# GREAT RIVER ENERGY

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

## ELKO NEW MARKET
## AND
## CLEARY LAKE AREAS PROJECT

**115 KILOVOLT TRANSMISSION LINE REBUILDS**
**and**
**NEW 115 KILOVOLT TRANSMISSION LINE**

DOCKET NOS.
ET2/CN-12-1235
ET2/TL-12-1245

GREAT RIVER ENERGY
A Touchstone Energy Cooperative

**June 20, 2013**

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## LIST OF ACRONYMS

| ACRONYMS | |
|---|---|
| AC | Alternating Current |
| ACSR | Aluminum Conductor Steel Reinforced |
| ACSS | Aluminum Conductor Steel Supported |
| ALJ | Administrative Law Judge |
| BMPs | Best Management Practices |
| BPA | Bonneville Power Administration |
| CH | County Highway |
| CIP | Conservation Improvement Program |
| Commission | Minnesota Public Utilities Commission |
| CON | Certificate of Need |
| Corps | United States Army Corps of Engineers |
| CR | County Road |
| CSAH | County State Aid Highway |
| dBA | Decibel – A weighted |
| DC | Direct Current |
| DNR | Minnesota Department of Natural Resources |
| DSM | Demand Side Management |
| EA | Environmental Assessment |
| EF | Electric Fields |
| EFP | Energy Facility Permitting |
| ELF | Extremely Low Frequency |
| EMF | Electromagnetic Fields |
| EPA | United States Environmental Protection Agency |
| EQB | Minnesota Environmental Quality Board |
| G | Gauss |
| HVDC | High Voltage Direct Current |
| HVTL | High Voltage Transmission Line |
| ICNIRP | International Commission on Non-Ionizing Radiation Protection |
| IEEE | Institute of Electrical and Electronic Engineers |
| IMDs | Implantable Medical Devices |
| ITCM | ITC Midwest LLC |
| kV | Kilovolt |
| kV/m | Kilovolts Per Meter |
| kW | Kilowatt |
| LGUs | Local Governmental Units |
| LHVTL | Large High Voltage Transmission Line |
| mA rms | MilliAmperes Root Mean Square |
| MF | Magnetic Fields |
| mG | Milligauss |
| MHS | Minnesota Historical Society |
| MISO | Midcontinent Independent System Operator |
| MnDOT | Minnesota Department of Transportation |

| ACRONYMS | |
|---|---|
| MPCA | Minnesota Pollution Control Agency |
| MRO | Midwest Reliability Organization |
| MVEC | Minnesota Valley Electric Cooperative |
| MW | Megawatt |
| MWh | Megawatt hours |
| NAC | Noise Area Classifications |
| NERC | North American Electric Reliability Council |
| NESC | National Electrical Safety Code |
| NIEHS | National Institute of Environmental Health Sciences |
| NPAS | New Prague Area Study |
| NPDES | National Pollutant Discharge Elimination System |
| NRCS | Natural Resources Conservation Service |
| NRHP | National Register of Historic Places |
| NWI | National Wetlands Inventory |
| PWI | Public Waters Inventory |
| ROW | Right-of-Way |
| SHPO | State Historic Preservation Office |
| SMMPA | Southern Minnesota Municipal Power Agency |
| SNA | Scientific and Natural Area |
| SWCE | Steele-Waseca Cooperative Electric |
| SWPPP | Stormwater Pollution Prevention Plan |
| TSAS | Transmission System Assessment Study |
| USDA | United States Department of Agriculture |
| USFWS | United States Fish and Wildlife Service |
| WHO | World Health Organization |
| WMA | Wildlife Management Area |

# 1 SUMMARY OF THE APPLICATION

## 1.1 Introduction

Great River Energy (Applicant) is applying to the Minnesota Public Utilities Commission (Commission) for a Certificate of Need (CON) and a Route Permit to construct approximately 5.4 miles of new double circuit 115 kilovolt (kV) transmission line and to rebuild approximately 11.3 miles of existing 69 kV transmission line to 115 kV specifications in Scott and Rice counties, Minnesota (Project).

The Applicant proposes to rebuild the 115 kV lines along the same routes as the existing 69 kV lines and to construct the new double circuit 115 kV line between the existing Minnesota Valley Electric Cooperative (MVEC) New Market distribution substation in Scott County and the Veseli Breaker Station, owned by Northern States Power Company, doing business as Xcel Energy, in Rice County, Minnesota. The Applicant anticipates start of construction in spring 2015 and energization of the lines in summer 2016.

Great River Energy is a not-for-profit generation and transmission cooperative based in Maple Grove, Minnesota. Great River Energy provides electrical energy and related services to 28 member cooperatives, including MVEC and Steele-Waseca Cooperative Electric (SWCE), the distribution cooperatives serving the area proposed to be supplied by the new and rebuilt transmission lines (**Figure 1-1**). Great River Energy's distribution cooperatives, in turn, supply electricity and related services to more than 639,000 residential, commercial, and industrial customers in Minnesota and Wisconsin.

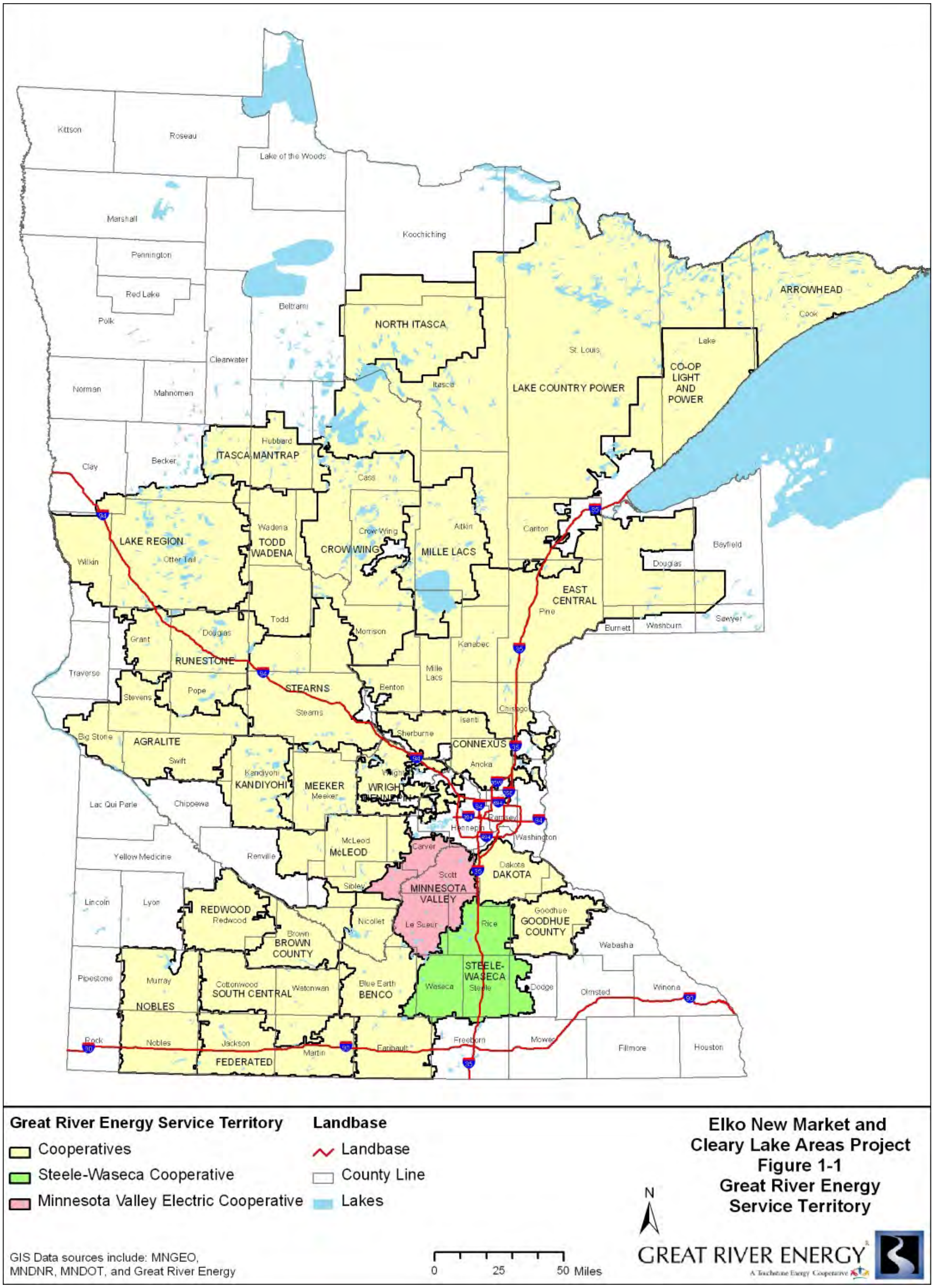
MVEC provides electricity and related services to over 35,000 residential, commercial and industrial customers in Minnesota. Nearly 19,000 residential, commercial and industrial members of this cooperative would benefit from the proposed high voltage transmission lines.

SWCE provides electricity and related services to nearly 10,000 residential, commercial and industrial customers in Minnesota. Approximately 1150 residential, commercial and industrial members of this cooperative would benefit from the proposed high voltage transmission lines.

Great River Energy's generation system includes a mix of baseload and peaking plants, including coal-fired, refuse-derived fuel, natural gas and oil plants as well as wind generators (a total of approximately 3,500 megawatts (MW)). Great River Energy owns approximately 4,600 miles of transmission line in Minnesota, North Dakota, South Dakota, and Wisconsin.

Great River Energy's transmission network is interconnected with the regional transmission grid to promote reliability and Great River Energy is a member of the Midwest Reliability Organization (MRO) and the Midcontinent Independent System Operator (MISO).

**Figure 1-1. Great River Energy Service Territory**



## 1.2 Project Contact

The contact for the Elko New Market and Cleary Lake Areas Project is:

Carole L. Schmidt
Great River Energy
Supervisor, Transmission Permitting and Compliance
12300 Elm Creek Blvd.
Maple Grove, MN 55369
763-445-5214
cschmidt@grenergy.com

## 1.3 Proposed Project

Great River Energy has studied the power service to the region and has determined that new 115 kV electrical facilities are needed to meet existing electric load and future electric load requirements. The corridor studied and the proposed routes are shown on **Figure 1-2**. The proposed plan to address low voltage and transmission system overloads in the area includes:

- Rebuild approximately 3.5 miles of the existing Great River Energy single circuit 69 kV "MV-PN" line to 115 kV standards from Prior Lake Junction south to Credit River Junction;

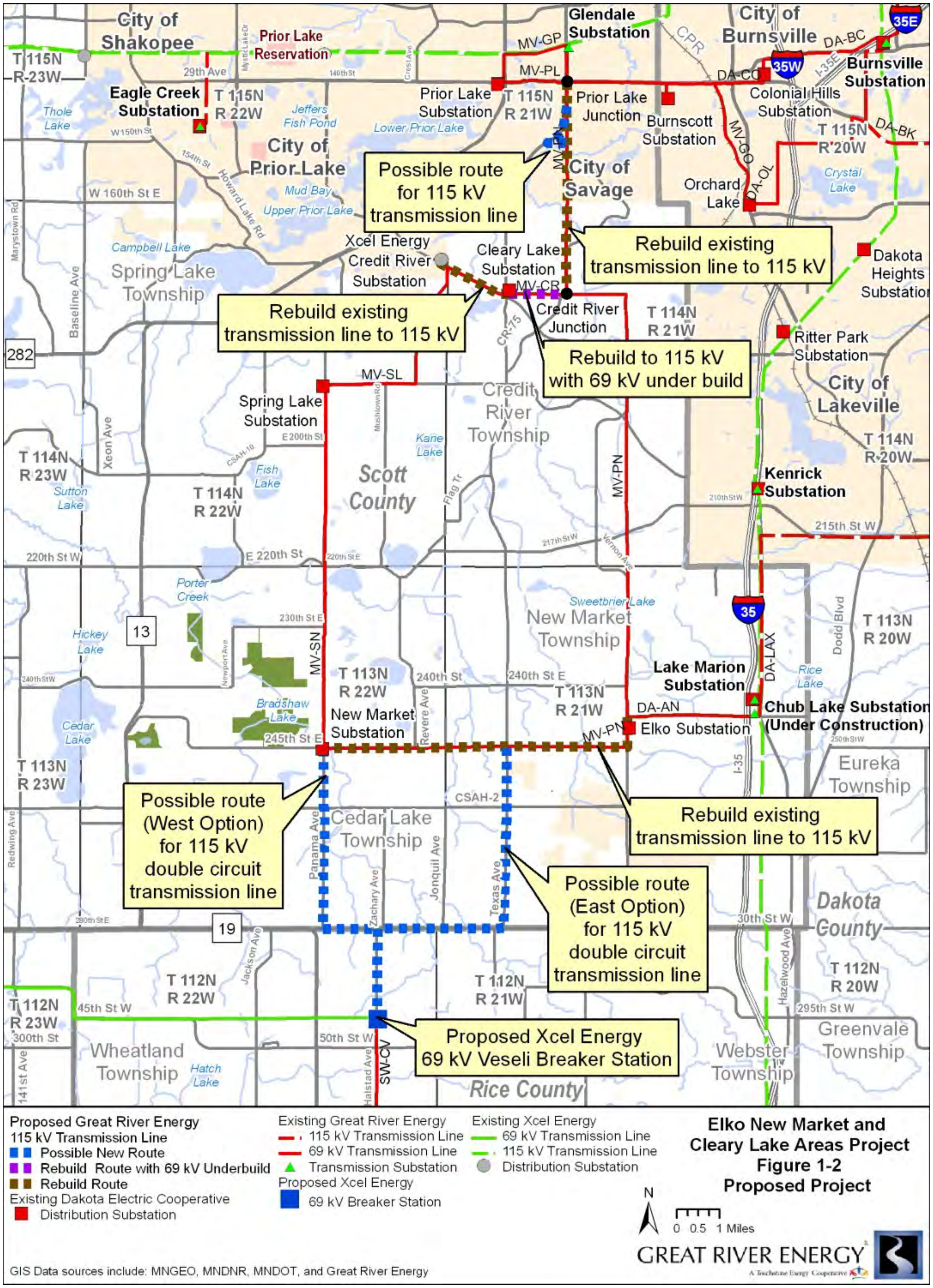
- Rebuild approximately 0.9 mile of the existing Great River Energy single circuit 69 kV "MV-CR" line to single circuit 115 kV standards with 69 kV underbuild from Credit River Junction west to MVEC's Cleary Lake Substation;

- Rebuild approximately 1.3 miles of the existing Great River Energy single circuit 69 kV MV-CR line to 115 kV standards northwest from MVEC's Cleary Lake Substation to Xcel Energy's Credit River Substation;

- Rebuild approximately 5.6 miles of the existing Great River Energy single circuit 69 kV MV-PN (north of Elko Substation to New Market Substation). line to 115 kV standards (from intersection of County Road 62 and Natchez Avenue, south along Natchez to 250th Street, then west to Panama Avenue); and

- Construct approximately 5.4 miles of new double circuit transmission line from the MV-PN line to Xcel Energy's Veseli 69 kV breaker station.

**Figure 1-2. Proposed Project**



When initially proposed during open house meetings, the Project included permitting two miles of 69 kV double circuit transmission line to operate at 115 kV along County Road (CR) 62. This existing line, the "DA-AN" line, was initially proposed to be constructed on quadruple circuit 345 kV/345 kV/115 kV/115 kV structures to be installed as part of the Brookings County to Hampton 345 kV Transmission Project (Docket No. ET2/TL-08-1474). The Commission approved an alignment north of CR 62 that would not use the quadruple circuit structures along CR 62. As a result of this decision by the Commission, planning engineers reviewed detailed as-built information for the DA-AN line and determined that the existing 69 kV double circuit transmission line could operate until 2022 without experiencing the overload concerns identified elsewhere on the Cleary-Elko System. The DA-AN rebuild is therefore not proposed as part of the Project.

The existing and proposed transmission lines are located in Scott and Rice counties, Minnesota. Single-pole wood structures with horizontal post insulators will be used for most of the new and rebuilt transmission lines. Laminated wood poles or steel poles may be required in some locations (angle poles or areas where soil conditions are poor and guying is not practical). Typical pole heights will range from 52 to 92 feet above ground and spans between poles will range from 250 to 400 feet. Some segments of the transmission lines will carry distribution line underbuild.

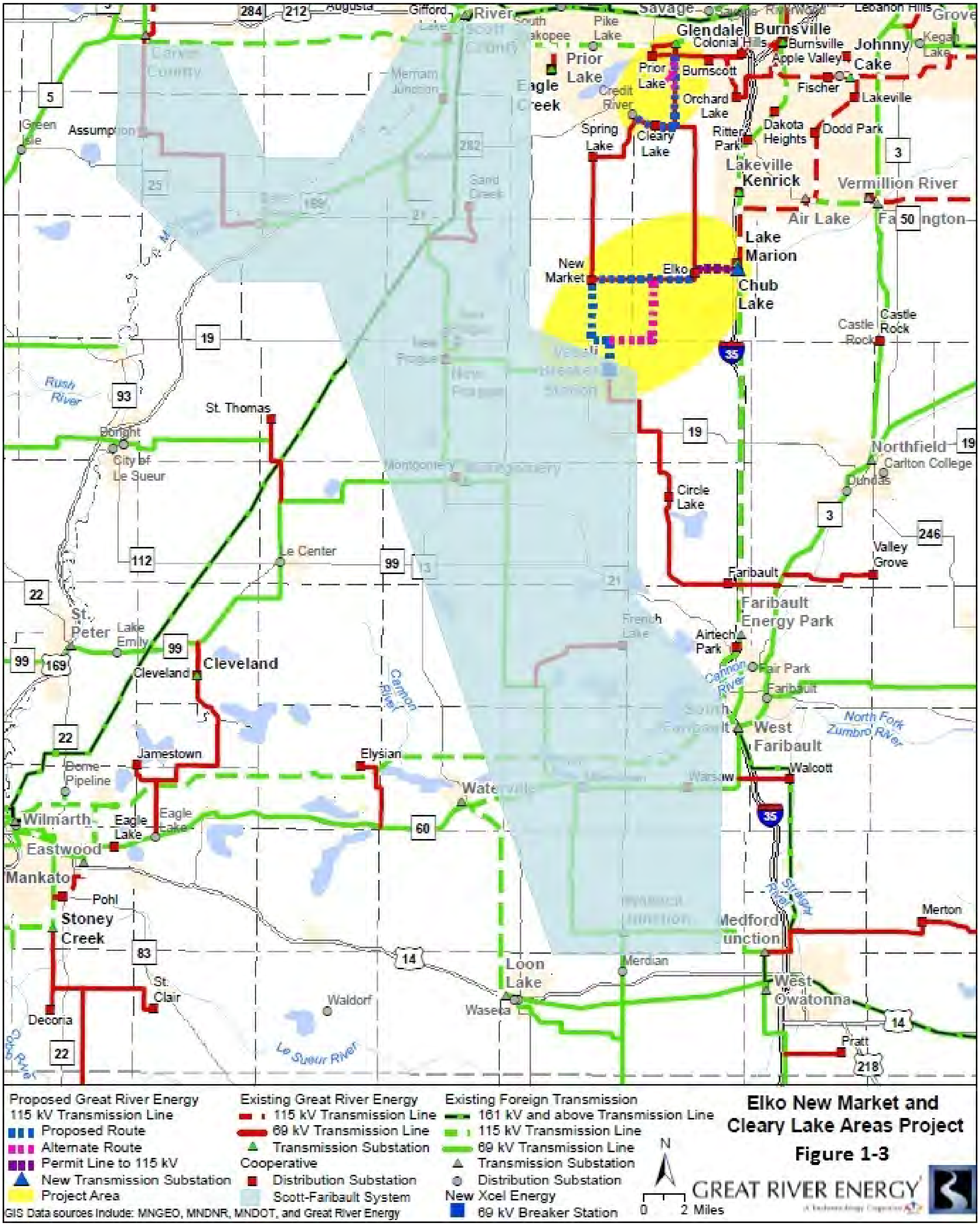
The Applicant proposes that the majority of the rebuilt lines would follow the alignment of the existing 69 kV lines. An offset from existing pole locations may be required in some areas. The necessary easement width is 35 feet on each side of the transmission centerline; however, in areas where the line follows an existing distribution line or roadway, the easement may overlap with existing easements and/or the road right-of-way. If the existing 69 kV MV-PN right-of-way in the City of Savage is selected for the Project, Great River Energy may rebuild the transmission facilities within the existing right-of-way, but may seek to acquire additional land rights where feasible. Great River Energy has existing easements for the majority of the 69 kV lines and anticipates that only minimal additional property will be required for the rebuild portions of the Project. Great River Energy may enter into new easements or amendments of the existing easements with landowners to update the language to reflect typical provisions included in today's easements. Great River Energy will acquire easements for the new double circuit 115 kV transmission line between the New Market Substation and the Veseli Breaker Station.

The Project will cost approximately $ 14.8 million dollars.

## 1.4 Project Need and Purpose

The 69 kV transmission system to the west of the Project area, bounded by the Scott County, Carver County, Owatonna, and Faribault substations ("Scott-Faribault System") (**Figure 1-3**), is at risk of experiencing low voltage and transmission system overload issues at system peak conditions. The existing transmission system has reached its maximum peak load-serving capability and any switching procedure that may be initiated to alleviate or address low voltage or transmission line overload concerns will no longer be sufficient to address these concerns.

**Figure 1-3. Scott-Faribault System**



To provide sufficient support to the Scott-Faribault System, transmission planning engineers determined that connecting that system to the 69 kV transmission system in the Project area ("Cleary-Elko System") was the most efficient way to alleviate the identified transmission load-serving deficiencies on the Scott-Faribault System. The Cleary-Elko System, under contingency operation, currently experiences overload and low voltage issues and needs to be rebuilt. Connecting these two systems would require construction of a new double circuit line between the existing New Market Substation and the proposed 69 kV Veseli Breaker Station. The need to make improvements to the existing transmission system has been discussed in the Minnesota Biennial Transmission Projects Report since 2009 (Tracking Numbers 2009-TC-N5 for the Scott-Faribault System and 2009-TC-N2 for the Cleary-Elko System).

