics	●	●	●	●	●
Factor A Public Services					
Airports	●	●	●	●	●
Roads and Highways	●	●	●	●	●
Utilities	●	●	●	●	●
Factor B Public Safety					
EMF	●	●	●	●	●
Emergency Services	●	●	●	●	●
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	●	●	●	●	●
Factor E Natural Resources					
Air Quality	●	●	●	●	●
Climate Change	●	●	●	●	●

Element	Application of Routing Factor	Relative Merits of Routing Factor			
	Applicants' Proposed Route	Route Alternative A	Route Alternative B	Route Alternative C	Alignment Alternative D
Geology	●	●	●	●	●
Groundwater	●	●	●	●	●
Soils	●	●	●	●	●
Surface Water	●	●	●	●	●
Topography	●	●	●	●	●
Vegetation	○	●	●	●	●
Wetlands	●	○	●	○	○
Wildlife and Habitat	●	●	●	●	●
Factor F Rare and Unique Resources					
—	●	●	●	●	●
Factor H Paralleling Existing ROW					
—	○	●	●	●	⊘
Factor J Use of Existing Infrastructure					
—	○	●	●	●	⊘
Factor K Reliability					
—	●	●	○	●	●
Factor L Cost					
—	●	●	●	●	●

Discussion

The following summarizes potential impacts to resource elements that are anticipated to vary across routing options, or those resource elements not previously discussed.

Aesthetics

Among the route alternatives, Route Alternative C is near the fewest residences. Route Alternatives A, B, and C utilize more existing ROW than the Applicants' Proposed Route. On whole, Route Alternative C best minimizes aesthetic impacts. Alignment Alternative D is near fewer residences; however, the Applicant's Proposed Route in this area best utilizes existing ROW.

Cultural Values

For all routes, cultural values are expected to have a minimal to negative impact.

Land Use and Zoning

The Applicants' Proposed Route and Route Alternatives A and C will have minimal impacts to zoning due to the encroachment of land use from the adjacent cities of Carver and Victoria. Route Alternative A will also impact the future development of CSAH 10, as it will be widened in the next five to ten years. Route Alternative B has no known impacts to zoning.

Agriculture

Impacts to agriculture are expected to be minimal for all routing options; the Applicants' Proposed Route and Alignment Alternative D will span the most farmland.

Surface Waters

There is greater potential for indirect impacts to surface waters along the Route Alternative C and Alignment Alternative D.

Vegetation

Morte than double the tree clearing would be necessary along the Applicants' Proposed Route as opposed to the other routes.

Wetlands

Route Alternatives A and C and Alignment Alternative D have the most potential to impact wetlands as these routing alternatives pass through the greatest amount of wetlands

Paralleling

The Applicants' Proposed Route uses nearly half of the existing ROW compared to the Alternative Routes A, B and C. Alignment Alternative D doesn't utilize any existing ROW.

Use of existing infrastructures

The Applicants' Proposed Route is built along roads for nearly half of the length compared to the Alternative Routes A, B and C, which border roads or an existing HVTL for approximately 95% of the length. Alignment Alternative D doesn't utilize any existing infrastructure.

Reliability

Because all routing alternatives will be constructed and operated to the same standards, the reliability of each individual alternative is anticipated to be the same. Analysis of the reliability of the local electrical grid as a result of the project, conducted by the Applicants, concludes that local reliability is roughly the same for the Applicants' Proposed Route and Route Alternatives A and C (**Appendix C**). The Applicants indicate that use of Route Alternative B would make the local electrical grid relatively less reliable.

Costs

The Applicants' Proposed Route would cost roughly $18 million. Route Alternative A would increase the cost by approximately 2 %, Route Alternative B would decrease the cost by approximately 13%, and Route Alternative would increase the cost by approximately 7%. Alignment Alternative D would decrease the cost by 1.5%.