Further analysis determined that without any additional upgrades to the existing Cleary-Elko System, connecting this system to the Scott-Faribault System would result in increased overload conditions on the lines identified to be rebuilt as part of this Project. Although Great River Energy initially investigated rebuilding these lines at 69 kV during the 2013-2014 timeframe, Great River Energy determined that 115 kV operation of these facilities would be necessary within the standard transmission planning timeframe (2022 for the facilities located in the south portion ("Elko New Market") of the Project area and 2030 for the facilities located in the north portion ("Cleary Lake") of the Project area). Therefore, Great River Energy determined it was in the interest of the Company, the Company's cooperatives, and the cooperatives' ratepayers to construct the lines to 115 kV standards at this time.

The North American Electric Reliability Council (NERC), which develops standards for implementing secure and safe electrical delivery, mandates that certain levels of service be maintained to ensure that the transmission grid operates efficiently and reliably. In addition, electric utilities like Great River Energy are responsible for maintaining power quality at a level that prevents damage to all consumers' electrical equipment. Based on these mandates, transmission improvements are necessary to maintain the reliability and quality of electric service for this region.

## 1.5 Proposed Routes

The Applicant proposes to rebuild existing lines along the current alignments and to construct a new line (**Figure 1-2**) as described below. There is one possible deviation on the Cleary Lake Area Rebuild and two possible routes described for the new double circuit transmission line to the Veseli Breaker Station.

### 1.5.1 Cleary Lake Area Rebuild – MV-PN Line

Approximately 3.5 miles of the existing Great River Energy single circuit 69 kV MV-PN line will be rebuilt to 115 kV standards. This line begins at Prior Lake Junction, located in the southeast corner of the intersection of Eagan Drive (County State Aid Highway 42) and Dakota Avenue (County State Aid Highway 27), and runs south along County State Aid Highway (CSAH) 27 and the section line for about 1.0 mile. The transmission line leaves the highway and continues along the section line for approximately 1.75 miles until it meets up with a north/south portion of Murphy Lake Boulevard (CR 75) and then continues south on the section line approximately 0.75 mile to Credit River Junction, which is located approximately 350 feet east of Murphy Lake Boulevard on 175th Street East.

### 1.5.2 Cleary Lake Area Rebuild - MV-PN Line with Possible Deviation

On the very north end of the Project, a deviation of approximately 0.6 mile to the west of the existing Great River Energy MV-PN 69 kV line is a possible route because the existing Great River Energy easement in this area is only 60 feet wide (rather than the Great River Energy standard of 70 feet). There are a number of homes very close to the line and the terrain contains several ponds and a ravine that would make rebuilding the line somewhat difficult.

Beginning on the north side of Dufferin Drive, the line would run approximately 280 feet west to the east side of (CSAH) 27, then follow CSAH 27 in a southerly direction approximately 0.3 mile, then straight south approximately 0.1 mile along a property line, then east approximately 0.2 mile along another property line to the existing MV-PN line (**Figure 1-2**).

### 1.5.3 Cleary Lake Area Rebuild – MV-CR Line

Approximately 0.9 mile of the existing Great River Energy single circuit 69 kV MV-CR line will be rebuilt to single circuit 115 kV standards with 69 kV underbuild between Credit River Junction and the MVEC Cleary Lake Substation. From Credit River Junction, the line runs west on 175th Street East for about 0.5 mile and to the end of 175th St., and then west cross country for approximately 0.4 miles into the MVEC Cleary Lake Substation.

Approximately 1.3 miles of the existing Great River Energy single circuit 69 kV MV-CR line will be rebuilt to single circuit 115 kV standards between the MVEC Cleary Lake Substation and Xcel Energy's Credit River Substation. From the Cleary Lake Substation, the transmission line crosses over Texas Avenue (CSAH 27) and then runs northwest adjacent to Eagle Creek Avenue SE (CSAH 21) for 1.2 miles to just past the intersection of CSAH 21 and 170th Street East. The transmission line then runs straight north, for about 0.1 mile across Eagle Creek Ave. (CSAH 21) and Credit River Road SE, and into Xcel Energy's Credit River Substation, on the east side of Welcome Avenue SE.

### 1.5.4 Elko New Market Area Rebuild- MV-PN Line

Approximately 5.6 miles of the existing Great River Energy single circuit 69 kV MV-PN (north of Elko Substation to New Market Substation) transmission line will be rebuilt to 115 kV standards. From the intersection of County Road (CR) 62 (245th St. E) and County Highway 91 (Natchez Avenue), this line runs south along Natchez Avenue for approximately 0.6 miles, then turns and heads west for 5.0 miles along 250th St. E to the New Market Substation (owned by MVEC) at the intersection of 250th St. E and CSAH 23.

### 1.5.5 Elko New Market Area New Transmission Line

West Option (5.4 miles)

One possible route for the new double circuit transmission line (built to 115 kV standards) to the Veseli Breaker Station would run from the MVEC New Market Substation (at the intersection of 250th St. E and CSAH 23) south along CSAH 23 for 3.0 miles, then east along CSAH 86 for 0.9 mile, then south along Halstad Avenue for about 1.5 miles to the Xcel Energy Veseli Breaker Station.

East Option (6.5 miles)

A second possible route for the new double circuit transmission line (built to 115 kV standards) to the Veseli Breaker Station would run from the Great River Energy MV-PN 69 kV line (at the intersection of 250th Street and CSAH 27 (Texas Avenue)), south on CSAH 27 for 3.0 miles to CSAH 86, then west along CSAH 86 for 2.0 miles, then south along Halstad Avenue for 1.5 miles to the Xcel Energy Veseli Breaker Station.

## 1.6 Alternatives

Great River Energy considered several alternatives to the proposed Project, including: 1) a new local generation alternative; 2) various transmission solutions, including upgrading other existing facilities, different conductors, different voltage levels and different endpoints; and 3) a no-build alternative focusing on reactive power supply improvements and demand side management. Alternatives to the proposed Project are discussed further in **Chapter 6**.

## 1.7 Potential Environmental Effects

The Applicant analyzed the potential environmental effects from the proposed Project. No significant unavoidable impacts will result from upgrading the existing 69 kV lines to 115 kV specifications or from construction of the new double circuit 115 kV transmission line.

No homeowners will be displaced by the transmission line rebuilds or construction of the new transmission line. All agricultural land impacted during construction will be returned to its natural condition as nearly as possible and landowners will be compensated for any losses from construction. All water bodies will be protected during construction. The electric fields associated with the new line will be significantly less than the maximum levels permitted by state regulators. No stray voltage issues are anticipated to affect farm animals along the routes.

The Department of Commerce, Energy Facility Permitting (EFP) will prepare its own Environmental Assessment (EA) analyzing potential environmental impacts from the Project. The Certificate of Need process will require preparation of an Environmental Report. The Route Permit process will require preparation of an EA. The Department of Commerce may elect to prepare only an EA for the Project, which will meet all statutory and rule requirements of both the Environmental Report and EA.

## 1.8 Public Involvement

The Applicant held public open house informational meetings on January 15, 2013, at the Scott County Library (Elko New Market Branch) and on January 16, 2013, at the Prior Lake High School to provide information about the Project to the public. Approximately 85 members of the public, including governmental officials, attended the open houses.

Inquiries from the public included whether the transmission line will go through their property, tree removal, Project schedule, and compensation for easements. Three written statements have been received on the Project. One person asked us not to go forward with the Project, one person said they liked the inclusion of more than one possible route, and one person just gave their name and address. In addition, approximately five telephone calls have been received requesting information on the Project and possible line locations.

The Applicant mailed notice (an example letter is provided in **Appendix A)** of the Project and open houses to tribal (Mdewakanton Sioux Community) and local governmental units (LGUs) and extended an invitation by phone to meet prior to filing of the application. The Applicant subsequently met with several LGUs, including the City of Elko New Market, the City of Savage, Credit River Township, Wheatland Township, New Market Township, and Scott County to describe the Project and solicit input.

The need for the Project has been discussed in the Minnesota Biennial Transmission Projects Report since 2009 (Tracking Numbers 2009-TC-N2 and 2009-TC-N5).

The public will have an opportunity to review this application and submit comments to the Commission about the Project. A copy of the application will be available on the Commission eDockets webpage and on the Great River Energy webpage at: www.greatriverenergy.com. Additionally, a copy of this application will be available at the Elko New Market-Scott County, Prior Lake, Savage, and New Prague libraries for the public to review.

A scoping meeting will be held in the area by EFP within 60 days of acceptance of this application as complete to answer questions about the Project and to solicit public comments and suggestions for matters to examine during its environmental review. In a few months, assuming the Department of Commerce chooses to prepare an EA that includes all requirements of an Environmental Report, a public hearing will be held in the Project area after the EA is complete. At this hearing, members of the public will be given an opportunity to ask questions and submit comments. The Applicant will also present further evidence to support its need and route for the Project. Great River Energy anticipates that the Commission will hold a joint public hearing on both the Certificate of Need and the Route Permit pursuant to Minnesota Statutes Section 216B.243, subdivision 4.

Persons interested in receiving notices and other announcements about the Project Certificate of Need application can register their names and addresses with the Commission. Persons interested in having their name added to the Project Mailing List for the Route Permit can register electronically at: http://mn.gov/commerce/energyfacilities/#mailing or by contacting the EFP staff person responsible for the environmental review of the Project. Contact information is provided below.

| | |
|---|---|
| **Minnesota Public Utilities Commission** | **Department of Commerce, EFP** |
| Scott Ek, Staff Analyst | David Birkholz, Environmental Review Manager |
| 121 7th Place East, Suite 350 | 85 7th Place East, Suite 500 |
| St. Paul, MN 55101 | St. Paul, MN 55101 |
| 651.201.2255 | 651.296.2878 |
| 800.657.3792 | 800.657.3794 |
| scott.ek@state.mn.us | david.birkholz@state.mn.us |
| www.puc.state.mn.us | mn.gov/commerce/energyfacilities |

### 1.9 Conclusion

The Commission has established criteria in Minnesota Rule 7849.0120 to apply in determining whether a proposed high voltage transmission line is needed. An applicant for a Certificate of Need must show that the probable result of denying the request would be an adverse effect on the future adequacy and reliability of the system, there is not a more reasonable and prudent alternative, the proposed facility will provide benefits to society compatible with protecting the environment, and the project will comply with all applicable standards and regulations. The Applicant has demonstrated in the Application that Project's proposed new transmission and upgrades meet all the requirements required to obtain a Certificate of Need. The Project will provide a reliable, cost-effective power supply to customers in the area.

With regard to route selection for high voltage transmission lines, the applicable rules are found in Minnesota Rules Chapter 7850. This Project satisfies the criteria for a route permit: the transmission line conserves resources, minimizes environmental impacts, and minimizes effects on human settlement and land-based economies by the use of existing transmission line corridors and road corridors.

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# 2 GENERAL PROJECT INFORMATION

## 2.1 Certificate of Need Requirement

Minnesota Statutes Section 216B.243, subdivision 2, provides that "No large energy facility shall be sited or constructed in Minnesota without the issuance of a certificate of need by the [public utilities] commission pursuant to sections 216C.05 to 216C.30 and this section and consistent with the criteria for assessment of need." A large energy facility is defined in Minnesota Statutes Section 216B.2421 subdivision 2(3) as, among other things, "any high-voltage transmission line with a capacity of 100 kilovolts or more with more than ten miles of its length in Minnesota."

The proposed 115 kV transmission lines will be located in Minnesota and will, in total, be approximately 17 miles long. Because the Project consists of a transmission line in excess of 100 kV and is more than ten miles in length, a CON is required. Great River Energy requests that the Commission approve the Project and grant Great River Energy the ability to increase the voltage of these lines to 115 kV when necessary to support demand without seeking additional approvals from the Commission, although notice of such increase in operating voltage would be provided to the Commission.

The Commission has adopted rules for the consideration of applications for certificates of need. Minn. R. Ch. 7849. On November 9, 2012, Great River Energy filed a Petition for Exemption under Minnesota Rule 7849.0200, subpart 6, requesting that the Applicant be exempt from certain filing requirements under Chapter 7849. The Commission approved the Petition in an order dated February 4, 2013 (Exemption Order). This Application contains the information required under Minnesota Rules Chapter 7849, as modified by the Commission in its Exemption Order. A copy of the Commission's Exemption Order is provided in **Appendix B**.

The CON application content requirements are provided in **Appendix C** with cross references indicating where information can be found in this Application.

## 2.2 Route Permit

Minnesota Statutes Section 216E.03, subdivision 2, provides that "[n]o [person] may construct a high voltage transmission line without a route permit from the commission." A high voltage transmission line (HVTL) is defined by Minnesota Statutes Section 216E.01, subdivision 4, as "a conductor of electric energy and associated facilities designed for and capable of operation at a nominal voltage of 100 kilovolts or more and is greater than 1,500 feet in length." Because the Project consists of transmission lines of 115 kV that are greater than 1,500 feet, a Route Permit is required.

The rules that apply to the review of Route Permit applications are found in Minnesota Rules Chapter 7850. Minnesota Rule 7850.1900, subparts 2 and 3, set forth the information that must be included in a Route Permit application.

Minnesota Statutes Section 216E.04, subdivision 2(3) provides for an Alternative Review Process for transmission lines between 100 and 200 kilovolts; therefore, this Project qualifies for alternative review. This Alternative Review Process is shorter than the process required for transmission lines over 200 kV. The Applicant notified the Commission on May 22, 2013, pursuant to Minnesota Rule 7850.2800, subpart 2 of its intent to utilize the Alternative Review Process and file its Route Permit Application under Minnesota Rules 7850.2800 to 7850.3900. A copy of the Applicants' notification letter is provided in **Appendix D**.

Under the Alternative Review Process, an applicant is not required to propose any alternative routes, but must disclose any other routes that were rejected by the applicant (Minn. Stat. § 216E.04, subd. 3.). Further, an Environmental Impact Statement is not required under the Alternative Review Process. Instead, the Department of Commerce is required to prepare an EA. Minn. Stat. § 216E.04, subd. 5. Unlike the full route permit process for higher voltage lines, which requires a formal contested case hearing, the Commission has discretion to determine what kind of public hearing to conduct. Minn. Stat. § 216E.04, subd. 6. In **Section 2.3** below, the procedures described are those required for the lower voltage lines under the Alternative Review Process.

The Route Permit application content requirements are provided in **Appendix E** with cross references indicating where information can be found in this Application.

## 2.3 Regulatory Process

As a result of legislation passed in 2005, the Commission has jurisdiction over both Certificates of Need and Route Permits. 2005 Minn. Laws ch. 97, art. 3, § 17. Minnesota Statutes. Section 216E.02, subdivision 2, states that "[t]he commission is hereby given the authority to provide for site and route selection for large electric power facilities." The legislature transferred these siting and routing responsibilities to the Commission to "ensure greater public participation in energy infrastructure approval proceedings and to better integrate and align state energy and environmental policy goals with economic decisions involving large energy infrastructure." 2005 Minn. Laws ch. 97, art. 3, § 17.

The Applicant chose to file for a CON and a Route Permit at the same time and in a single document. Because the preferred routes for the proposed transmission lines primarily follow existing transmission lines, it was efficient for the Applicant to compile the necessary information to request a Route Permit concurrently with the CON. Combining the applications was done at the request of EFP staff.

Combining the CON and the Route Permit proceedings into one proceeding is consistent with the goal of the Legislature to simplify public participation and to expedite agency review and decision-making. The Legislature provided in the 2005 Act transferring siting and routing authority to the Commission that "Unless the commission determines that a joint hearing on siting and need under this subdivision and section 216E.03, subdivision 6, is not feasible or more efficient or otherwise not in the public interest, a joint hearing under those subdivisions shall be held." Minn. Stat. § 216B.243, subd. 4 and Minn. R. 7849.1900, subp. 4. A joint hearing in this case is certainly feasible, it is definitely efficient, and it will promote the public interest.

The regulatory process described in this section, then, is the process that is followed to satisfy all the requirements under the CON rules (Chapter 7849) and all the requirements under the Route Permit rules (Chapter 7850). In the end, the Commission can make a decision on the need and authorize construction along a designated route in one proceeding.

The Commission's rules establish requirements that apply prior to the submission of a CON application. Minn. R. 7829.2550, subp. 1, requires the applicant for a high voltage transmission line CON to submit a proposed plan for providing notice three months prior to the filing of the application. In this matter, Great River Energy filed a proposed Notice Plan with the Commission on November 9, 2012. The proposed Notice Plan incorporated the notice requirements of the Commission's Certificate of Need rules (Minn. R. 7829.2550). The Commission approved the Notice Plan Petition on January 24, 2013, and issued its written Order on February 4, 2013. A copy of the Commission's Order is provided in **Appendix F.**

In accordance with Minnesota Statute Section 216E.04, subdivision 4, upon filing this CON and Route Permit Application, the Applicant will mail a notice of the filing to potentially affected landowners, to those persons who have registered their names with the Commission and expressed an interest in large energy projects, and to the area tribal government and several local units of government whose jurisdictions are reasonably likely to be affected by the proposed Project. Minn. Stat. § 216E.04, subd. 4; Minn. R. 7850.2100. In addition, the Applicant will publish notice in a number of local newspapers announcing the filing of this Application.

An electronic version of the Application will be available on eDockets in docket numbers 12-1235 and 12-1245. The Application will also be available on Great River Energy's transmission projects webpage (http://www.greatriverenergy.com/deliveringelectricity/currentprojects/) with a link to the Elko New Market and Cleary Lake transmission upgrade by clicking on either Scott or Rice counties on the map.

Upon submission of an application for a CON or a Route Permit, the Department of Commerce, EFP has the obligation to conduct environmental review of the Project. Minn. R. 7849.1200 and 7850.3700. In this matter, because the Applicant is applying for both a CON and a Route Permit, the environmental review will consider issues relating both to the need for the Project, including size, type, timing, voltage, and system configurations, and also to the proposed route, such as construction impacts, environmental features, and impacts on homeowners. EFP has the option to elect to combine the environmental review and prepare one document, an EA. Minn. R. 7849.1900. The Applicant believes that combining the environmental review into one document is appropriate and preferable in this matter – it is more expeditious, it will be easier for the public to follow, and it is consistent with legislative intent to combine the need and routing processes.

The process EFP must follow in preparing the EA is set forth in Minnesota Rule 7850.3700. This process requires EFP to schedule at least one scoping meeting in the area of the proposed Project. The purpose of the meeting is to advise the public of the Project and to solicit public input into the scope of the environmental review. The Applicant and EFP will both have representatives at the public meeting to answer questions and provide information for the public. The public meeting will be held within 60 days after the Application is accepted and deemed complete.

Once the public meeting has been held, EFP will issue a Scoping Decision describing the issues and alternatives that will be evaluated in the EA. EFP has four months from the time the Application is submitted to complete the environmental review and prepare the EA. Minn. R. 7849.1400, Subp. 9. Upon completion of the EA, EFP will publish notice in the *EQB Monitor*, a bi-weekly publication of the Environmental Quality Board (EQB) that can be accessed on the EQB webpage, www.eqb.state.mn.us/monitor.html, and will mail notice to persons who have registered their names with EFP to receive notices about this Project. Persons wishing to place their names on the mailing list for this Project can do so by contacting EFP directly (contact information on page 1-11) or electronically on the EFP webpage. A copy of the EA will be available through eDockets by searching the Project docket numbers.

After the EA is completed, the Commission will schedule a public hearing to again solicit public input and to create an administrative record. The Commission will select a person to preside at the hearing; it may be an administrative law judge (ALJ) from the Office of Administrative Hearings or another person acceptable to the Commission. The Commission will establish the procedures to be followed at the hearing. Minn. R. 7850.3800. The EA will become part of the record for consideration by the Commission. Interested persons will be notified of the date of the public hearing and will have an opportunity to participate in the proceeding. The hearing will likely be a joint hearing to consider both the CON and the Route Permit. Minn. R. 7849.1900 and 7850.3800.

Once the hearing is concluded, the ALJ will prepare a report based on the record and briefs filed by parties to the proceeding. After the ALJ issues the report, the matter will come to the Commission for a decision. At that time, the Commission may afford interested persons an opportunity to provide additional comments.

The Commission has one year from the time a CON Application is submitted to reach a final decision. Minn. Stat. § 216B.243, subd. 5. A route permit under the Alternative Permitting Process can be issued in six months after the Commission's determination that the Application is complete (Minn. Stat. § 216E.04, subd. 7); however, Minnesota Rule 7850.2700, Subpart 3 prohibits the Commission from making a final decision on a route permit until the CON is approved. Minn. Stat. § 216E.02, subd. 2.

The Applicant anticipates that a final decision on the Certificate of Need and the Route Permit for this Project can be made by summer 2014.

## 2.4 Public Participation

The Applicant held public open house informational meetings on the Project on January 15, 2013, at the Scott County Library (Elko New Market Branch) and on January 16, 2013, at the Prior Lake High School. Approximately 85 members of the public, including governmental officials, attended the open houses.

The meetings were publicized in several local papers approximately one week prior to the open houses, and landowners potentially impacted received a letter of invitation. Tribal and local government officials and resource agencies were also invited by letter. Minn. Stat. § 216E.03, subd. 3a. Large aerial maps of the proposed Project, photos of proposed transmission structures, fact sheets, information on the permitting process and need for the Project, right-of-way (ROW) information, and a post card for questions or comments were available at the open house.

Inquiries from the public included whether the transmission line will go through their property, tree removal, Project schedule, and compensation for easements. Three written statements have been received on the Project. One person asked us not to go forward with the Project, one person said they liked the inclusion of more than one possible route and, one person just gave their name and address. In addition, approximately five telephone calls have been received requesting information on the Project and possible line locations.

The need for the Project has also been discussed in the Minnesota Biennial Transmission Projects Report since 2009. The public participation process associated with the Biennial Transmission Projects Report provided the public and LGUs opportunities to offer comments and suggestions. In accordance with the Notice Plan, Great River Energy mailed 967 letters to landowners, residents, LGU officials, and State and Federal agencies on May 30, 2013. Great River Energy also published notice of the Project, in accordance with the Notice Plan in the Faribault Daily News & Northfield News, Belle Plaine Herald, Prior Lake American, Savage Pacer, and Star Tribune between May 25, 2013, and June 1, 2013.

## 2.5 Other Permits/Approvals

In addition to the CON and Route Permit sought in this Application, several other permits may be required for the Project depending on the actual routes selected and the conditions encountered during construction. These are the same kind of permits utilities have identified in other applications to the Commission for authorization to construct similar high voltage transmission lines and there is nothing unusual about the permits that may be required in this case. See the Tower and Badoura 115 kV Projects, MPUC Docket No. E015/TL-05-867, and the RDO 115 kV Project, MPUC Docket No. ET2/TL-06-468 for reference.