Chapter 8 Sources

Adams, R., Pollution Sensitivity of Near-Surface Materials, (June 2016), https://www.leg.state.mn.us/docs/2017/other/170839.pdf

Avian Power Line Interaction Committee, Edison Electric Institute, and California Energy Commission, *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*, (2006), https://www.nrc.gov/docs/ML1224/ML12243A391.pdf

Avian Power Line Interaction Committee, Edison Electric Institute, and Raptor Research Foundation, *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996*, (1996), https://law.resource.org/pub/us/cfr/ibr/002/aplic.raptor.1996.pdf

Carver County, *2040 Comprehensive Plan*, (n.d.), https://www.carvercountymn.gov/home/showdocument?id=14307

Center for Hearing and Communication, *Common Environmental Noises*, (n.d.), http://chchearing.org/noise/common-environmental-noise-levels/

Chalmers, James, *Transmission Line Impacts on Rural Property Values*, (2012), https://eweb.irwaonline.org/eweb/upload/web_mayjune12_Transmission.pdf

Chalmers, James, *High Voltage Transmission Lines and Residential Property Values in New England PowerPoint Presentation*, (October 30, 2019), https://www.nhmunicipal.org/sites/default/files/uploads/Annual_Conference/2019/Sessions/Wednesday/market_effects_of_utility_rows_presentation-1045am.pdf

Chalmers, James and Voorvaart, Frank, *High-Voltage Transmission Lines: Proximity, Visibility, and Encumbrance Effects*, (2009), http://www.atc-projects.com/wp-content/uploads/2012/11/Chalmers-Appraisal-Journal-Article-Q2-2009-HVTLs-Proximity-Visibility-Encumbrance-Effects.pdf

City of Carver, *Future Land Use*, (August 2018), https://www.cityofcarver.com/DocumentCenter/View/3272/2040-Land-Use-Map

City of Victoria, *Our Victoria Tomorrow*, (August 2019), https://cms3.revize.com/revize/victoriamn/documents/Development/Development%20Services/Comprehensive%20Plan/Our%20Victoria%20Tomorrow_10.27.21%20Update_202111091659521894.pdf

Electric Power Research Institute,

- *Transmission Lines and Property Values: State of the Science*, (November 2003), http://www.epri.com/abstracts/Pages/ProductAbstract.aspx?ProductId=000000000001005546
- *Susceptibility of Implanted Pacemakers and Defibrillators to Interference by Power-Frequency Electric and Magnetic Fields*, (1997), https://www.epri.com/research/products/tr-108893

Explore Minnesota, *2023 leisure and hospitality industry data*, (n.d.), https://mn.gov/tourism-industry/assets/2023%20MN%20L%26H%20Data_tcm1135-665060.pdf

Federal Highway Administration,

- *Techniques for Reviewing Noise Analyses and Associated Noise Reports, Figure 1-1*, (June 1, 2018), https://www.fhwa.dot.gov/Environment/noise/resources/
- *Noise: Construction Noise Handbook*, (August 24, 2017), https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm

Florida Department of State, *Rule 62-814.450 Electric and Magnetic Field Standards*, (June 1, 2008), 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/wp-content/uploads/import/documents/other/nesc_2017_brochure.pdf

Jackson, Thomas and Pitts, Jennifer, *The Effects of Electric Transmission Lines on Property Values: A Literature Review*, (2010), http://www.real-analytics.com/Transmission%20Lines%20Lit%20Review.pdf.

Kinnard, William and Dickey, Sue Ann, *A Primer on Proximity Impact Research: Residential Values Near High-Voltage Transmission Lines*, (April 1995), https://cre.org/real-estate-issues/primer-proximity-impact-research-residential-property-values-near-high-voltage-transmission-lines/

Maryland Department of Natural Resources, *Impacts of Power Generation and Transmission: Water Resources*, (n.d.), http://pprp.info/ceir17/HTML/Chapter4-2-2.html

Michigan Agricultural Electric Council, *Stray Voltage: Questions and Answers*, (October 2008), https://www.maec.msu.edu/application/files/4216/4555/7484/Stray_Voltage_Q__A.pdf

Minnesota Department of Administration, *Office of the State Archaeologist Portal*, (n.d.), https://osaportal.gisdata.mn.gov/

Minnesota Department of Agriculture,

- *Organic Farm Directory by County*, (n.d.), https://www.mda.state.mn.us/organic-farm-directory-county
- *Minnesota Noxious Weed List*, (n.d.), https://www.mda.state.mn.us/plants-insects/minnesota-noxious-weed-list

Minnesota Department of Health,

- *Wellhead Protection Area Delineation Fact Sheet*, (April 6, 2018), https://www.health.state.mn.us/communities/environment/water/docs/swp/delineation.pdf
- *Minnesota Well Index*, (n.d.), https://mnwellindex.web.health.state.mn.us/