A list of the local, state and federal permits that might be required for this Project is provided in **Table 2-1**.

### 2.5.1 Local Approvals

The Applicant will work with local units of government to address any concerns related to the following possible approvals.

<u>Road Crossing/Right-of-Way Permits</u>

These permits may be required to cross or occupy county, township, and city road ROW.

**Table 2-1. List of Possible Permits**

| Permit | Jurisdiction |
|---|---|
| **Local Approvals** | |
| Road Crossing/ROW Permits | County, Township, City |
| Lands Permits, Building Permits | County, Township, City |
| Overwidth Loads Permits | County, Township, City |
| Driveway/Access Permits | County, Township, City |
| **Minnesota State Approvals** | |
| Endangered Species Consultation | Minnesota Department of Natural Resources – Ecological Services |
| Licenses to Cross Public Waters and Lands | Minnesota Department of Natural Resources – Lands and Minerals |
| Utility Permit | Minnesota Department of Transportation |
| Wetland Conservation Act | Board of Water and Soil Resources |
| National Pollutant Discharge Elimination System (NPDES) Permit | Minnesota Pollution Control Agency |
| **Federal Approvals** | |
| Section 10 Permit | US Army Corps of Engineers |
| Section 404 Permit | US Army Corps of Engineers |
| Permit to Cross Federal Aid Highway | Federal Highway Administration |
| United States Fish and Wildlife Service (USFWS) | Endangered Species Consultation |
| **Other Approvals** | |
| Crossing Permit | Other Utilities such as Pipelines |

Lands Permits

These permits may be required to occupy county, township, and city lands such as park lands, watershed districts, and other properties owned by these entities.

Building Permits

These permits may be required by the local jurisdictions for substation modifications and construction.

Over width/Loads Permits

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

Driveway/Access Permits

These permits may be required to construct access roads or driveways from county, township, or city roadways.

2.5.2 State of Minnesota Approvals

Endangered Species Consultation

The Minnesota Department of Natural Resources (DNR) Natural Heritage and Nongame Research Program collects, manages, and interprets information about nongame species. Consultation was requested from the DNR for the Project regarding rare and unique species. The Applicant will work with the DNR to identify any areas that may require marking transmission line shield wires and/or to use alternate structures to reduce the likelihood of avian collisions.

License to Cross Public Lands and Waters

The DNR Division of Lands and Minerals regulates utility crossings over, under, or across any State land or public water identified on the Public Waters and Wetlands Maps. A license to cross Public Waters is required under Minnesota Statutes Section 84.415 and Minnesota Rules Chapter 6135. The Proposed Project will require licenses for the up to six Public Waters crossed by the new and rebuilt transmission lines. The Applicant will file these license applications once the design of the transmission lines is complete and will acquire the licenses prior to construction.

Utility Permit

A permit from the Minnesota Department of Transportation (MnDOT) is required for construction, placement, or maintenance of utility lines that occur adjacent or across the highway ROW. The Applicant will file for this permit once the design of the transmission lines is complete and will acquire the permit prior to construction.

Wetland Conservation Act

The Minnesota Board of Water and Soil Resources administers the state Wetland Conservation Act, under Minnesota Rules Chapter 8420. The proposed Project may require a permit under these rules if permanent impacts to wetlands are anticipated to result from construction. The Applicant will apply for this permit (which is a joint application with the Section 404 permit) or for an exemption if applicable once the design of the transmission lines is complete.

NPDES Permit

A National Pollutant Discharge Elimination System (NPDES) permit from the Minnesota Pollution Control Agency (MPCA) is required for stormwater discharges associated with construction activities disturbing equal to or greater than one acre. A requirement of the permit is to develop and implement a stormwater pollution prevention plan (SWPPP), which includes Best Management Practices (BMPs) to minimize discharge of pollutants from the site. This permit will be acquired if construction of the transmission lines will cause a disturbance of greater than one acre.

### 2.5.3 Federal Approvals

Section 10 Permit

The US Army Corps of Engineers (Corps) regulates impacts to navigable waters of the United States. There are no rivers in the Project area that are classified by the Corps as navigable.

Section 404 Permit

A Section 404 permit is required from the Corps for discharges of dredged or fill material into waters of the United States. If impacts exceed the permitting threshold, the Applicant will apply for this permit once the design of the transmission lines is complete.

United States Fish and Wildlife Service (USFWS)

Review of the Project was requested from the USFWS regarding federally-listed species or critical habitat. The Applicant will work with the USFWS to identify any areas that may require marking transmission line shield wires and/or to use alternate structures to reduce the likelihood of avian collisions. Any eagle or other migratory bird nests discovered during survey of the line or in the land acquisition process will be reported to the USFWS and the Applicant will adhere to guidance provided.

### 2.5.4 Other Approvals

Northern Natural Gas Co. has a pipeline that crosses Zachary Avenue approximately 0.4 mile north of 280th Street. MinnCan has a gas pipeline that crosses Zachary Avenue at 270th Street and the same line parallels Panama Avenue for approximately 0.43 mile, beginning approximately 0.62 mile south of 260th Street. In the event the final, approved transmission line route crosses these pipelines, the Applicant will work with the pipeline companies to obtain crossing permits. Crossing permits will be required from any other utilities who own pipelines crossed by the transmission lines.

# 3 APPLICANT INFORMATION

## 3.1 Proposed Ownership

It is anticipated that Great River Energy will be the sole owner of the proposed 115 kV transmission lines proposed in this Application.

## 3.2 Organization and System Background

Great River Energy is a not-for-profit generation and transmission cooperative based in Maple Grove, Minnesota. Great River Energy provides electrical energy and related services to 28 member cooperatives, including MVEC and SWCE, the distribution cooperatives serving the areas that will benefit from the proposed Project. Great River Energy's distribution cooperatives, in turn, supply electricity and related services to more than 639,000 residential, commercial and industrial customers in Minnesota and Wisconsin.

Great River Energy and its cooperatives' mission is to provide safe, reliable, competitively priced energy to those they serve.

Great River Energy's generation system includes a mix of baseload and peaking plants, including coal-fired, refuse-derived fuel, natural gas and oil plants as well as wind generators (a total of approximately 3,500 MW). Great River Energy owns approximately 4,600 miles of transmission line in Minnesota, North Dakota, South Dakota, and Wisconsin.

MVEC provides electricity and related services to approximately 35,000 residential, commercial and industrial customers in Minnesota. Nearly 19,000 residential, commercial and industrial members from this cooperative would benefit from the proposed Project.

SWCE provides electricity and related services to nearly 10,000 residential, commercial and industrial customers in Minnesota. Approximately 1,150 residential, commercial and industrial members of this cooperative would benefit from the proposed high voltage transmission lines.

**Figure 1-1** shows Great River Energy's service territory and highlights the service areas of MVEC and SWCE.

Great River Energy's electric system is interconnected directly with neighboring suppliers. Great River Energy is a member of the MRO and MISO.

## 3.3 Existing Transmission System

There are two transmission systems that will benefit from the Project: the Scott-Faribault System and the Cleary Lake – Elko System (collectively, the "affected load area"). None of the distribution substations in the affected load area are served by 115 kV transmission lines. The existing transmission system serving the affected load area is comprised of several networks operated primarily at 69 kV (**Figure 3-1**), constructed mainly during the 1960s and 1970s. Many of the electric facilities in the area are shared facilities with other electric providers. Great River Energy as well as the other utilities has used these shared facilities to provide long-term benefit to the electric customers in the area.

### 3.3.1 The Scott-Faribault System 69 kV Network

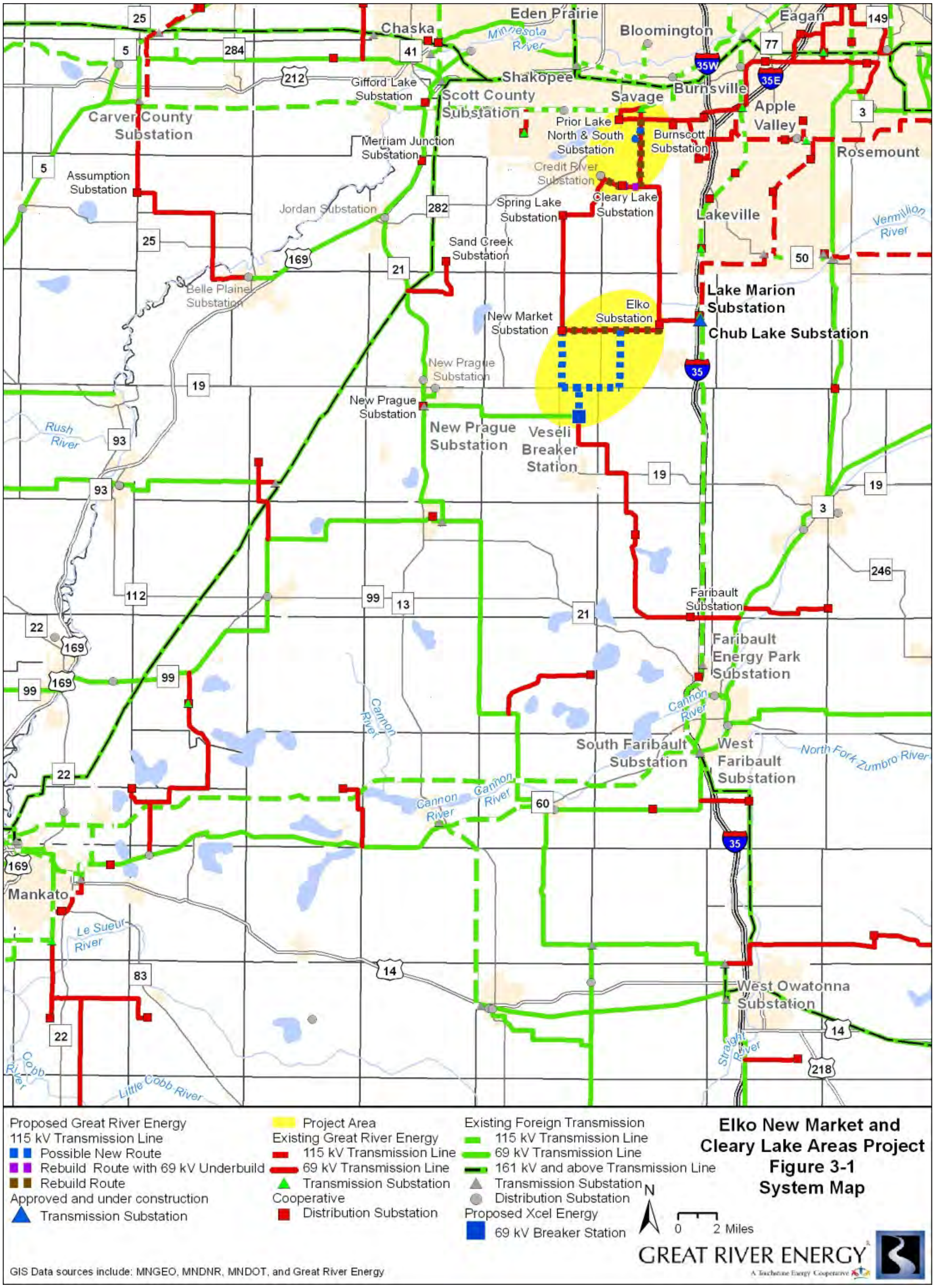
The 69 kV network that serves the Scott-Faribault System is served by several 69 kV substations in the area. The substations that support the affected load area are the 115 kV/69 kV Scott County Substation located near Young America, the 115 kV/69 kV Carver County Substation located west of Shakopee, the 115 kV/69 kV Loon Lake Substation located near Waseca, and the 161 kV/69 kV West Owatanna Substation located near Owatonna. Between these substations there are nearly 174 miles of 69 kV transmission lines.

In the Scott-Faribault System, the 69 kV transmission system serves a mix of loads including agricultural, residential, commercial, and industrial loads in the cities and towns in the affected load area through various distribution substations: Assumption, Belle Plaine, French Lake, Gifford Lake, Jordan, Merriam Junction, Montgomery, New Prague, Sand Creek, and Veseli. In addition to serving these loads, the transmission system provides contingency back-up service to Great River Energy member cooperative distribution substations such as Circle Lake, Faribault, and Montgomery.

In addition to many miles (174 miles) of 69 kV transmission lines serving the loads in the Scott-Faribault System, the conductors in the area are of high impedance and low current carrying capacity. Of the 174 miles of 69 kV transmission lines in the affected load area of the Scott-Faribault System, over 130 miles are 4/0A or smaller conductor. These characteristics contribute to significant power loss, voltage drop, and overload concerns in the transmission system. During contingencies, for example the loss of the Carver County 115/69 kV transformer, more power flows from other sources and increased amount of power flow is seen from the Loon Lake and West Owatanna substations to the Scott-Faribault System. As the power loss is proportional to the square of current, the power loss increases proportional to the square of the current. As the proposed Project introduces a new source in the middle of the Scott-Faribault System, power flow from the existing sources to the affected load area decreases. As a result the power loss decreases. The voltage drop causes low voltage concerns in the system. The proposed Project addresses the voltage drop concern as it introduces a new source to around the mid section of the Scott-Faribault System.

The 69 kV transmission lines in the Scott-Faribault System are owned by multiple electric companies. Great River Energy owns approximately 61 miles of these transmission lines. Xcel Energy owns approximately 43 miles of these transmission lines. ITC Midwest LLC (ITCM) owns approximately 62 miles of these transmission lines.

## Figure 3-1. System Map



### 3.3.2 The Cleary Lake-Elko System 69 kV Network

The 69 kV network that serves the Project area is served by several 69 kV substations in the area. The substations that support the Project area are the 115 kV/69 kV Glendale Substation to the north and the 115 kV/69 kV Lake Marion Substation to the south. Between these substations, the Cleary Lake-Elko System is made up of nearly 39 miles of 69 kV transmission lines.

In the Project area, the 69 kV transmission system serves a mix of loads including agricultural, residential, commercial, and industrial loads in the cities and towns of the affected load area in the Cleary Lake – Elko system. The distribution substations serving the affected load area in the Cleary Lake – Elko System includes Cleary Lake, Credit River, Spring Lake, New Market, and Elko. The inadequacies in the affected load area of the Cleary Lake – Elko system are both low voltage and transmission line overload concerns, which will be addressed when the proposed Project is in service.

The transmission lines in the Project area consist of 4/0A and 336A conductors. The Project area mostly consists of 4/0A conductor, which has relatively low capacity and high impedance when compared with the 336A conductor. These characteristics of the 4/0A conductor have been sources of low voltage and overload concerns to the transmission system. The proposed Project rebuilds a significant portion of the 4/0A conductor with 795ACSS conductor, which has a low impedance and high current carrying capability characteristics. This will address the low voltage problems due to voltage drop across the transmission line conductors, reduce power loss in the system due its low impedance characteristics and provide sufficient current carrying capability that addresses overload concerns in the system.

The existing 69 kV transmission network in the Project area is owned entirely by Great River Energy.

**Table 3-1** summarizes the conductor type, length, and rating of the existing 69 kV transmission lines in the affected load area.

**Table 3-1. Affected Load Area and Project Area Conductors**

| | Scott – Faribault System | | Cleary Lake – Elko System | |
|---|---|---|---|---|
| **Conductor Type** | **Length (in miles)** | **Rating (in MVA )** | **Length (in miles)** | **Rating (in MVA)** |
| **1/0A** | 22 | 31.6 | N/A | N/A |
| **2/0A** | 28 | 30.0 | N/A | N/A |
| **3/0A** | 13 | 36.0 | N/A | N/A |
| **4/0A** | 68 | 48.4 | 23 | 48.4 |
| **336 A** | 4 | 67.5 | 15 | 67.5 |
| **477A** | 9 | 85.0 | N/A | N/A |
| **795A** | 30 | 114.5 | N/A | N/A |
| **Total Length** | **174** | **N/A** | **38** | **N/A** |

# 4 PROPOSED PROJECT

## 4.1 Project Description

Great River Energy proposes to construct approximately 17 miles of 115 kV transmission lines (**Figure 4-1A** and **Figure 4-1B**). Of these 17 miles, approximately 11.3 miles will replace existing 69 kV lines (the MV-CR line and portions of the MV-PN line), and approximately 5.4 miles will be new double circuit 115 kV transmission line. The total length of the proposed Project is approximately 17 miles, located entirely in Minnesota, in Scott and Rice counties.

### 4.1.1 Transmission Lines

Great River Energy proposes to rebuild existing lines along current alignments, where possible, and construct a new double circuit transmission line as part of the Project.

There is one possible deviation on the Cleary Lake Area Rebuild and two possible routes (West Option and East Option) described for the new double circuit transmission line to the Veseli Breaker Station.

Detailed route maps (on aerial photo background) are included in **Appendix G**.

<u>Proposed Routes</u>

*Cleary Lake Area Rebuild- MV-PN Line*

Approximately 3.5 miles of the existing Great River Energy single circuit 69 kV MV-PN transmission line will be rebuilt to 115 kV standards (**Figure 4-1A**). This line begins at Prior Lake Junction, located in the southeast corner of the intersection of Eagan Drive (CSAH 42) and Dakota Avenue (CSAH 27), and runs south along the section line for about 1.0 mile. The transmission line leaves the highway and continues along the section line for approximately 1.75 miles until it meets up with a north/south portion of Murphy Lake Boulevard (CR 75) and then continues south on the section line approximately 0.75 mile to Credit River Junction, which is located approximately 350 feet east of Murphy Lake Boulevard on 175$^{th}$ Street East.

*Cleary Lake Area Existing MV-PN Line with Possible Deviation*

On the very north end of the Project, a deviation of approximately 0.6 mile to the west of the existing Great River Energy MV-PN 69 kV line is a possible route (**Figure 4-1A**) because the existing Great River Energy easement in this area is only 60 feet wide (rather than the Great River Energy standard of 70 feet), there are a number of homes very close to the line, and the terrain contains several ponds and a ravine that would make rebuilding the line somewhat difficult.

**Figure 4-1A. Proposed Project North - Cleary Lake Area**

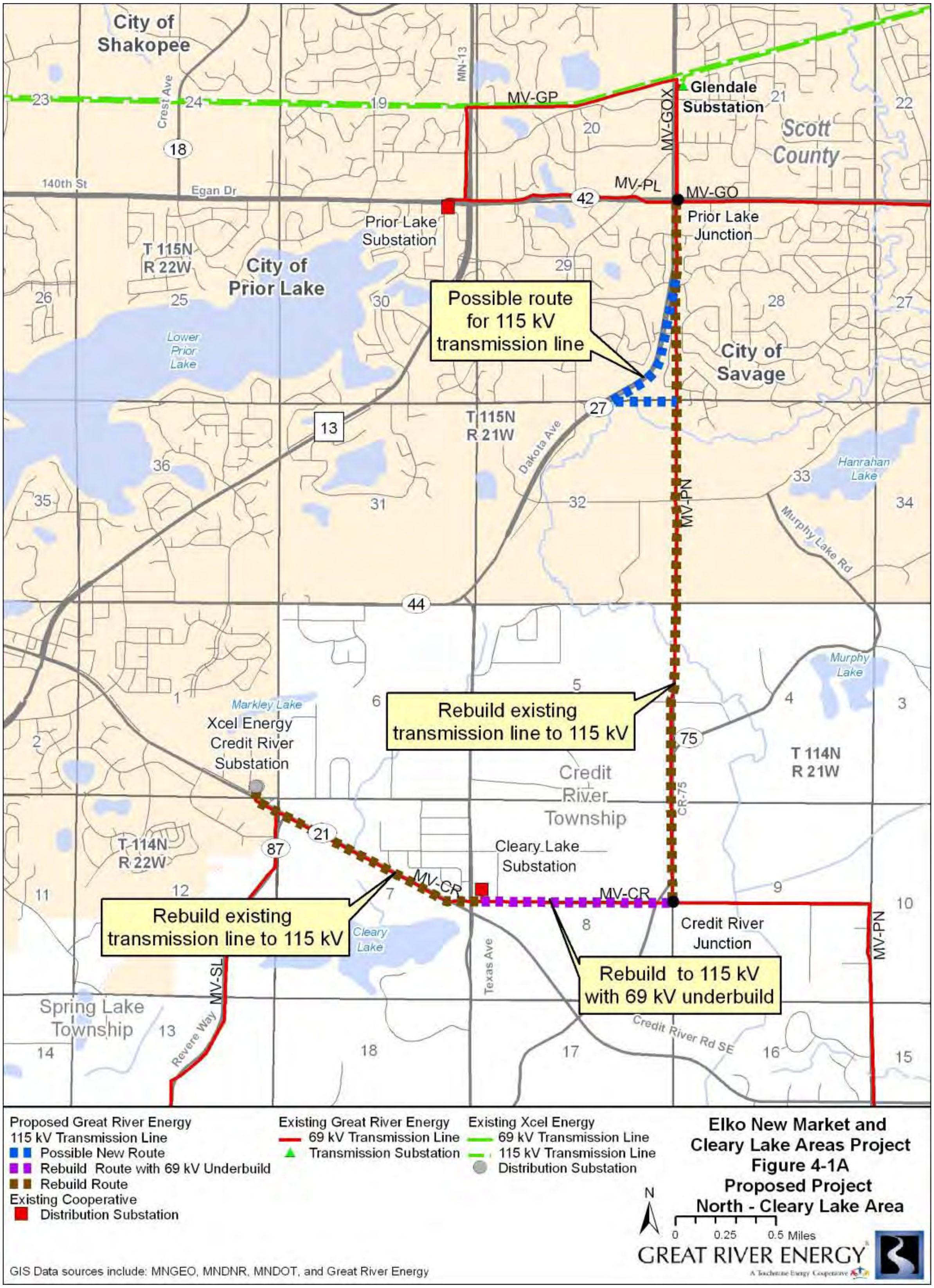
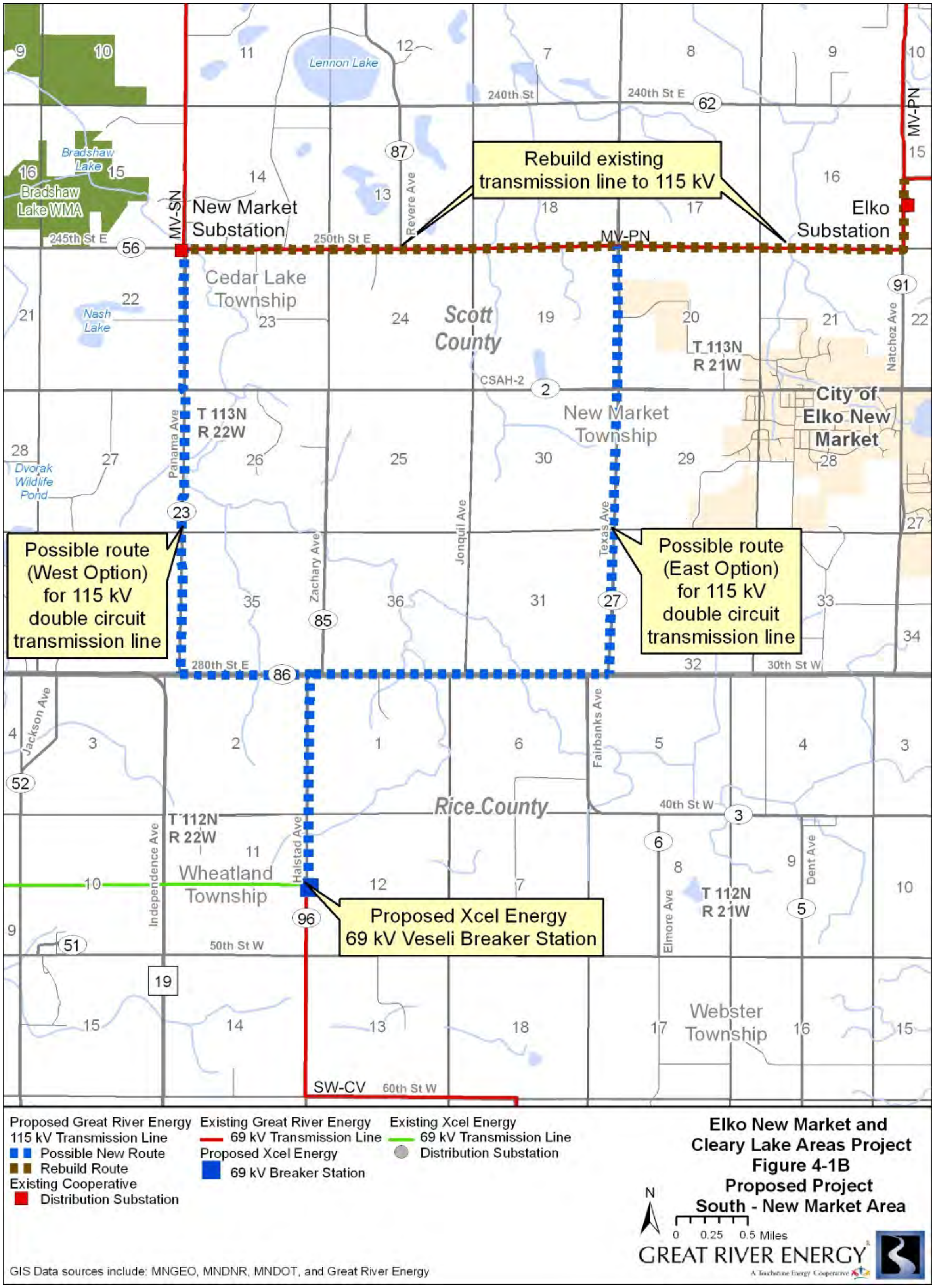