Minnesota Department of Natural Resources,

- *Application for License to Cross Public Lands and Waters*, (June 13, 2015), http://files.dnr.state.mn.us/lands_minerals/utility/utility_crossing_application.pdf
- *Bald Eagles in Summer*, (n.d.), https://www.dnr.state.mn.us/birds/eagles/summer.html
- *Big Woods Subsection*, (n.d.), https://www.dnr.state.mn.us/ecs/222Mb/index.html

- *MBS Site Biodiversity Significance Ranks*, (n.d.), https://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html
- *Minnesota groundwater provinces 2021*, (n.d.), https://www.dnr.state.mn.us/groundwater/provinces/index.html
- *Minnesota's Wildlife Action Plan 2015 – 2025*, (2016), https://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/mnwap/wildlife-action-plan-2015-2025.pdf
- *Pollinator Best Management Practices*, (December 2014), https://files.dnr.state.mn.us/natural_resources/npc/2014_draft_pollinator_bmp_guidelines.pdf
- *Rare Species Guide*, (n.d.), https://www.dnr.state.mn.us/rsg/index.html
- *Requirements for Projects Involving Public Waters Work Permits*, (n.d.), https://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/requirements.html
- *Smoke Event of Jun 14, 2023*, (n.d.), https://www.dnr.state.mn.us/climate/journal/smoke-event-june-14-2023.html
- *Snakes and Lizards of Minnesota*, (2010), http://files.dnr.state.mn.us/natural_resources/animals/reptiles_amphibians/snake_lizard_mn.pdf
- *Status and Trends of Wetlands in Minnesota: Wetland Quantity Trends from 2006 to 2011*, (May 2013), https://files.dnr.state.mn.us/eco/wetlands/wstmp_trend_report_2006-2011.pdf
- *The Wildlife Action Network developed for the 2015-2025 MN Wildlife Action Plan*, (April 13, 2016), https://files.dnr.state.mn.us/assistance/nrplanning/bigpicture/mnwap/mndnr_wildlife_action_network_description.pdf
- Utility Crossing Licenses, (n.d.), https://www.dnr.state.mn.us/permits/utility_crossing/index.html
- *Wetlands*, (n.d.), https://www.dnr.state.mn.us/wetlands/index.html

Minnesota Department of Transportation,

- *Aggregate Source Information System*, (January 24, 2023), https://www.dot.state.mn.us/materials/asis_GE.html.
- *Land Management*, (n.d.), https://www.dot.state.mn.us/utility/forms.html
- *Minnesota Statewide Archaeological Predictive Model*, (n.d.), https://www.dot.state.mn.us/mnmodel/
- *MnDOT Policies*, (n.d.), http://www.dot.state.mn.us/policy/operations/op002.html
- *NWI Project FAQs*, (n.d.), https://www.dnr.state.mn.us/eco/wetlands/nwi_faq.html
- *Traffic Mapping Application*, (n.d.), https://www.dot.state.mn.us/traffic/data/tma.html

Minnesota Pollution Control Agency,

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

- *Annual AQI Days by Reporting Region*, (2024), https://data.pca.state.mn.us/views/Minnesotaairqualityindex/AQIExternal?%3Aembed=y&%3AisGuestRedirectFromVizportal=y
- *Basins and Major Watersheds in Minnesota*, (n.d.), https://www.pca.state.mn.us/sites/default/files/wq-ws1-01.pdf
- *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*, (November 19, 2015) https://www.pca.state.mn.us/business-with-us/construction-stormwater
- *Environmental Justice*, (n.d.), https://www.pca.state.mn.us/about-mpca/environmental-justice
- *Impaired Waters Viewer (IWAV)*, (2020), https://www.pca.state.mn.us/water/impaired-waters-viewer-iwav
- *Minnesota Watershed Information*, (n.d.), https://www.pca.state.mn.us/water/watersheds
- *Noise Pollution*, (n.d.), https://www.pca.state.mn.us/air/noise-pollution

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

National Cancer Institute, *Magnetic Field Exposure and Cancer*, (May 30, 2022), http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/magnetic-fields-fact-sheet

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*, (March 20, 2024) http://www.niehs.nih.gov/health/topics/agents/emf/index.cfm

Pinski, Sergio L. and Trohman, Richard G., *Interference in Implanted Cardiac Devices*, (2002), http://www.sarasotaanesthesia.com/reading/literature/Interference%20AICD%20Review%20Part%201.pdf