**Figure 4-1B. Proposed Project South – New Market Area**



Beginning on the north side of Dufferin Drive, the line would run approximately 280 feet west to the east side of CSAH 27, then follow CSAH 27 in a southerly direction approximately 0.3 mile, then straight south approximately 0.1 mile along an eastern property line, then east approximately 0.2 mile along a northern property line to the existing MV-PN line.

*Cleary Lake Area Rebuild- MV-CR Line*

Approximately 0.9 mile of the existing Great River Energy single circuit 69 kV MV-CR line will be rebuilt to single circuit 115 kV standards with 69 kV underbuild between Credit River Junction and the MVEC Cleary Lake Substation (**Figure 4-1A**). From Credit River Junction, the line runs west on 175$^{th}$ Street East for about 0.5 mile and to the end of 175$^{th}$ St., and then west cross country for approximately 0.4 miles into the MVEC Cleary Lake Substation.

Approximately 1.3 miles of the existing Great River Energy single circuit 69 kV MV-CR line will be rebuilt to single circuit 115 kV standards between the MVEC Cleary Lake Substation and Xcel Energy's Credit River Substation (**Figure 4-1A**). From the Cleary Lake Substation, the transmission line crosses over Texas Avenue (CSAH 27) and then runs northwest adjacent to Eagle Creek Avenue SE (CSAH 21) for 1.2 miles to just past the intersection of CSAH 21 and 170$^{th}$ Street East. The transmission line then runs straight north, for about 0.1 mile across Eagle Creek Avenue (CSAH 21) and Credit River Road SE, and into Xcel Energy's Credit River Substation, on the east side of Welcome Avenue SE.

*Elko New Market Area Rebuild – MV-PN Line*

Approximately 5.6 miles of the existing Great River Energy single circuit 69 kV MV-PN (north of Elko Substation to New Market Substation) transmission line will be rebuilt to 115 kV standards (**Figure 4-1B**). From the intersection of CR 62 (245$^{th}$ St. E) and County Highway 91 (Natchez Avenue), this line runs south along Natchez Avenue for approximately 0.6 miles, then turns and heads west for 5.0 miles along 250th St. E to the New Market Substation at the intersection of 250$^{th}$ St. E and CSAH 23.

*Elko New Market Area New Transmission Line*

***West Option (5.4 miles)***

One possible route for the new double circuit transmission line (built to 115 kV standards) to the Veseli Breaker Station would run from the Great River Energy New Market Substation (at the intersection of 250$^{th}$ St. E and CSAH 23) south along CSAH 23 for 3.0 miles, then east along CSAH 86 for 0.9 mile, then south along Halstad Avenue for 1.5 miles to the Xcel Energy Veseli Breaker Station (**Figure 4-1B**).

***East Option (6.5 miles)***

A second possible route for the new double circuit transmission line (built to 115 kV standards) to the Veseli Breaker Station would run from the Great River Energy MV-PN 69 kV line (at the intersection of 250$^{th}$ Street and CSAH 27 (Texas Avenue)), south on CSAH 27 for 3.0 miles to CSAH 86, then west along CSAH 86 for 2.0 miles, then south along Halstad Avenue for 1.5 miles to the Xcel Energy Veseli Breaker Station (**Figure 4-1B**).

Right-of-Way

The Applicant has worked closely with the local, state and federal agencies and landowners regarding the Project. Where Great River Energy is proposing to rebuild existing 69 kV transmission facilities, the ROW currently measures 28 to 70 feet in width. Before beginning construction, Great River Energy will acquire additional property rights for the ROW where necessary, typically through an easement that will be negotiated with the landowner for each parcel. For the portions of the Project that are being rebuilt, Great River Energy will not necessarily acquire additional property rights if it is determined that the 115 kV facilities can be operated within the existing ROW. Where Great River Energy is proposing new construction, a 70-foot wide permanent ROW (35 feet on each side of the transmission line centerline) will be acquired. A portion of the easement may overlap with existing distribution line easements, and/or where the line parallels a road, the road ROW.

Structures

The majority of the new 115 kV lines will consist of single pole wood structures spaced approximately 350 to 400 feet apart. For the single circuit (rebuild) portions of the Project the 115 kV spans will be longer than the existing 69 kV spans, therefore fewer poles will be required. Both single circuit and double circuit structures will typically range in height from 52 to 92 feet above ground, depending upon the terrain and environmental constraints (such as highway crossings, river and stream crossings, and required angle structures). The average diameter of the wood structures at ground level is 20 inches.

Sections of the existing lines have distribution underbuild, which would be attached to new 115 kV transmission line structures spaced 250 to 350 feet apart.

H-Frame design structures may be used in areas with rugged topography and where longer spans are required to avoid or minimize impacts to wetlands or waterways. Span lengths average 600 to 800 feet, with 1,000-foot spans possible with certain topography. Structure heights typically range from 52 to 75 feet above ground with taller structures required for exceptionally long spans and in circumstances requiring additional vertical clearance exceeding the National Electrical Safety Code (NESC) and other agency requirements.

Typical 115 kV structure types (single circuit, single circuit with 69 kV underbuild, single circuit with distribution underbuild, double circuit, braced post and H-Frame) are shown in **Figure 4-2** and **Figure 4-3**.

Conductors

The single circuit structures will have three single conductor phase wires and one shield wire, and the double circuit structures will have six single conductor phase wires and one shield wire.

It is anticipated that the phase wires will be 795 thousand circular mil aluminum conductor steel-supported (ACSS) with seven steel core strands and 26 outer aluminum strands on all of the 115 kV lines.

**Figure 4-2. Typical Transmission Structure Types**

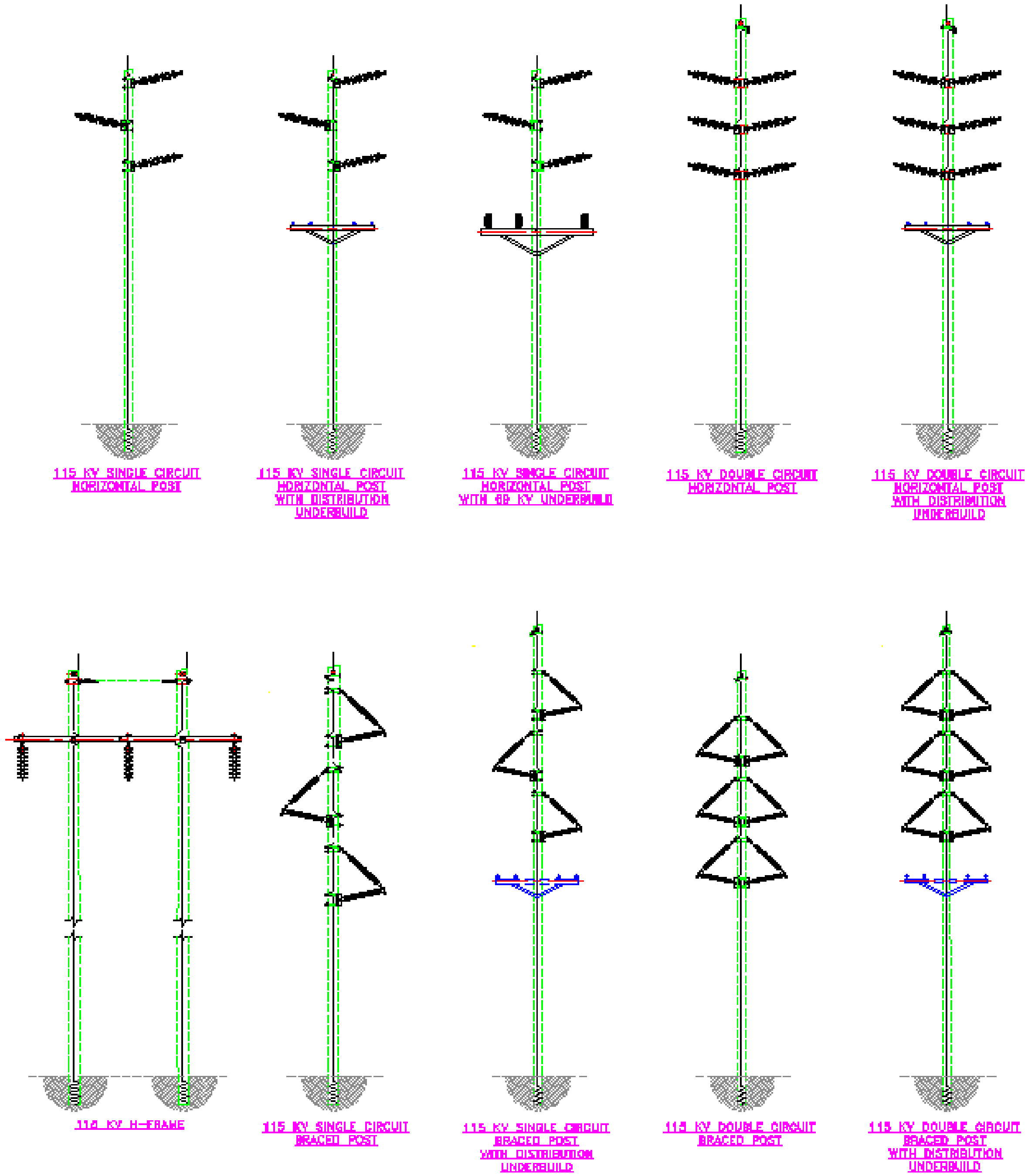


**Figure 4-3. Photos of Typical 115 kV Transmission Structures**

**Typical Single Circuit Structure with Distribution Underbuild**

**Typical Double Circuit 115 kV Structure**

**Typical H-Frame 115 kV Structure**

**Typical Braced Post 115 kV Structure**

The shield wire will be 0.528 optical ground wire for all transmission line segments.

Service Life

The service life of a transmission line is approximately 40 years, although based on experience, it is quite possible that the line and structures will last longer than 40 years.

Annual Availability

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

### 4.1.2 Associated Facilities

There are no associated facilities proposed as part of the Project.

## 4.2 Estimated Costs

Estimated costs for the proposed Project are divided into five phases. The tasks associated with each phase are outlined below and estimated costs for each phase are summarized in **Table 4-1**.

- Planning

  Siting and routing preliminary activities
  Project presentation to the public
  Certificate of Need and Route Permit development
  Establishing centerlines for survey

- Design

  Line and structure design
  Survey and probes/soil borings

- Procurement

  Cost of all construction materials, i.e. poles, conductor and hardware
  Easements, ROW and Environmental permits

- Construction

  Staking for clearing and construction
  ROW clearing and restoration
  All construction labor and heavy equipment

- Close Out

  Remaining ROW restoration activities
  Field verification surveys

Financial, engineering, and environmental close out activities

**Table 4-1. Estimated Project Costs (2014 Dollars)**

| Planning | Design | Procurement | Construction | Close Out | Total |
|---|---|---|---|---|---|
| $388,000 | $1,487,000 | $5,178,000 | $7,330,000 | $380,000 | **$14,763,000** |

All capital costs for the proposed transmission lines will be borne by Great River Energy.

#### 4.2.1 Transmission Line Construction Costs

Single pole construction costs are approximately $498,000 per mile. H-Frame construction costs are approximately $550,000 per mile and the double circuit construction costs are approximately $747,000 per mile.

There may be areas where construction is more difficult (e.g. where there are access issues or where greater span lengths must be employed to avoid sensitive features). In these areas the use of wooden mats, the Dura-Base Composite Mat System, or specialized construction vehicles to minimize environmental impacts during line construction may be required and could increase costs by $50,000 or more per mile.

#### 4.2.2 Operation and Maintenance Costs

The estimated annual cost of ROW maintenance and operation and maintenance of Great River Energy's transmission lines (69 kV to 500 kV) in Minnesota currently average about $2,000 per mile. Storm restoration, annual inspections and ordinary replacement costs are included in these annual operating and maintenance costs.

### 4.3 Effect on Rates

The Commission's rules require an applicant to provide the annual revenue requirements to recover the costs of a proposed project. The Commission's Order of February 4, 2013, granting exemptions allowed that effect on rates be described in the format as set forth below.

Great River Energy has submitted the New Market-Elko and Cleary Lake area projects for consideration as part of the MISO Midwest Transmission Expansion Plan 2013 (MTEP 13) process. The initial annual revenue requirement for these projects is estimated to be $2.3M. Assuming a 1 percent load growth in the NSP pricing zone from 2013-2016, the effect on the zonal rate for the NSP pricing zone is estimated to be $0.0233/kW-mo.

The MTEP 13 process will take much of 2013 to complete, with final approval by the MISO Board of Directors expected in December 2013. Any sharing of revenue requirements with other MISO members will not be known until that time. Any sharing of revenue requirements will help reduce transmission rates to the customers of both Great River Energy and other transmission providers in the affected load area.

The model for determining the impacts on ratepayers has changed due to implementation of MISO Attachment FF to the Transmission Energy Market Tariff (FERC Docket No. ER06-18), which now allocates and recovers costs associated with new transmission projects and system upgrades within the MISO system on a regional basis, using provisions developed by the Regional Expansion Criteria and Benefits Task Force. Where a project has been determined to be a Baseline Reliability Project below 345 kV but above 100 kV, its total cost is recovered through a "subregional" allocation based on an analysis of the line outage distribution factor impacts of the project.

## 4.4 Project Schedule

Provided the Applicant obtains a CON and a Route Permit by late summer 2014, the Applicant plans to commence construction of the Project in spring 2015 and complete it by spring 2016. The Applicant anticipates that construction will take a little over a year and that the entire Project will be energized in summer 2016.

## 4.5 Estimated Line Losses

When electrical energy is sent over a transmission line, some of it is lost through conversion into heat from the resistance in the conductor. The losses that occur are directly related to the square of the current flowing through the transmission line, the conductor size, and the length of the line. Additionally, transmission lines operated at higher voltages need less current to transfer the same amount of power than lower voltage lines. Therefore, the higher the operating voltage of a transmission network, the lower the amount of losses encountered for the same amount of power transferred, wire size, and line length. Also, because the current across a transmission line usually varies over time, losses are seldom constant from hour to hour, or from month to month.

Losses are a measure of the energy flow across the system that is converted into heat due to the resistance within the elements of the transmission system. It is necessary for utilities to provide enough generation to serve their respective system demands (plus reserves), taking into account the loss of the energy before it can be usefully consumed. By reducing and minimizing the amount of system losses, more efficient delivery of the electrical energy to the end user is achieved, which can help to defer the need to add more generation resources to a utility's portfolio. Therefore, system loss reduction results in monetary savings in the form of less fuel required to meet the system demand plus delayed capital investment in generating plant construction.

In determining the amount of losses associated with a particular project, it is not reasonable to consider only the project's transmission and calculate the losses directly from operation of that transmission. It is necessary to look at the total losses of the system that result with and without the proposed project. In its Exemption Order, the Commission authorized the Applicant to provide line loss data for the system as a whole, rather than line loss data specific to the individual transmission lines. In this case the Applicant considered a significantly larger area served by a number of utilities to determine the resulting effect of the Project's transmission upgrades.

Great River Energy calculated losses at peak demand based on the projected 2016 summer peak loadings, as this is when the Project is scheduled to be energized. The results are summarized in **Table 4-2**.

**Table 4-2. Summary of Line Losses**

| Scenario | System Losses (MW) |
|---|---|
| Existing System | 456.6 |
| System with Project Transmission | 453.8 |
| Difference | -2.8 |

**Table 4-2** shows that the Project's proposed transmission infrastructure reduces the losses on the electrical system. Under summer peak demand conditions, the losses incurred are 2.8 MW less when the Project is energized as compared to the existing system configuration.

Because demand for electric power is not constant and losses are related to the square of current flowing through the transmission lines in the electric system, the losses will change over time, increasing as demand increases and decreasing as demand decreases. Because losses change over time, there is no precise method to calculate average annual loss reductions. One common method is to use the loss savings at peak demand to estimate the average annual loss savings based on the following formulas[1]:

Loss Factor = (0.3 × Load Factor) + (0.7 × Load Factor²)

Annual Loss Savings (MWh) = (Loss Factor x Peak Loss Savings) x 8760 hours/year

The average load factor for the Project area is 45.3 percent. Using the method described above and the calculated loss savings at peak demand (given in **Table 4-2**), the Project will reduce average transmission losses by an estimated 6,854 megawatt hours (MWh) annually.

## 4.6 Construction Practices

Great River Energy intends to employ normal practices in construction of the new transmission line and rebuilding the existing transmission lines. No unusual or difficult features are expected along the routes. Construction practices to be followed are described in more detail in **Section 8.4**.

## 4.7 Operation and Maintenance Practices

Great River Energy will periodically use its transmission line ROW to perform inspections, maintain equipment, and repair damage. Regular maintenance and inspections will be performed

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

over the life of the facility to ensure a reliable system. Annual inspections will be done by foot, snowmobile, All-Terrain Vehicle, pickup truck, or by aerial means. These inspections will be limited to the acquired ROW and areas where obstructions or terrain require access off the easement. If problems are found during inspection, repairs will be performed and the landowners will be compensated for any losses incurred.

Great River Energy's Transmission Construction & Maintenance Department will conduct vegetation surveys and remove undesired vegetation that will interfere with the operation of the transmission lines. Frequency of vegetation maintenance is on a three to seven year cycle. ROW practices include a combination of mechanical and hand clearing, along with an application of herbicides where allowed.

## 4.8 Work Force Required

During construction, there will be minimal positive impacts to community services, hotels and restaurants to support the utility personnel and contractors. It is estimated that 15 to 20 workers will be employed during construction of the Project.

It is not expected that additional permanent jobs would be created by this Project. The construction activities would provide seasonal influx of additional revenue into the communities during the construction phase, and some materials may be purchased locally.

# 5 PROJECT NEED AND PURPOSE

## 5.1 Summary of Need

This proposed Project is needed by 2016 to address circuit overloads that currently exist on a portion of the line from Credit River Junction to Cleary Lake Tap to Credit River Tap. The Project will also address low voltage concerns in the affected load area (the Project Area and the Scott-Faribault System) (**Figure 5-1**). Further, the Project will alleviate capacity issues identified on the lines between an area just north of Elko Substation and the New Market Substation and the lines from the Credit River Substation to Prior Lake Junction when the Scott-Faribault System is connected to the Cleary-Elko System. Historical data show that the electrical peak demand in the affected load area has been growing at a weighted annual average rate of nearly four percent over the last five years. Further detail on the proposal and the need for the Project is provided below.

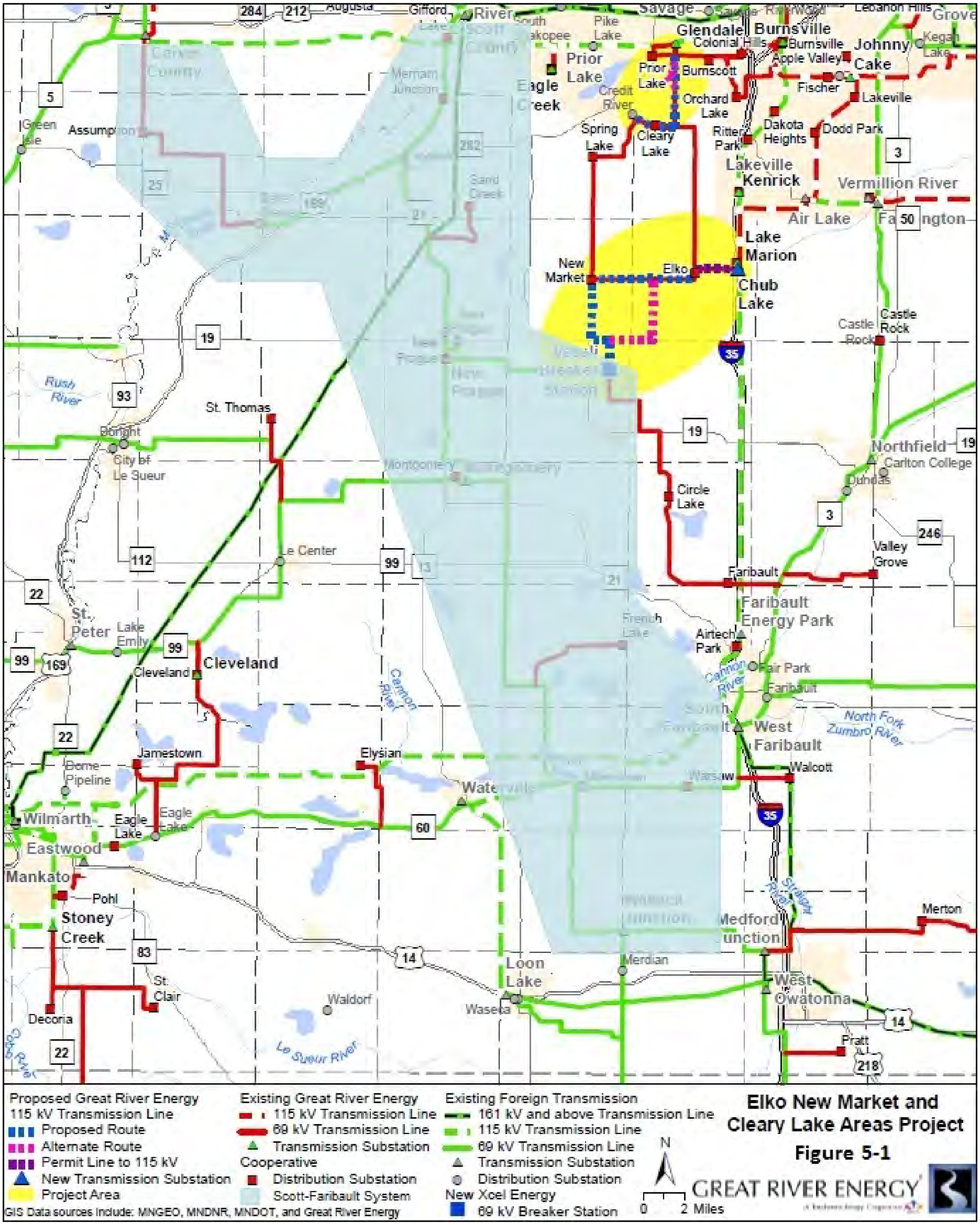
Great River Energy determined that the transmission system (69 kV and above) in the south Metro area is approaching the point of being inadequate to a serve power demands. This Project is made up of two segments: 1) the system in the Cleary Lake area to the north and 2) the system in the Elko New Market area to the south. The general reasons the upgraded facilities are necessary are discussed below. Although these two segments are separated by approximately eight miles, the transmission system necessitates upgrades of both segments at this time for operational reasons.

Great River Energy's most recent annual Transmission System Assessment Study identified load-serving deficiencies, both low voltage and transmission system overloads, in the extensive Scott-Faribault 69 kV system (**Figure 5-1**). A detailed study of this 69 kV system, known as the New Prague Area Study (NPAS), was completed and resulted in engineers identifying the need to connect the Scott-Faribault System with the 69 kV Cleary-Elko System by 2016 to address these deficiencies. This study is attached as **Appendix H**.

To connect these two systems (the Scott-Faribault and Cleary-Elko systems), a new breaker station near the existing Veseli Distribution Substation in Wheatland Township and a double circuit transmission line between this breaker station and the existing New Market Substation are required. Modeling and forecasting determined that the existing 69 kV transmission line between the Elko and New Market substations was of insufficient capacity to support the system after the connection of the Scott-Faribault and Cleary-Elko systems in 2016 was completed. Further, within the Cleary-Elko System, two existing 69 kV lines are of immediate concern for thermal overload and must be rebuilt, even if the Cleary-Elko and Scott-Faribault systems were not connected:

1. Prior Lake Junction – Credit River Junction 69 kV transmission line (MV-PN line) and
2. Cleary Lake Substation – Credit River Substation 69 kV transmission line (MV-CR line).

**Figure 5-1. Study Area**



Immediate concerns with the two lines identified above in the Cleary-Elko System could be addressed by rebuilding the 69 kV transmission lines and constructing a 69 kV double-circuit transmission line between the New Market Substation and the proposed Veseli Breaker Station. Further engineering analysis, however, identified that the Cleary-Elko System will need to be upgraded to 115 kV operation within the transmission planning horizon. System needs and forecasts indicate that by 2022, a circuit between the Chub Lake Substation and the Veseli Breaker Station would need to be operated at 115 kV.[2] Additionally, 115 kV operation of the line from Credit River Substation to Prior Lake Junction is anticipated to be necessary to provide adequate service in the Cleary Lake area by approximately 2030. Great River Energy has determined that it is in the financial interest of the Company, its cooperatives, and its cooperatives' customers to construct these lines to 115 kV standards as part of this Project.

The Veseli Breaker Station will be constructed to 69 kV standards and therefore is not part of this Application.

### 5.1.1 Operational Contingencies

The proposed Project is required to address low voltage and transmission line overload concerns in the affected load area. Low voltage and transmission line overload concerns are due to the growth of the peak electrical demand that has surpassed the level that can be served, and the age of the 69 kV transmission lines combined with the overall length of the 69 kV network. Historical data for the affected load area show that the peak electrical demand of the areas have been growing at a weighted annual average rate of nearly four percent in each of the last five years. The Project will also improve an aged transmission infrastructure prone to operational concerns.

Maintaining the voltage of the transmission system is essential for the normal operation of electrical equipment connected to the transmission system. Electric appliances, for example, draw a large amount of current (above rated current) during low voltage conditions. This condition creates heat within the electric appliance that can damage the appliance. **Table 5-1** identifies the voltage criteria applied by substation owners and operators in the affected load area under both system intact and contingency conditions. Great River Energy, Xcel Energy, SMMPA, and ITCM all operate substations in the affected load area.

[2] To allow this connection, a 115/69 kV transformer would need to be added to what will become the existing footprint of the Veseli Breaker Station. The DA-AN line between the Chub Lake Substation and Natchez Avenue will need to be upgraded to 115 kV standards before it could be operated at this voltage. This issue does not currently experience the 69 kV overload concerns identified on the Cleary-Elko System, so its rebuild is not included in the Project.

**Table 5-1. Substation Voltage Criteria**

| Transmission System | System Intact | | Contingency | |
|---|---|---|---|---|
| | Minimum Voltage (p.u.) | Maximum Voltage (p.u.) | Minimum Voltage (p.u.) | Maximum Voltage (p.u.) |
| **Xcel Energy and Great River Energy** | 0.95 | 1.05 | 0.92 | 1.10 |
| **ITCM** | 0.95 | 1.05 | 0.93 | 1.10 |
| **SMMPA** | 0.95 | 1.05 | 0.90 | 1.10 |

Transmission line overload concerns relate to the amount of current operating through the conductor. Electrical equipment requires sufficient current to function properly. Conductors are rated to allow a certain amount of current to be carried. As electrical demand grows or when additional equipment is connected to the system, the conductor continues to supply the required current until the conductor reaches its maximum rating. An overload situation occurs when the conductor transfers current above its rating. In an overload situation, a conductor can heat up and begin to sag. If the overload condition is great enough or prolonged enough, the conductor can break. A break in a conductor can cause service interruption, equipment damage, or other system concerns. **Table 5-2** identifies the thermal loading criteria applied by transmission line owners and operators in the affected load area under both system intact and contingency conditions.

**Table 5-2. Transmission Line Thermal Loading Criteria**

| Transmission System | Normal (percent) | Emergency (30 minutes) (percent) |
|---|---|---|
| **Xcel Energy** | 100 | 110 |
| **Great River Energy** | 100 | 100 |
| **ITCM** | 100 | 100 |
| **SMMPA** | 100 | 110 |

There are several single-line outages, when they occur, in the study area that lead to low voltage concerns (**Appendix H)**. Outages on the Scott County—Gifford Lake, Gifford Lake—Merriam Junction, Jordan—Sand Creek, or Sand Creek—New Prague Muni 69 kV transmission lines can lead to conditions that result in low voltage concerns.

The Cleary-Elko System serves Great River Energy consumers, with the exception of distribution customers served from Xcel Energy's Credit River Substation. This system is served from strong 115 kV/69 kV sources within relatively short distances, especially when compared to the 174-mile Scott-Faribault System. The Cleary-Elko System is made up of 4/0A conductor. This conductor is of low capacity and overloads during outage contingencies are possible on this system. Contingencies to this system include outages on the Lake Marion—Lake Marion Tap, Lake Marion Tap—Elko Tap, or Credit River—Cleary Lake 69 kV transmission lines during peak system demand conditions. Outages on any segment of the Credit River Junction—Cleary

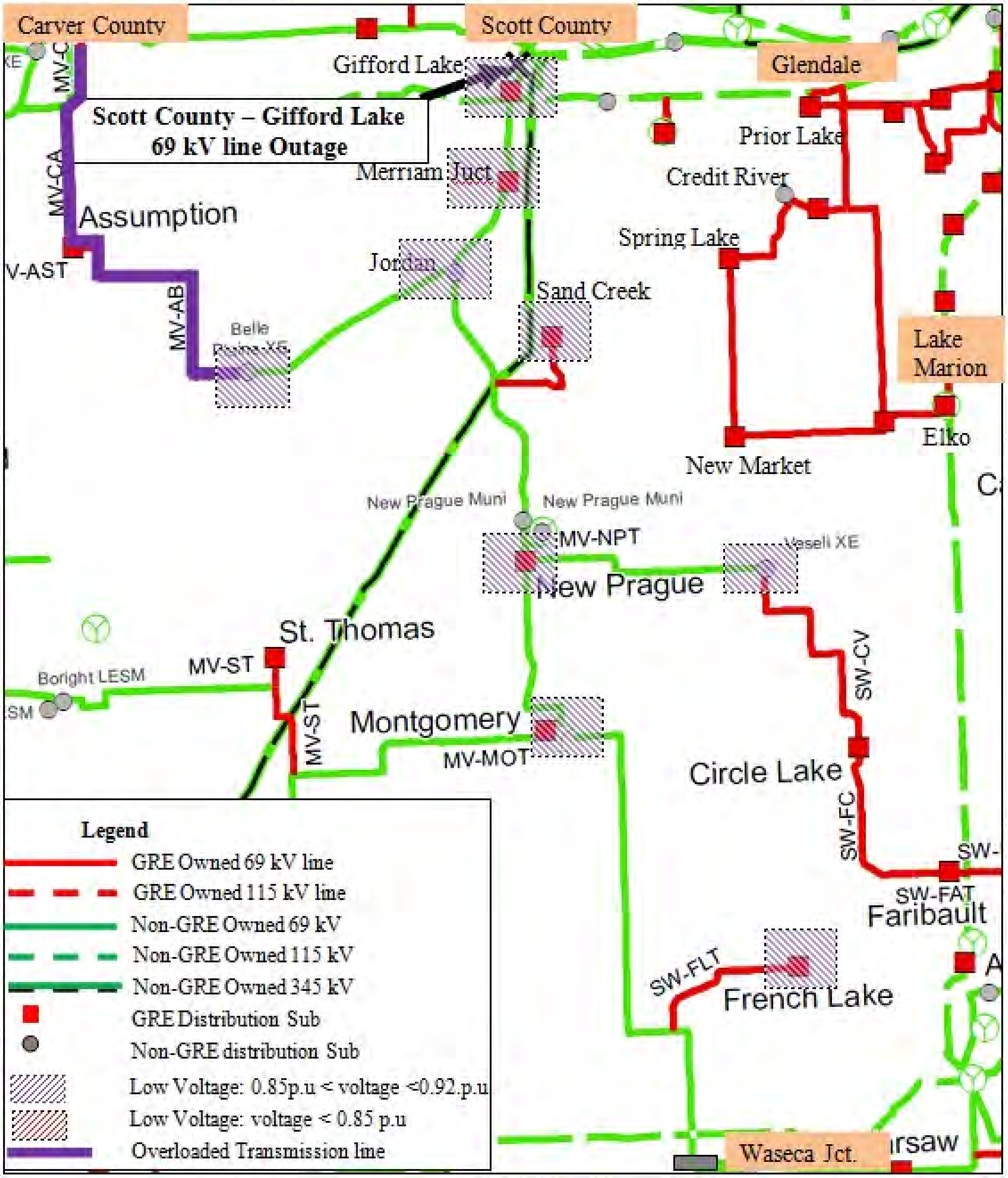
Lake or Lake Marion—Lake Marion Tap 69 kV transmission lines can cause low voltage concerns during peak system demand conditions.

### 5.1.2 Scott-Faribault System Contingencies

Scott County—Gifford Lake 69 kV Outage

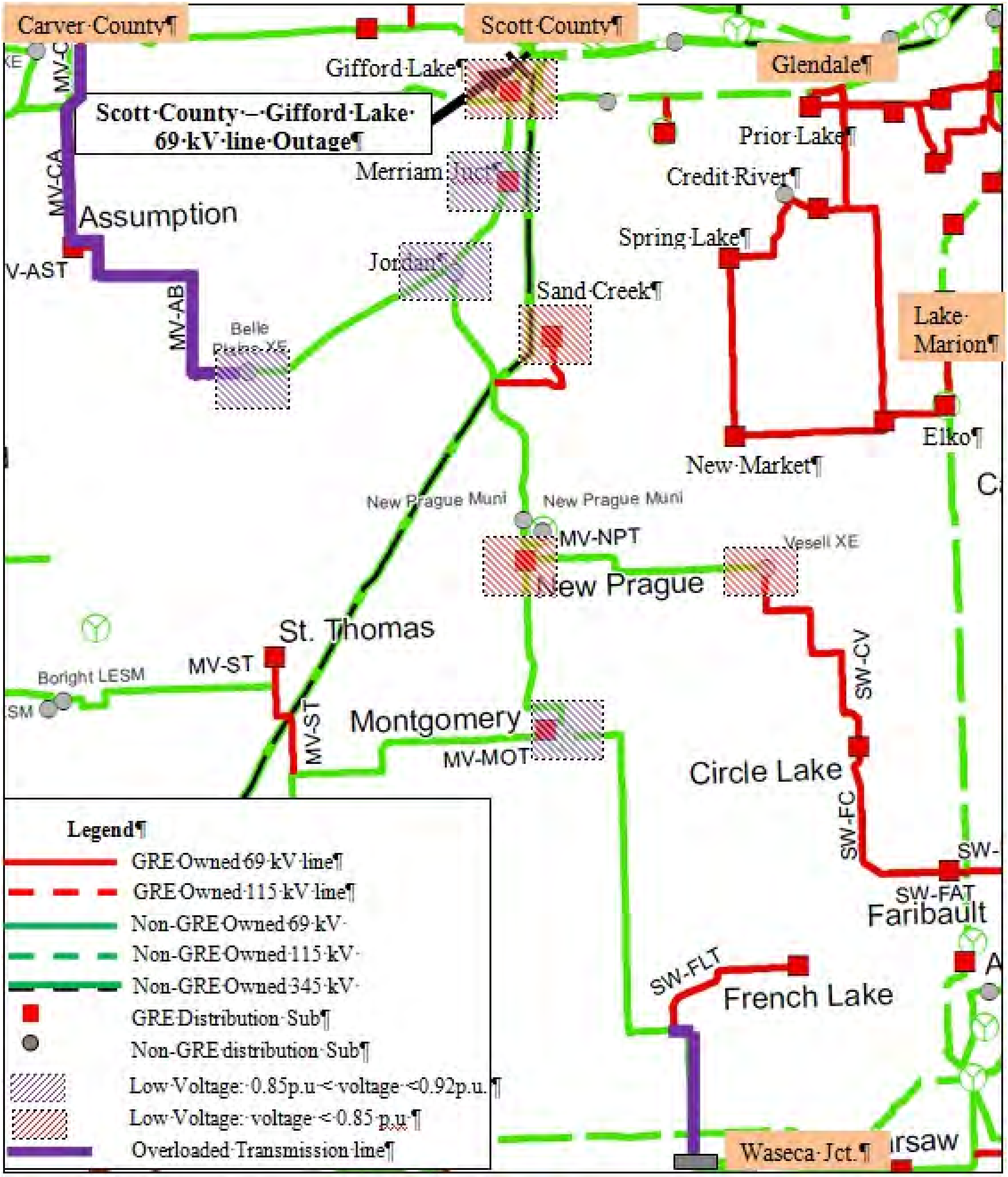
An outage of the Scott County—Gifford Lake 69 kV transmission line results in low voltage concerns at the following substations in the affected load area: Belle Plaine, French Lake, Gifford Lake, Jordan, Merriam Junction, Montgomery, New Prague, Sand Creek, and Veseli. The outage of this particular line causes voltages at the load-serving buses in these substations to drop below the required minimum 92 percent. Additionally, the transmission line between the Carver County and Assumption substations experiences an overload of 130 percent, while the transmission line between the Assumption and Belle Plaine substations experiences an overload of 124 percent. These low voltage and overload concerns are under existing system conditions. **Figure 5-2** identifies the substations and lines that experience these operational concerns during this contingency.

**Figure 5-2. Scott County—Gifford Lake 69 kV Outage at Existing System Conditions**




As shown in **Figure 5-3,** the low voltage concerns at the substations and the overload concerns on system transmission lines are only exacerbated using the 2016 model data.

**Figure 5-3. Scott County—Gifford Lake 69 kV Outage at 2016 System Conditions**




Specifically, the transmission line from the French Lake Tap to the Waseca Substation experiences an overload at 108 percent in addition to the two transmission lines that experience overload conditions under the 2012 model data. The overload on the transmission line between the Carver County and Assumption substations increases to 137 percent, while the overload on the transmission line between the Assumption and Belle Plaine substations increases to 131 percent. The same substations experience low voltage concerns, although the substations at Gifford Lake, New Prague, Sand Creek, and Veseli experience voltages below 85 percent.

Jordan—Sand Creek Tap 69 kV Outage

An outage of the Jordan—Sand Creek Tap 69 kV transmission line results in low voltage concerns at the following substations in the affected load area: French Lake, Montgomery, New Prague, Sand Creek, and Veseli. The outage of this particular line causes voltages at the load-serving buses in these substations to drop below the required minimum 92 percent and even below 85 percent. Additionally, the transmission line between the New Prague and Montgomery substations experiences an overload of 143 percent. The transmission line between the Montgomery Substation and the French Lake Tap experiences an overload of 171 percent. The transmission line between the French Lake Tap and Waseca Junction experiences an overload of 181 percent. These low voltage and overload concerns are under existing system conditions. **Figure 5-4** identifies the substations and lines that experience these operational concerns.

The low voltage concerns at the substations and the overload concerns on system transmission lines are only exacerbated using 2016 model data (**Figure 5-5)**.

Specifically, the transmission line between the New Prague and Montgomery substations experiences an overload of 156 percent. The overload on the transmission line between the Montgomery Substation and the French Lake Tap increases to 187 percent under 2016 conditions. The overload on the transmission line from the French Lake Tap to Waseca Junction increases to 199 percent. The same substations experience low voltage concerns, although the substations at Gifford Lake, New Prague, Sand Creek, and Veseli experience voltages below 73 percent and several approach 50 percent (New Prague, Sand Creek, and Veseli).