Pitts, Jennifer, and Jackson, Thomas, *Power Lines and Property Values Revisited*, (2007), https://www.researchgate.net/publication/316674821_Power_Lines_and_Property_Values_Revisited

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

Radio Reference, *Allied Radio Matrix for Emergency Response (ARMER)*, (March 22, 2025), https://www.radioreference.com/apps/db/?sid=3508

Roddewig, Richard and Brigden, Charles, *Power Lines and Property Prices*, (2014), https://cre.org/wp-content/uploads/2014/10/Real-Estate-Issues-Power-Lines-and-Property-Prices.pdf

United States Army Corps of Engineers

- *Section 404 of the Clean Water Act: How Wetlands are Defined and Identified*, (April 15, 2019), *http://www.epa.gov/cwa-404/section-404-clean-water-act-how-wetlands-are-defined-and-identified*

United States Department of Agriculture

- *2022 Census of Agriculture County Profile: Carver County*, (n.d.), https://www.nass.usda.gov/Publications/AgCensus/2022/Online_Resources/County_Profiles/Minnesota/cp27019.pdf
- *Census of Agriculture*, (2022), https://www.nass.usda.gov/AgCensus/
- *NRCS Field Office Technical Guide*, (March 2015), https://efotg.sc.egov.usda.gov/references/public/CO/5a_Prime_Farmland_Definition.pdf
- Soil Survey Division, *Soil Survey Manual (4th Ed.)*, (March 2017), https://www.nrcs.usda.gov/sites/default/files/2022-09/The-Soil-Survey-Manual.pdf

United States Bureau of Labor Statistics

- *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*, (2019), https://www.bls.gov/iif/oshwc/osh/case/cd_r1_2019.htm#iif_cd_r1p.f.2
- *TABLE A-1. Fatal occupational injuries by industry and event or exposure, all United States, 2019*, (2019), https://www.bls.gov/iif/oshwc/cfoi/cftb0331.htm#cfoi_at_a1.f.4
- *Graphics for Economic News Release: Fatal occupational injuries by event*, (2019), https://www.bls.gov/charts/census-of-fatal-occupational-injuries/fatal-occupational-injuries-by-event-drilldown.htm

United States Bureau of Reclamation, *Navajo Reservoir RMP/FEA, Appendix E Noise*, (June 2008), https://www.usbr.gov/uc/envdocs/ea/navajo/appdx-E.pdf

United States Environmental Protection Agency,

- *Compilation of Air Pollutant Emissions Factors: Western Surface Coal Mining,* (January 1995), https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors
- *Compilation of Air Pollutant Emissions Factors: Miscellaneous Sources*, (January 1995), https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors
- *Ground-Level Ozone Basics*, (April 28, 2021), https://www.epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics#effects
- *National Ambient Air Quality Standards (NAAQS) Table*, (December 20, 2016), https://www.epa.gov/criteria-air-pollutants/naaqs-table

- *Permit Program Under CWA Section 404*, (February 26, 2025), http://www.epa.gov/cwa-404/section-404-permit-program
- *Section 404 of the Clean Water Act: Section 404 Permit Program*, (June 17, 2020), https://www.epa.gov/cwa-404/section-404-permit-program

United States Fish and Wildlife Service

- *Environmental Conservation Online System*, (n.d.), https://ecos.fws.gov/ecp/species/758
- *Rusty Patched Bumble Bee*, (n.d.), https://www.fws.gov/species/rusty-patched-bumble-bee-bombus-affinis/map
- *Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat*, (January 14, 2016), https://www.federalregister.gov/documents/2016/01/14/2016-00617/endangered-and-threatened-wildlife-and-plants-4d-rule-for-the-northern-long-eared-bat

World Health Organization,

- *Radiation: Electromagnetic Fields, What are typical exposure levels at home and in the environment?*, (August 4, 2016), https://www.who.int/news-room/q-a-detail/radiation-electromagnetic-fields
- *Extremely Low Frequency Fields*, (2007), https://iris.who.int/bitstream/handle/10665/43646/9789241572385_eng.pdf?sequence=1

- Wisconsin Public Service Corporation*, Answers to Your Stray Voltage Questions: Backed by Research*, (2011), http://www.wisconsinpublicservice.com/business/pdf/farm_voltage.pdf