**Figure 5-4. Jordan—Sand Creek Tap 69 kV Outage at Existing System Conditions**

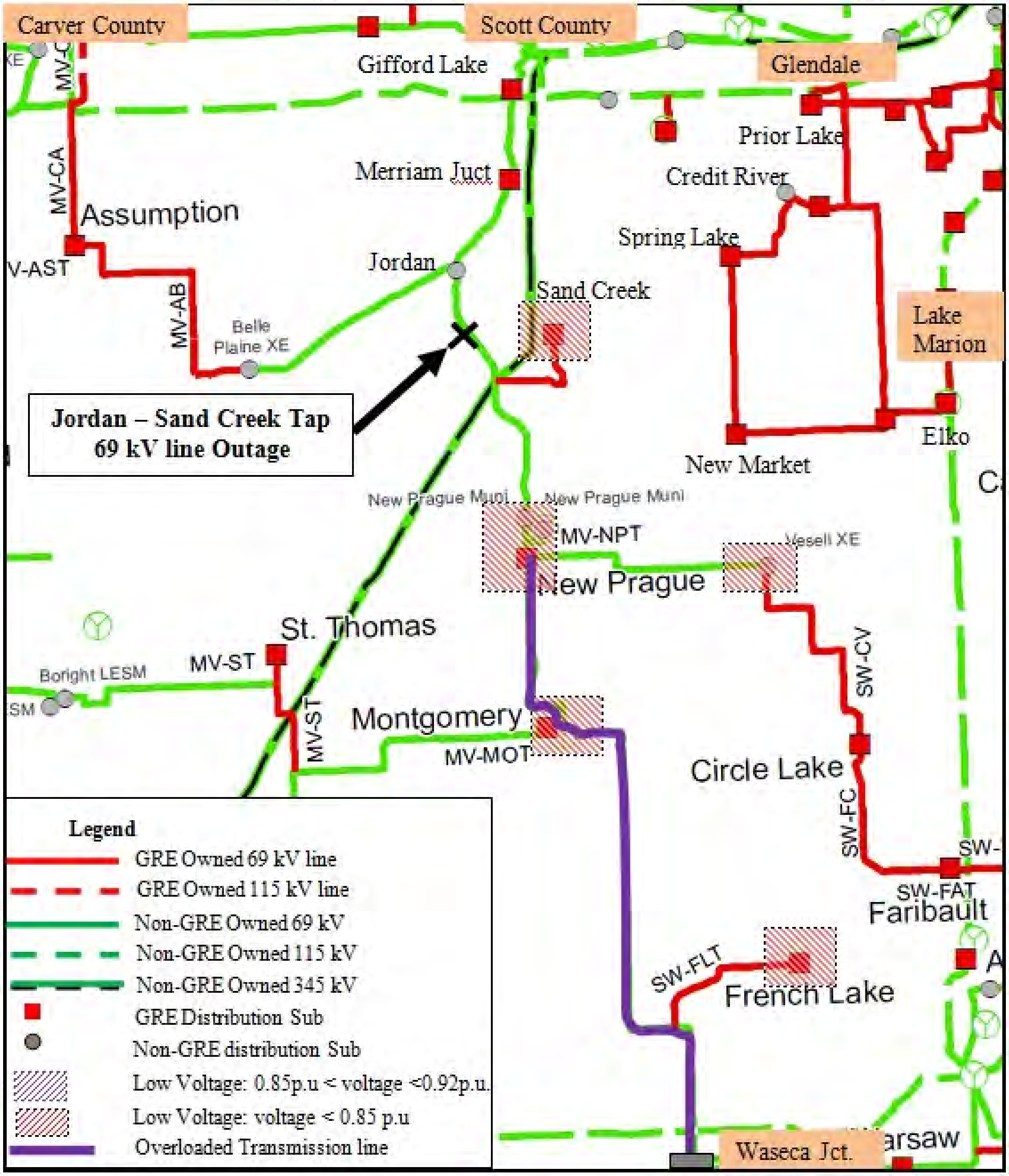
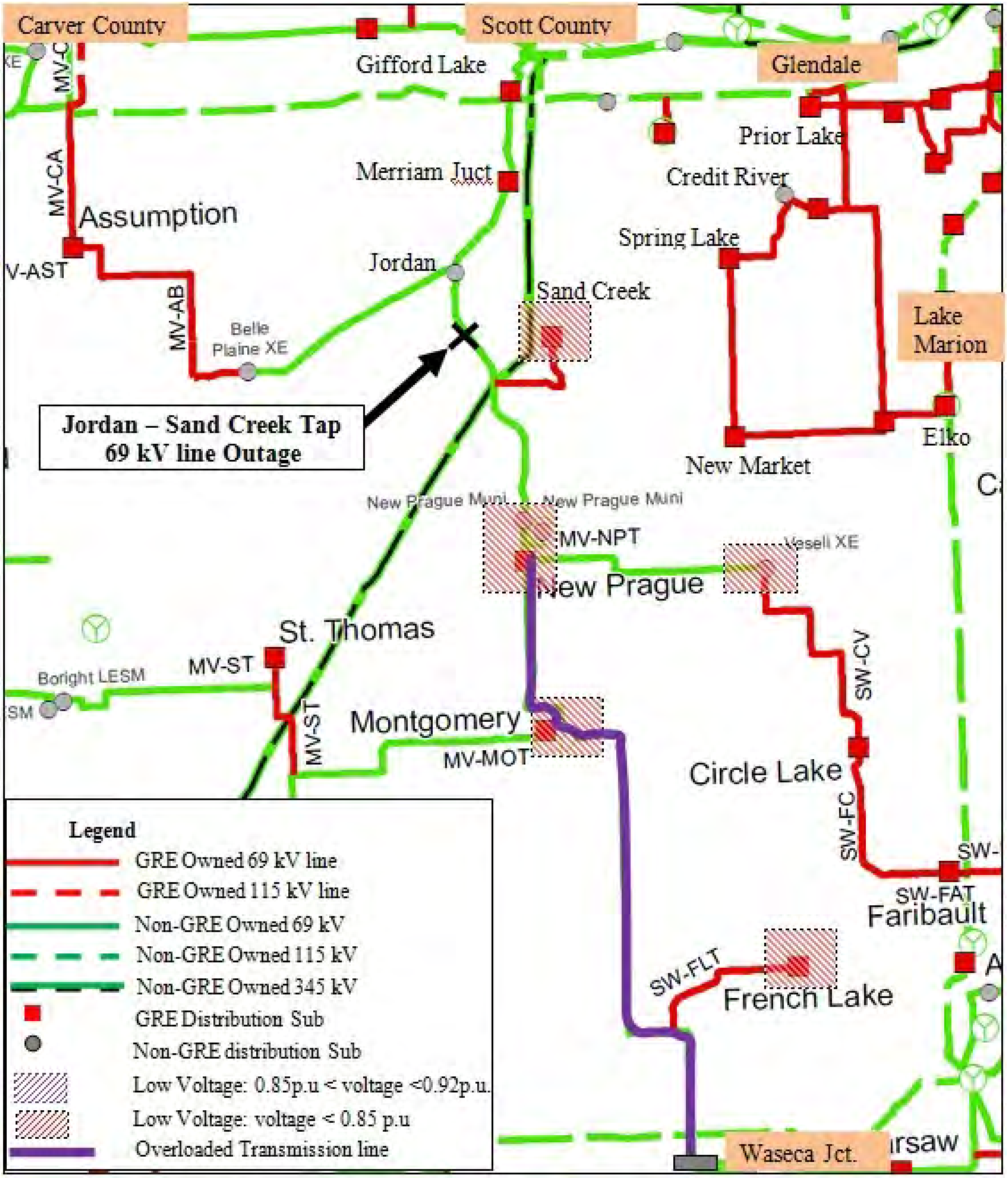


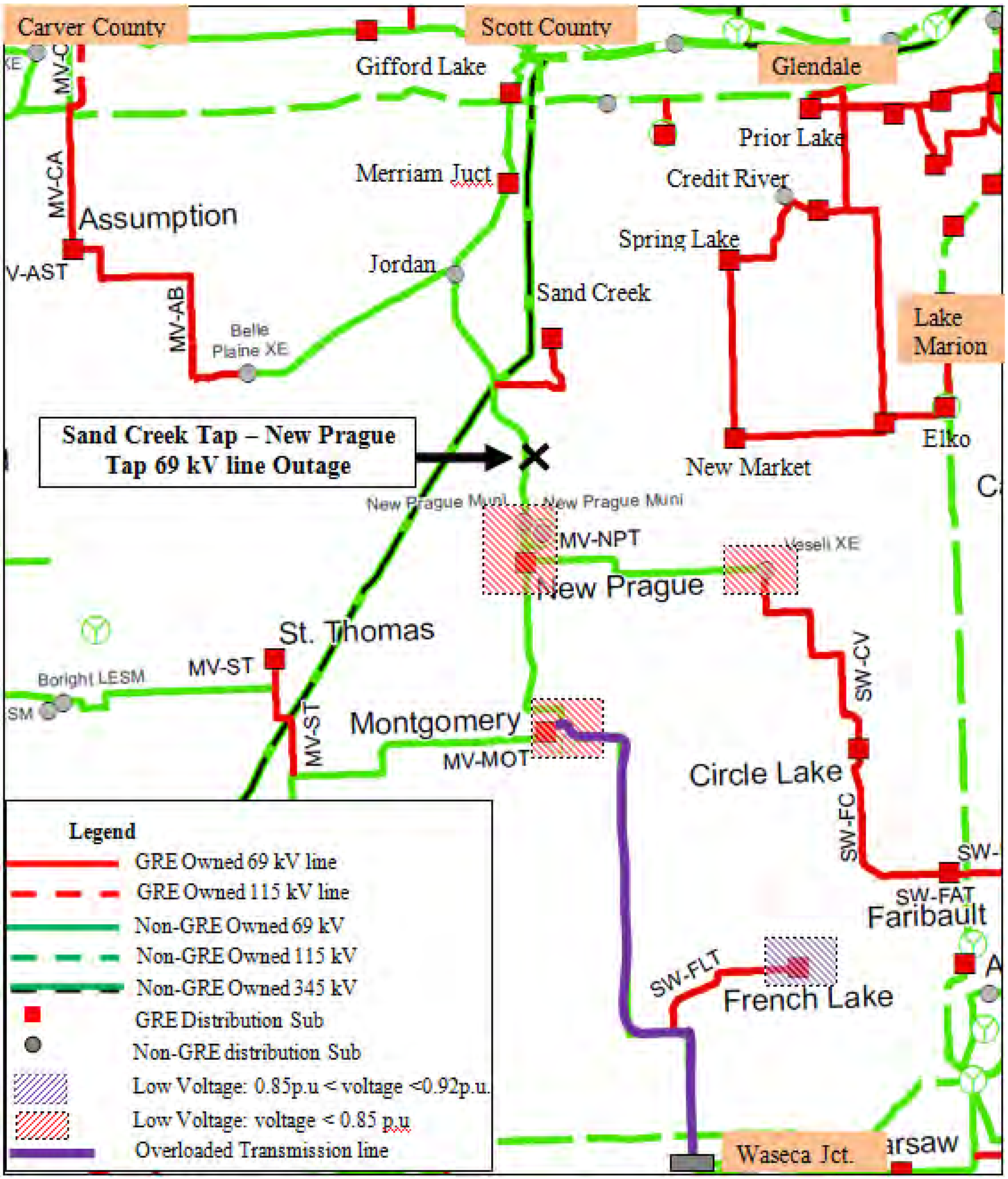
**Figure 5-5. Jordan—Sand Creek Tap 69 kV Outage at 2016 System Conditions**




Sand Creek—New Prague 69 kV Outage

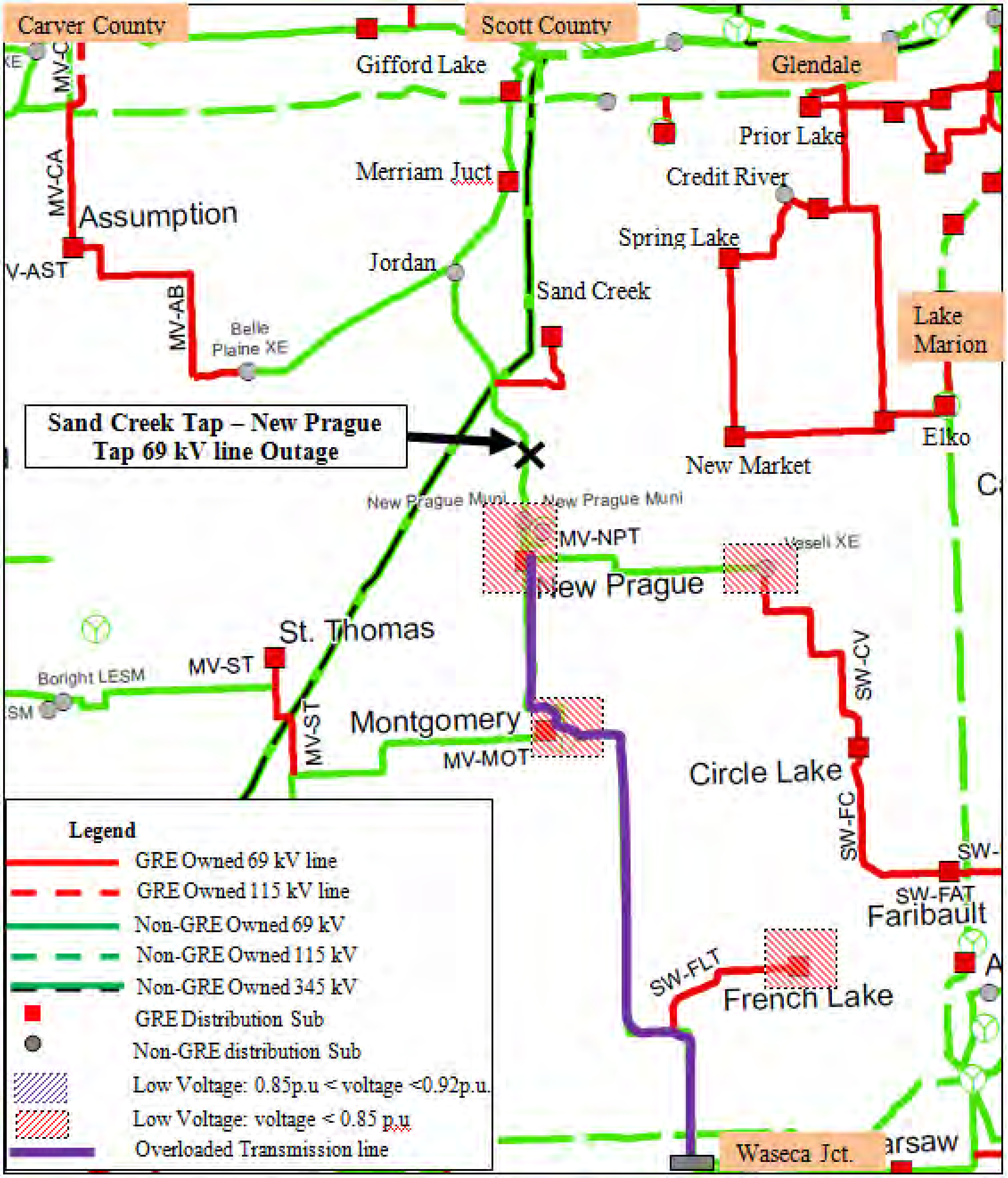
An outage of the New Prague—Sand Creek 69 kV transmission line results in low voltage concerns at the following substations in the affected load area: French Lake, Montgomery, New Prague, and Veseli. This outage causes the voltage at all these substations to drop below the required minimum 92 percent. The outage causes the voltage at all these substations, but the French Lake Substation, to drop below 85 percent. Additionally, the 69 kV transmission line between the Montgomery Substation and the French Lake Tap experiences an overload of 123 percent while the transmission line between the French Lake Tap and the Waseca Substation experience an overload of 132 percent. These low voltage and overload concerns are experienced during this Sand Creek—New Prague 69 kV transmission line outage under the existing system conditions. **Figure 5-6** identified the substations and lines that experience these operational concerns during this contingency.

**Figure 5-6. Sand Creek—New Prague 69 kV Outage at Existing System Conditions**



As shown in **Figure 5-7**, the low voltage concerns at the substations in the affected load area and the overload concerns on the Scott—Faribault System transmission lines are exacerbated using the 2016 model data.

**Figure 5-7. Sand Creek—New Prague 69 kV Outage at 2016 System Conditions**




Specifically, the low voltage concerns at the same substations identified under the existing system conditions drop below 85 percent and the transmission line overload concerns are greatly increased. The transmission line between the New Prague and Montgomery substations, which did not experience an overload under existing system conditions with the New Prague—Sand

Creek 69 kV transmission line outage, experiences an overload of 114 percent. The transmission line between the Montgomery Substation and the French Lake tap experiences an overload of 141 percent, while the transmission line between the French Lake Tap and the Waseca Substation experiences an overload of 151 percent. Additionally, the transmission line between the Waseca and Medford Substations experiences an overload at 101 percent. The French Lake, Montgomery, New Prague, and Veseli substations all experience low voltage conditions under 85 percent.

Gifford Lake—Merriam Junction 69 kV Outage

An outage of the Gifford Lake—Merriam Junction 69 kV transmission line under existing system conditions results in low voltage concerns under 92 percent at the following substations in the affected load area: Belle Plaine, Jordan, Merriam Junction, Montgomery, New Prague, Sand Creek, and Veseli. **Figure 5-8** identifies the substations that experience operations concerns under this existing system condition outage of the Gifford Lake—Merriam Junction 69 kV transmission line.

As shown in **Figure 5-9**, the low voltage concerns at the substations are exacerbated using the 2016 model data and transmission line overload concerns in the south end of the affected load area are experienced.

**Figure 5-8. Gifford Lake—Merriam Junction 69 kV Outage at Existing System Conditions**

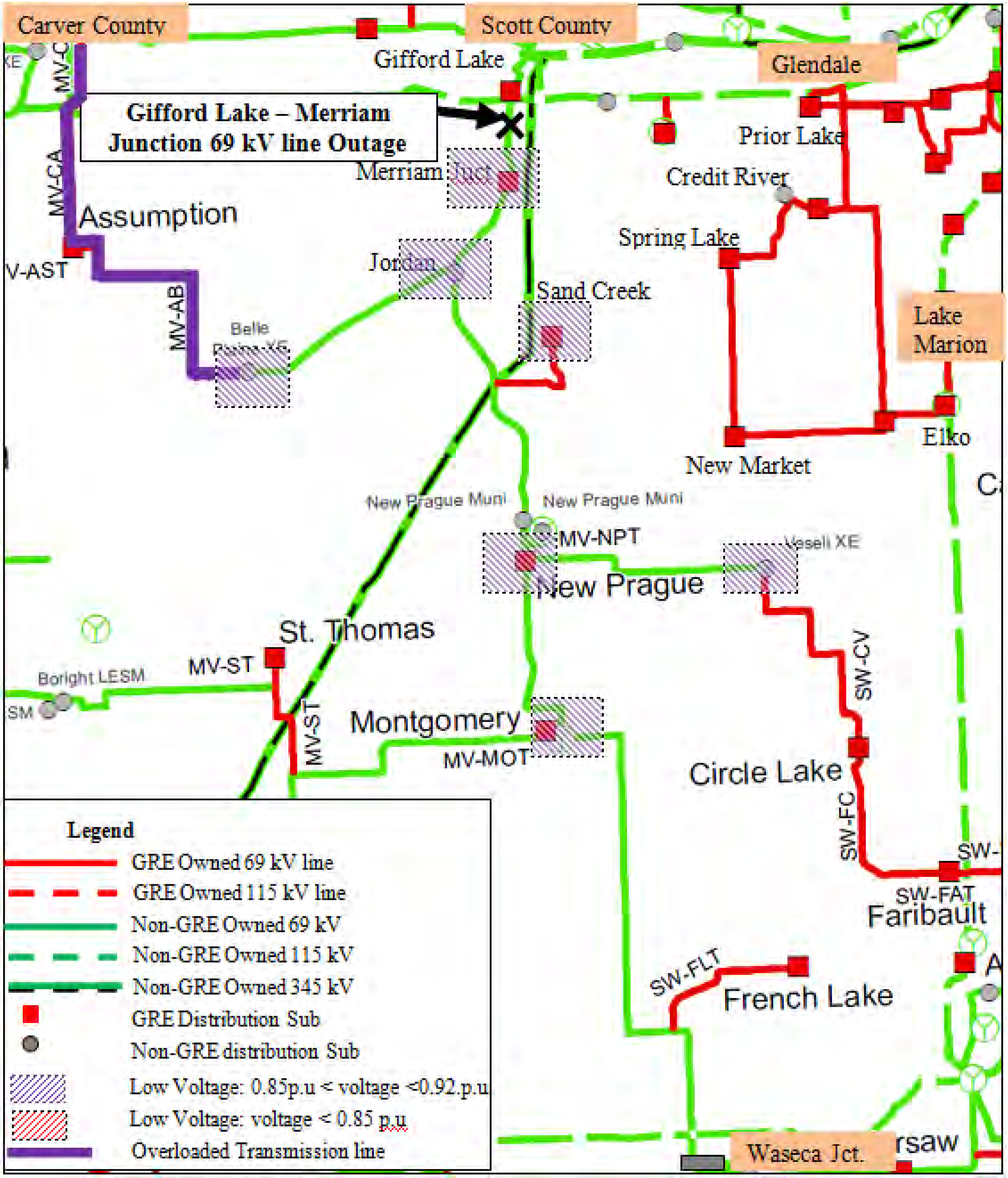
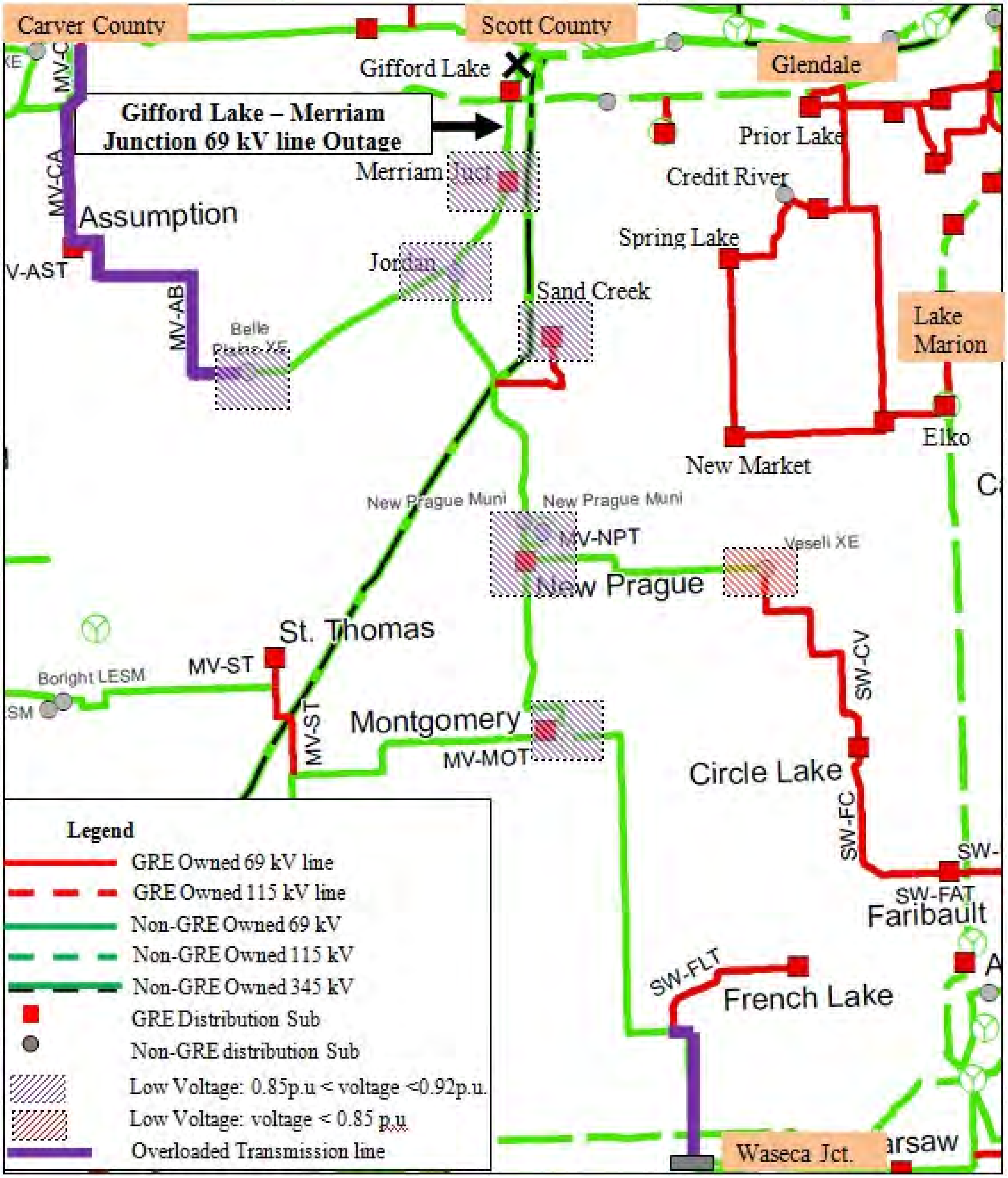


**Figure 5-9. Gifford Lake—Merriam Junction 69 kV Outage at 2016 System Conditions**




Specifically, the low voltage conditions experienced at the Veseli Substation in 2016 further deteriorate to below 85 percent and the Belle Plaine, Jordan, Merriam Junction, Montgomery, New Prague, and Sand Creek substations continue to experience low voltage conditions between 85 and 92 percent. Although no transmission line overloads were identified under existing system conditions, transmission line overloads were identified under 2016 system condition models. The transmission line between the French Lake Tap and the Waseca Substation, during an outage of the Gifford Lake—Merriam Junction 69 kV transmission line, experiences an overload of 103 percent.

### 5.1.3 Cleary-Elko System Contingencies

Lake Marion—Lake Marion Tap 69 kV Outage

An outage of the Lake Marion—Lake Marion Tap 69 kV transmission line results in low voltage concerns at the Elko and New Market substations of 90 percent and 92 percent, respectively. The outage of this line also causes line overload concerns in the Cleary Lake area. The 69 kV transmission line between Prior Lake Junction and Credit River Junction and the 69 kV transmission line between Credit River Junction and the Cleary Lake Substation each experience an overload of 140 percent. The transmission line between the Cleary Lake Substation and the Credit River Substation experiences an overload of 108 percent. These low voltage and overload concerns are under existing system conditions when the Lake Marion—Lake Marion Tap 69 kV transmission line is out of service.

Lake Marion Tap—Elko 69 kV Outage

An outage of the Lake Marion Tap—Elko 69 kV transmission line causes overload concerns on the 69 kV transmission lines between Credit River Junction and the Cleary Lake Substation (137 percent) and between the Cleary Lake Substation and the Credit River Substation (105 percent). No low voltage concerns are yet identified in the Cleary-Elko System under this contingency.

Credit River Junction—Cleary Lake 69 kV Outage

An outage of the Credit River Junction—Cleary Lake 69 kV transmission line results in both low voltage concerns at substations and overload concerns on transmission lines. During this contingency, low voltage concerns are identified at the Credit River (90 percent) and Cleary Lake (90 percent) substations. The transmission line between the Elko Substation and New Market Substation experiences an overload of 108 percent while the transmission line north from the Elko Substation to CR 69 experiences an overload of 140 percent.

## 5.2 Relationship Between Proposed Project and Overall State Energy Needs

The need for this Project has been discussed in the Minnesota Biennial Transmission Projects Report since 2009 (Tracking Numbers 2009-TC-N2 and 2009-TC-N5). In addition, Great River Energy held a voluntary public meeting in the Project area and notified tribal and local government units of the Project and its need. This provided an opportunity for the public, local governments and state agencies to become involved in the transmission planning process consistent with the Minnesota Energy Security and Reliability Act.

The proposed Project is a baseline reliability project that will insure a continuous supply of secure and reliable electric energy. The affected load area will benefit from the proposed Project. The benefit will be experienced in areas along U.S. Highway 169 between Jordan and Shakopee: Jordan, Norwood Young America, Cologne, Belle Plaine, New Prague, Montgomery, Sand Creek, French Lake, Veseli, Cleary Lake, Credit River, Spring Lake, Elko New Market, and areas in between. This Project is consistent with the goals of the Minnesota Energy Security and Reliability Act that addressed a wide range of energy issues, including building the infrastructure necessary to deliver electric energy in a timely, efficient, secure, and reliable manner while at the same time minimizing cost and impact on the environment.

If the proposed Project or one of its alternatives is not constructed, studies indicate that electric security in the Project area will decrease, which will lead to reduced reliability throughout the region. An insecure unreliable electric supply is not in the best interest of the area's residents or the State's, therefore doing nothing would not be consistent with the energy policies of the State.

### 5.3 Data Exemptions

On November 9, 2012, Great River Energy submitted a Petition for Exemption to the Commission requesting that the Applicant be exempted from certain filing requirements of the Minnesota Rules relating to information that must be included in a Certificate of Need application. The Commission, after soliciting and considering comments from interested persons, granted the exemption request on January 24, 2013, and issued its written Order on February 4, 2013. A copy of the Order is attached as **Appendix B**. In its Order, the Commission relieved Great River Energy from submitting certain information required under Minnesota Rules Chapter 7849 and specified other type of information that should be included in the CON application instead.

Great River Energy has included in this Application the information relating to the need for this Project required by the Minnesota Rules, as modified by the Commission in its Order granting the exemption request. The following summarizes the exemptions that were granted.

Minn. R. 7849.0260, Subps. A(3) and C(6). The Commission granted the request for an exemption from certain portions of Minnesota Rules 7849.0260, Subparts A(3) and C(6) requiring information on estimated line losses. The Commission authorized the Applicant to provide line loss data for the system as a whole, rather than line loss data specific to the individual transmission lines.

Minn. R. 7849.0270, Subps. 1 and 2 (B-F). The Commission granted the request for an exemption from certain portions of Minnesota Rule 7849.0270 requiring information on predicted energy consumption for the utility's entire service area. Because the transmission upgrades proposed here are intended to serve the Scott-Faribault System, the Commission authorized the Applicant to provide the requested data only for the affected load area. Peak demand forecast will be based on historical loading by cooperative- and non-cooperative-owned substations in the affected load area that are relevant to the Project.

The Commission also exempted the Applicant from providing data on forecasted consumption and peak demand by customer class (Minn. R. 7849.0270, Subps. 2(B) and 2(C)). Instead, Great River Energy will provide aggregate data on an annual coincident peak basis for cooperative- and non-cooperative load in the Scott-Faribault and Cleary-Elko systems.

The Commission exempted Great River Energy from providing information on the system peak demand by month as required in Minnesota Rule 7849.0270, Subpart 3(D). Instead of this information, Great River Energy will provide historical summer and winter peak power demand data and forecast of power demand at cooperative- and non-cooperative-owned substations in the Scott-Faribault and Cleary-Elko systems that will benefit from the Project.

In lieu of providing the estimated annual revenue requirement per kilowatt hour for the system in current dollars (Minn. R. 7849.0270, Subp. 2(E)), the Commission granted the Applicant's request to provide: 1) a description of how MISO spreads wholesale electricity costs among users of the transmission grid, and 2) general estimates of how the cost of the Project would affect ratepayers of Great River Energy.

Minnesota Rule 7849.0270, Subpart 2(F) requires average system weekday load factors for each month. The Commission granted the exemption from this requirement because load factor is not relevant when evaluating the need for a transmission facility.

Minn. R. 7849.0270, Subps. 3-5 requires information on the forecast methodology employed, identification of databases, and details on the assumptions made in preparing the forecasts provided under Minnesota Rule 7849.0270, Subpart 2. Instead of this information, Great River Energy proposed providing substation load forecasts and line operation data. The Commission granted this exemption and Great River Energy will provide cooperative- and non-cooperative substation load data for those relevant substations within the Scott-Faribault and Cleary-Elko systems.

Minn. R. 7849.0280. The Commission exempted Great River Energy from the requirements of paragraphs B through G and I, as those sections apply to generation, not transmission proposals. The Commission also granted the request that the remaining requirements of Minnesota Rule 7849.0280, Subparts A and H, apply to the cooperative and non-cooperative load data.

Minn. R. 7849.0290. This rule requires an applicant to submit information about its conservation programs throughout its entire system. The Commission authorized the Applicant to provide this information only for the applicable load area.

Minn. R. 7849.0300 and 7849.0340 requires detailed information regarding the consequences of delay on three specific statistically-based levels of demand and energy consumption. Great River Energy proposed to include a discussion of issues of delay and variations in actual demand from forecast without the examination of delay incorporating three specific statistically-based levels of demand. The Commission granted the requested exemption to these rules.

## 5.4 Affected Load Area

The customers that will benefit from the Project are primarily in Carver, Scott, and Rice counties. Although the construction is proposed to take place in the Cleary-Elko System, there will be benefits for customers in this system and the Scott-Faribault System.

Great River Energy has two member cooperatives serving load in the affected load area from several substations. MVEC serves residential, commercial, agricultural and industrial customers in Carver, Scott and Rice counties, including areas between Jordan and Shakopee along the Highway 169, Cologne, Norwood Young America, Sand Creek, New Prague, Prior Lake, Cleary Lake, Spring Lake and Elko-New Market areas. These areas will be benefit from the completion of the proposed Project. SWCE has consumers served from the French Lake area that will directly benefit from the proposed Project in Rice County.

Xcel Energy serves several areas in the affected load area. The load centers served by Xcel Energy in the affected load area include Jordan, Belle Plaine, Veseli and Credit River. These areas will directly benefit from the proposed Project.

Similarly, SMMPA and ITCM provide service to consumers in the city of New Prague and city of Montgomery, respectively. These cities are among the load centers in the affected load area, and will benefit from the stronger 69 kV network when the proposed Project is completed.

Other, non-cooperative, loads in the Cleary-Elko and Scott-Faribault systems are served by Xcel Energy, ITCM, and municipal power providers.

## 5.5 Peak Demand and Annual Electrical Consumption

Minnesota Rule 7849.0270 requires an applicant for a CON to provide information about the peak demand and annual electrical consumption within the applicant's service area and system. Because the Project's transmission upgrades are designed to address localized system reliability issues, the Commission exempted the Applicant from providing this information for its entire system and authorized the Applicant to provide the data only for the Affected Load Area. Also, because there are small numbers of customers in the Affected Load Area, the Commission agreed with the Applicant that it was not necessary to provide the data for the various consumer classes served. Finally, the Commission also agreed that the average system weekday load factor by month was not information that was required in this case.

### 5.5.1 Peak Demand

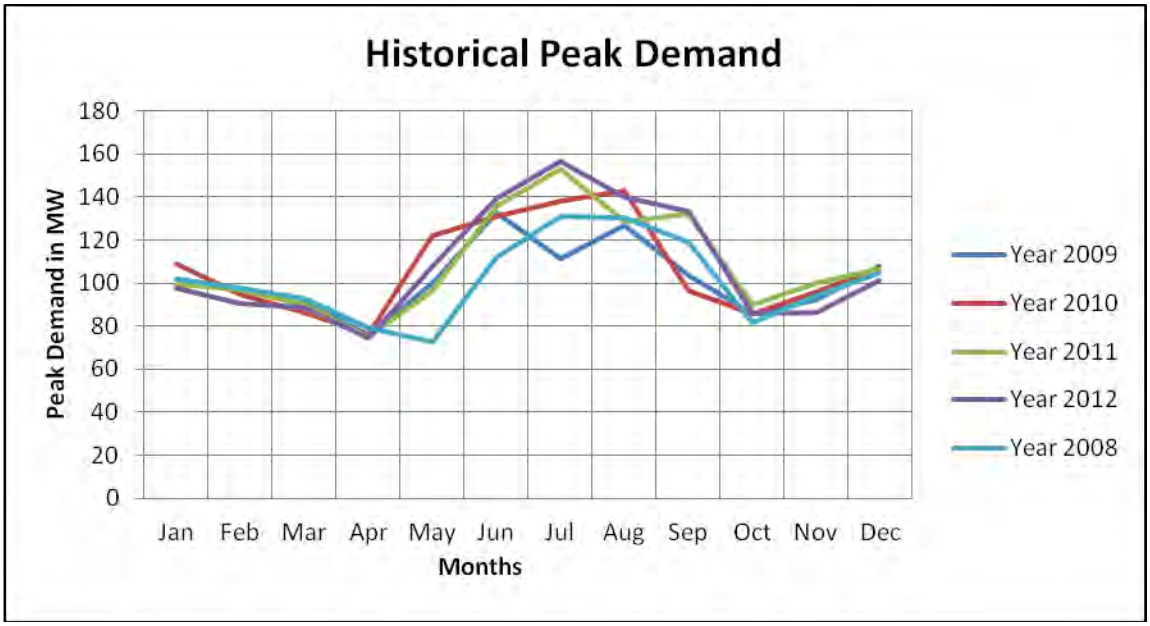
The peak demand for the affected load area for the previous five years is shown by month in **Table 5-3**. These peak demand values are based on the affected load area coincident peak demands.

**Table 5-3. Historical Monthly Peak Demand (MW)**

| | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2008 | 102.1 | 97.88 | 92.68 | 79.38 | 72.93 | 112.2 | 130.97 | 130.16 | 119.26 | 81.84 | 94.37 | 104.78 |
| 2009 | 102.1 | 97.04 | 91.5 | 75.5 | 100.3 | 132.75 | 111.5 | 126.8 | 103.6 | 86.07 | 92.56 | 107.72 |
| 2010 | 109.1 | 94.68 | 86.2 | 76.52 | 122.07 | 130.8 | 138.1 | 143.06 | 96.2 | 85.55 | 95.65 | 107.3 |
| 2011 | 99.2 | 97.3 | 89.9 | 75.34 | 96.2 | 135.45 | 152.7 | 128.6 | 132.2 | 90.15 | 99.83 | 106.5 |
| 2012 | 97.65 | 90.67 | 88.67 | 74.33 | 107.8 | 139.3 | 156.6 | 140.12 | 133.4 | 86.0 | 86.38 | 101.2 |

**Figure 5-10** shows the plots of the historical monthly peak demand shown in **Table 5-3**. The figure shows the affected load area highest electric demand occurs in the months between June and August. These are summer season months and the study models were based on addressing the summer peak demand of the affected load area. The load forecasts are mainly for expected summer season peak demands as there is no value in creating a projection for winter season.

**Figure 5-10. Historical Monthly Peak Demand of the Affected Load Area**




5.5.2 Annual Electrical Consumption

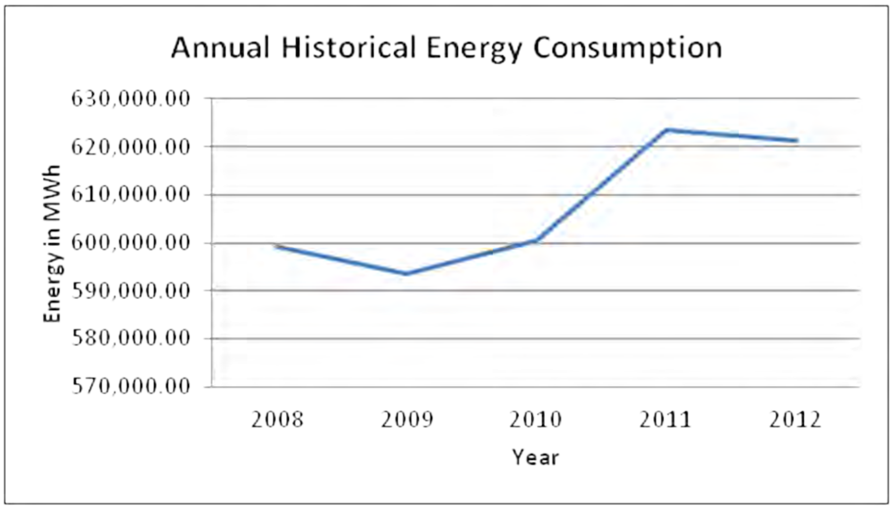
The total annual electrical consumption in megawatt hours (MWh) for Great River Energy, Xcel Energy, SMMPA, and ITCM loads in the affected load area for the previous five years is shown by month in **Table 5-4.**

**Table 5-4. Historical Monthly Energy Consumption (MWh)**

| Year | Jan. | Feb. | March | April | May | June | July | August | Sept. | October | Nov. | Dec. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2008 | 54,871.0 | 50,392 | 43,587 | 43,262.1 | 42,343 | 45,043.9 | 63,302.8 | 59,321.8 | 48,371.2 | 46,131.8 | 45,096.2 | 57,656.9 | 599,379.8 |
| 2009 | 57,582.3 | 47,575.7 | 47,893.1 | 41,607.1 | 45,509.1 | 45,425.6 | 52,519.4 | 55,081.1 | 49,436.9 | 46,957.7 | 46,733.3 | 57,314.7 | 593,635.9 |
| 2010 | 55,852.0 | 47,907.0 | 45,517.9 | 40,652.9 | 46,362.0 | 51,040.3 | 64,855.2 | 67,318.5 | 44,502.6 | 44,589.9 | 44,415.5 | 47,437.2 | 600,451.0 |
| 2011 | 54,762.2 | 48,286.6 | 49,251.2 | 42,835.0 | 43,836.5 | 51,377.6 | 69,823.1 | 61,290.4 | 49,372.3 | 48,404.5 | 49,870.0 | 54,550.3 | 623,659.7 |
| 2012 | 53,449.7 | 48,231.3 | 46,532.1 | 41,540.8 | 47,392.4 | 58,925.9 | 75,923.0 | 60,251.4 | 50,324.2 | 46,662.7 | 41,310.4 | 50,698.7 | 621,242.6 |

**Figure 5-11** shows the annual historical energy consumption from 2008 through 2012 of the affected load area plotted versus year. The historical five year energy growth rate of the affected load area is calculated to be 0.9 percent.

**Figure 5-11. Five-Year Historical Annual Energy Consumption of the Affected Load Area**



## 5.6 Forecasts

Minnesota Rule 7849.0270 requires an applicant to explain the manner in which the applicant has conducted forecasting of its future energy needs. In the current filing, the Commission granted certain exemptions as summarized in **Section 5.3** and included in **Appendix B**, which is expected to result in a more streamlined filing focusing on the elements of the forecast that are more relevant to the need for the facilities. The affected load centers are mostly served by Great River Energy and Xcel Energy. SMMPA, and ITCM serve the cities of New Prague and Montgomery, respectively. The load forecasting methodology used by these companies when determining the need for the proposed transmission Project is discussed in **Section 5.6.1**.

### 5.6.1 Methodology

When developing the long-range load forecast of the area for the affected load area, multiple load forecasts scenarios were compared. A more conservative load forecast, which has a high probability of occurring in the system, was chosen for the study. In fact, the existing and projected load profile and type of customers, such as residential, agricultural, commercial or industrial of the affected load area are different from one area to another area. To be more predictive of the load growth trends at a specific load center in the affected load area, more emphasis was given to forecast loads based on growth rate by individual distribution substations.

Great River Energy member cooperatives serve the majority of the load centers in the affected load area. The following data were analyzed and compared when determining the growth rate percentage and projected peak load data that were used during the study for loads served by Great River Energy member cooperatives:

1. Past 10-year historical cooperative coincident peak load data and growth rate;

2. Recent 5-year historical cooperative peak load data and growth rate; and

3. Average annual growth rate per substation as forecasted by Great River Energy member cooperatives.

Great River Energy retrieved 10 years of historical coincident peak load data for the affected load centers served by its member cooperatives. The historical coincident peaks are chosen so that switching peaks due to transferring loads between substations are removed when determining the peak demand at a substation. Note that switching peak is a peak demand at a substation when load is transferred to the substation from another substation by switching feeders. This mostly occurs during contingencies in the distribution system. **Table 5-5** shows the 10 years, from 2003 through 2012, recorded historical coincident peak demands in kilowatts (kW) for the affected load area served by Great River Energy member cooperatives:

### Table 5-5. Affected Load Area 10-Year Historical Coincident Peak Load Served by Great River Energy Member Cooperatives

| Substation | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|
| New Prague | 5,548 | 4,710 | 5,477 | 6,901 | 6,389 | 6,543 | 6,561 | 7,283 | 7,719 | 7,190 |
| Merriam Jct. | 6,550 | 6,238 | 6,943 | 8,152 | 7,104 | 4,466 | 4,288 | 6,538 | 4,928 | 6,272 |
| Prior Lake N | 18,238 | 10,114 | 11,772 | 11,085 | 11,459 | 10,550 | 9,864 | 8,552 | 9,159 | 11,078 |
| Assumption | 1,908 | 1,578 | 1,777 | 1,953 | 2,569 | 1,833 | 1,689 | 1,936 | 1,860 | 2,455 |
| New Market | 10,263 | 9,017 | 4,753 | 5,560 | 4,333 | 3,483 | 3,281 | 3,861 | 4,122 | 4,002 |
| Spring Lake | 9,166 | 8,114 | 9,231 | 10,617 | 6,123 | 4,740 | 4,431 | 5,398 | 5,789 | 5,686 |
| Gifford Lake | NA | 3,500 | 3,949 | 2,420 | 3,609 | 2,748 | 3,653 | 2,642 | 2,510 | 3,013 |
| Elko | NA | NA | 5,459 | 9,858 | 9,354 | 9,426 | 9,030 | 10,419 | 10,551 | 10,974 |
| Cleary Lake | NA | NA | NA | NA | 6,436 | 6,834 | 6,982 | 11,136 | 11,102 | 11,216 |
| Sand Creek | NA | NA | NA | NA | NA | 4,344 | 4,294 | 2,844 | 5,132 | 5,148 |
| Prior Lake S | 14,866 | 17,652 | 15,902 | 16,600 | 15,474 | 14,829 | 14,465 | 13,808 | 14,797 | 15,429 |
| French Lake | 683 | 1,451 | 2,406 | 1,548 | 2,339 | 1,432 | 1,681 | 2,485 | 2,558 | 2,750 |

**Figure 5-12** illustrates the annual growth trend of the affected load area peak demand for the past ten years for loads served by Great River Energy member cooperatives.

### Figure 5-12. Affected Load Area Served by Great River Energy Member Cooperatives 10-Year Historical Peak Demand Growth Trend

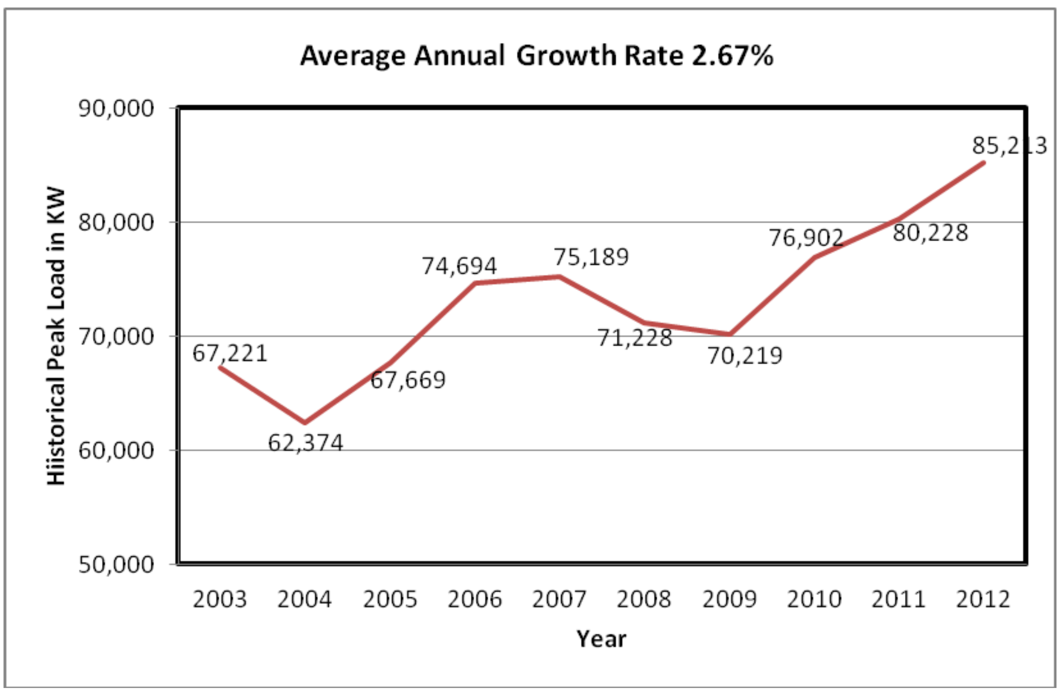


**Figure 5-12** shows that the peak load demand for the cooperative loads in the affected load area has shown consistent growth starting 2004 and onward. The slump in the load growth between the years 2007 and 2009 is attributed to the economic downturn that was seen in most areas in the transmission system. The peak demand average annual growth rate of the affected load area served by Great River Energy member cooperatives for the prior 10 years is found to be about 2.67 percent.

Great River Energy also looked at the past five years historical peak demands of the affected load area to get a more descriptive trend of the peak load growth rate of the affected load area for the near-term. The five year historical load growth rate portrays the near-term peak load growth trend of the affected load area better than the growth rate based on the 10 year historical data. **Table 5-6** shows the five years, from 2008 through 2012, historical coincident peak loads recorded in the system.

**Table 5-6. Affected Load Area Five-Year Historical Coincident Peak Load (in kW) Served by Great River Energy Member Cooperatives**

| Substation | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|
| New Prague | 6,543 | 6,561 | 7,283 | 7,719 | 7,190 |
| Merriam Jct | 4,466 | 4,288 | 6,538 | 4,928 | 6,272 |
| Prior Lake N | 10,550 | 9,864 | 8,552 | 9,159 | 11,078 |
| Assumption | 1,833 | 1,689 | 1,936 | 1,860 | 2,455 |
| New Market | 3,483 | 3,281 | 3,861 | 4,122 | 4,002 |
| Spring Lake | 4,740 | 4,431 | 5,398 | 5,789 | 5,686 |
| Gifford Lake | 2,748 | 3,653 | 2,642 | 2,510 | 3,013 |
| Elko | 9,426 | 9,030 | 10,419 | 10,551 | 10,974 |
| Cleary Lake | 6,834 | 6,982 | 11,136 | 11,102 | 11,216 |
| Sand Creek | 4,344 | 4,294 | 2,844 | 5,132 | 5,148 |
| Prior Lake S | 14,829 | 14,465 | 13,808 | 14,797 | 15,429 |
| French Lake | 1,432 | 1,681 | 2,485 | 2,558 | 2,750 |

The annual peak load demand of the affected load area in **Table 5-6** is plotted in **Figure 5-13** to graphically illustrate the peak load growth trend from 2008 through 2012.

**Figure 5-13. Affected Load Area Five-Year Historical Peak Load Growth Trend**

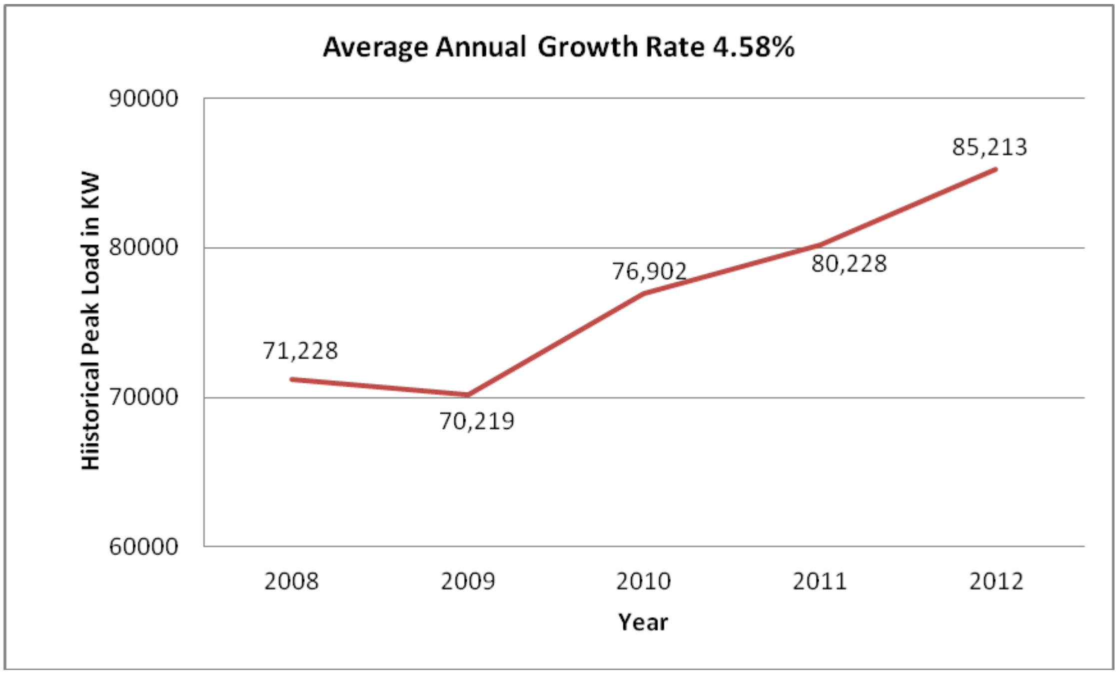



**Figure 5-13** shows consistent growth of the peak demand for the affected load area served by Great River Energy member cooperatives. The historical peak load average annual growth rate was calculated to be about 4.58 percent.

Great River Energy also considered the load growth percentage as forecasted by MVEC. The load projection was done for individual substations that serve the affected load area. The load projection takes into account the projected land use data that are available from city and county agencies in MVEC's service territory. The number of new residential, commercial and industrial consumers for each substation was projected as part of long range load forecast analysis. **Table 5-7** shows the projected average annual load growth percentages for each substation.

**Table 5-7. Forecasted Average Annual Growth Rate**

| Substation | Annual Growth Rates |
|---|---|
| New Prague | 3.00% |
| Merriam Junction | 1.50% |
| Prior Lake North | 2.00% |
| Assumption | 3.00% |
| New Market | 2.00% |
| Spring Lake | 3.00% |
| Gifford Lake | 2.00% |
| Elko | 7.00% |
| Cleary Lake | 5.00% |
| Sand Creek | 3.00% |
| Prior Lake South | 2.00% |

The projected growth rates for the Merriam Junction and Gifford Lake Substation in **Table 5-7** did not consider the proposed mining loads that these substations will serve in the near future. An additional 2 MW mining load is projected to come in-service in the 2013 timeframe at Merriam Junction, and about 11 MW additional mining load is expected to be in-service in the 2015 timeframe at Gifford Lake. These are spot loads, and inclusion of these loads in the calculation of the growth rates would affect the accuracy of the long-term growth rates of the substations.

When determining the average annual growth rates for forecasting the future peak demand of the affected load area, Great River Energy compared the three percentage growth rates, the ten year, five year and the weighted annual average growth rate from the data provided by its member cooperatives. The 10-year historical peak load data showed an average annual growth rate of 2.67 percent, the five-year historical peak load data showed an average annual growth rate of about 4.58 percent and the load projection of individual substations by MVEC showed a weighted average annual growth rate of 3.26 percent. The weighted average annual growth rate was calculated based on the following formula and uses the 2012 historical substation peak loads from **Table 5-4**.

$$\text{Weighted average annual growth rate} = \frac{LCP\#1 * \%GR1 + LCP\#2 * \%GR2 + LCP\#3 * \%GR3 + \cdots etc}{LCP\#1 + LCP\#2 + LCP\#3 + \cdots etc}$$

Where: LCP# 1 = Historical Peak Load of Load Center 1 (Substation 1)

LCP# 2 = Historical Peak Load of Load Center 2 (Substation 2)

%GR1 = % percentage growth rate substation #1

%GR2= % percentage growth rate of substation # 2

With the transmission system showing inadequacies under recent historical peak load during contingencies, it was decided to use a conservative growth rate with which the forecasted peak load has the high probability of occurring on the years it is forecasted for. The weighted average annual load growth rate produced from Great River Energy's member cooperative load growth rate forecast (**Table 5-7**) showed a weighted annual average annual growth rate that is not as high as the historical five-year average annual growth rate or as slow as the ten year historical average annual load growth rate. Therefore, the peak demand of the affected load area will be forecasted using the weighted average annual growth rate percentage for loads served by Great River Energy member cooperatives, and individual substation peaks are forecasted using the growth rate provided for each substation in **Table 5-8**. This table shows the forecasted 2016 load levels per substation used when determining the need for the proposed Project. The starting load for the load forecast is the 2012 peak load recorded at each substation serving the affected load area.

**Table 5-8. Forecasted 2016 Load Levels Used for the Out-Year Study**

| Substations | Summer Peak - 2012 Load | | Applied Growth Rate | Summer Peak - 2016 Load | |
|---|---|---|---|---|---|
| | MW | MVAr | | MW | MVAr |
| New Prague | 7.719 | 1.567 | 3.00% | 8.69 | 1.76 |
| Merriam Junction | 6.538 | 1.328 | 1.50% | 8.94 | 1.82 |
| Prior Lake North | 11.078 | 2.249 | 2.00% | 11.99 | 2.43 |
| Assumption | 2.455 | 0.499 | 3.00% | 2.76 | 0.56 |
| New Market | 4.122 | 0.837 | 2.00% | 4.46 | 0.91 |
| Spring Lake | 5.789 | 1.176 | 3.00% | 6.52 | 1.32 |
| Gifford Lake | 3.653 | 0.742 | 2.00% | 3.95 | 0.80 |
| Elko | 10.974 | 2.228 | 7.00% | 14.38 | 2.92 |
| Cleary Lake | 11.216 | 2.278 | 5.00% | 13.63 | 2.77 |
| Sand Creek | 5.148 | 1.045 | 3.00% | 5.79 | 1.18 |
| Prior Lake South | 15.429 | 3.133 | 2.00% | 16.70 | 3.39 |
| French Lake | 2.750 | 0.558 | 3.00% | 3.10 | 0.63 |

Xcel Energy provides service in the affected load area though four distribution substations, Credit River, Veseli, Jordan, and Belle Plaine. Similar to the load forecast for affected area loads served by Great River Energy member cooperatives, a conservative growth rate was used when forecasting affected area loads served by Xcel Energy. The historical peak load growth of the affected load area served by Xcel Energy grew in the same trend as the affected load area served by Great River Energy member cooperatives. **Table 5-9** shows the 10-year historical load recorded for the substations in the affected load area served by Xcel Energy.

**Table 5-9. 10-Year Historical Peak Load (in kW) Data for Affected Load Area Served by Xcel Energy**

| Substation | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|---|---|---|
| Credit River | 13610 | 13370 | 15500 | 17070 | 17451 | 16057 | 14633 | 16720 | 17626 | 17140 |
| Veseli | 7040 | 7080 | 8895 | 4150 | 4192 | 5301 | 5301 | 5952 | 6012 | 6394 |
| Jordan | 7560 | 7140 | 8760 | 9343 | 8789 | 8220 | 8220 | 7895 | 8623 | 9749 |
| Belle Plaine | 9160 | 9620 | 9993 | 12758 | 14126 | 13002 | 13002 | 15576 | 13945 | 14815 |

**Figure 5-14** shows that the customer load in the affected load area served by Xcel Energy grew at an average annual rate of 2.84 percent in the last ten years (2003 – 2012). Similarly, the plot of the five year historical peak loads, **Figure 5-15**, shows that the affected load area grew at average annual rate of 3.09 percent between 2008 and 2012.

**Figure 5-14. Affected Load Area 10-Year Historical Peak Demand Growth Trend Served by Xcel Energy**

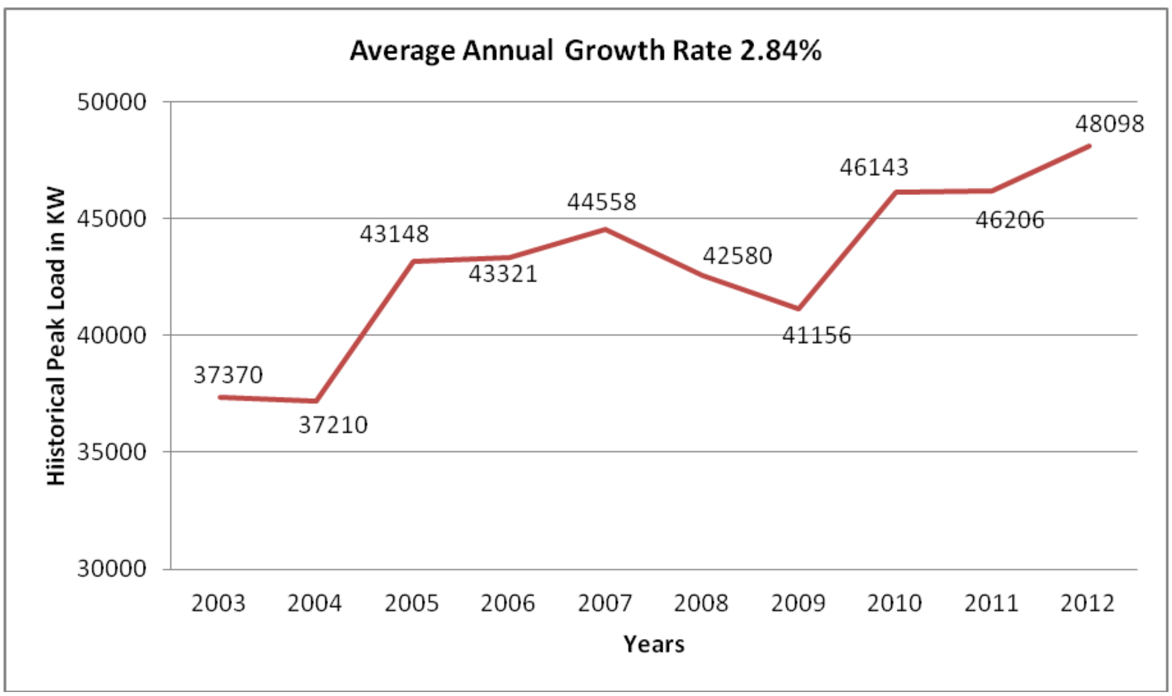
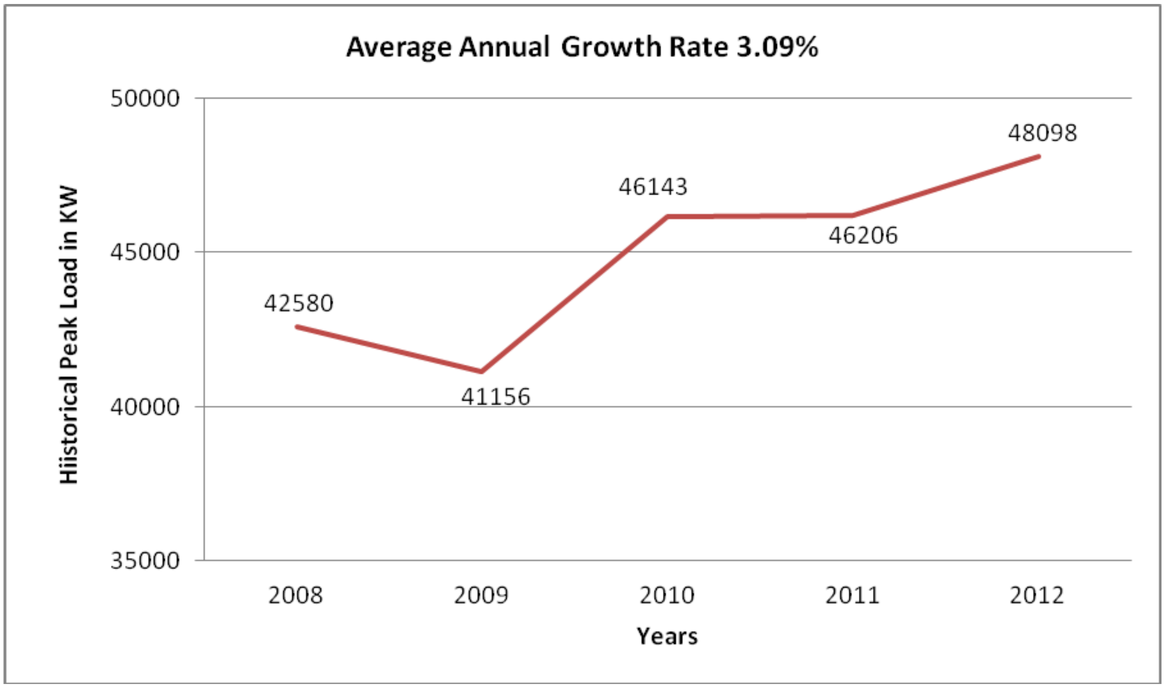


**Figure 5-15. Affected Load Area Five-Year Historical Peak Demand Growth Trend Served by Xcel Energy**



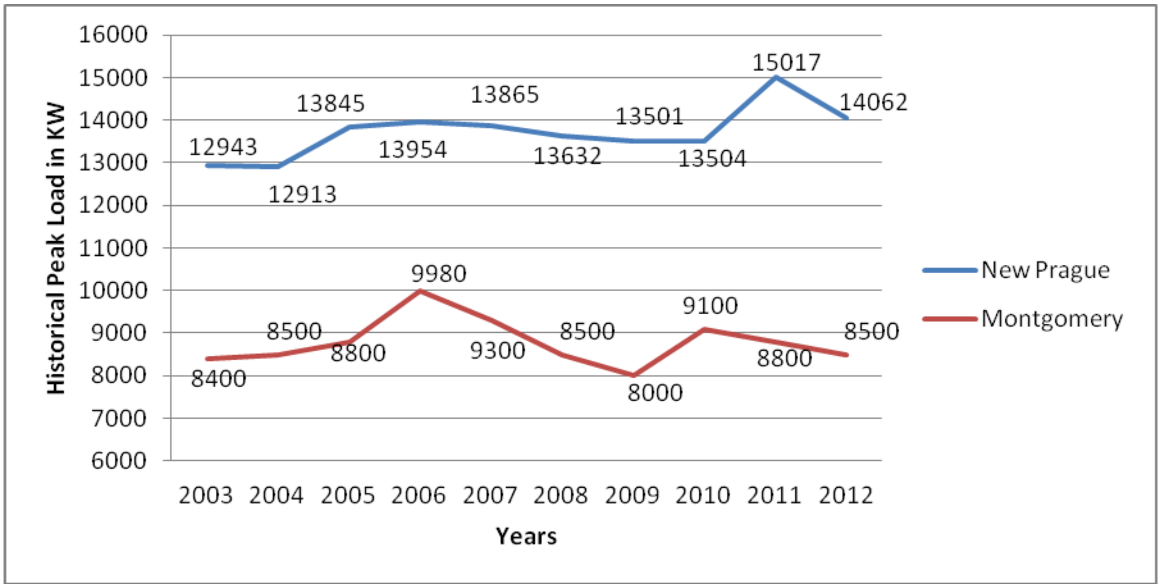

The growth rate of the peak loads in affected load area served by Xcel Energy is growing at a faster rate than the growth rate used when studying and justifying the need for the proposed Project. The proposed Project is based on a conservative average annual growth rate of 1 percent that was applied to Xcel Energy's 2012 peak load. A one percent annual growth rate was applied to the 2012 peak loads when forecasting and modeling the 2016 (out-year) load level of the affected load area served by Xcel Energy. **Table 5-10** shows the 2012 peak loads recorded for Xcel Energy substations serving the affected load area, the applied growth rate and the forecasted 2016 load level. It should be noted that use of either ten- or five-year historical load growth percentage would result in higher 2016 load levels than shown in **Table 5-10.**

**Table 5-10. Forecasted 2016 Load Levels Used for the Out-Year Study**

| Load | Summer Peak - 2012 Load | | Applied Growth Rate | Summer Peak - 2016 load | |
|---|---|---|---|---|---|
| | MW | MVAr | | MW | MVAr |
| Credit River | 17.14 | 3.48 | 1% | 19.0 | 3.858 |
| Veseli | 6.072 | 1.233 | 1% | 6.250 | 1.269 |
| Jordan | 9.488 | 1.927 | 1% | 9.770 | 1.984 |
| Belle Plaine | 15.889 | 3.226 | 1% | 16.370 | 3.324 |

SMMPA and ITCM serve load centers in the City of New Prague and Montgomery, respectively. The historical peak load growth rates for these areas have not been as significant as seen by Great River Energy member cooperatives and Xcel Energy. The 10-year average historical peak load growth rate for New Prague is calculated to be 0.93 percent, and the 10-year historical load growth rate of ITCM'S portion of the Montgomery load was found to be 0.13 percent. **Figure 5-16** shows the historical peak load growth trends of the New Prague and Montgomery areas.

**Figure 5-16. Affected Load Area 10-Year Historical Peak Demand Growth Trend Served by ITCM and SMMPA**




The five-year historical peak load growth of the two areas is flat, where the New Prague area grew at an average annual rate of 0.78 percent and the Montgomery load showed no growth. Consistent with the slow or stagnant load growth for this substation, the New Prague area load was grown at an average annual growth rate of 0.8 percent and the ITC Montgomery load was grown at an average annual growth rate of 0.25 percent. **Table 5-11** shows the projected peak loads and applied annual percentage growth rate data for loads in the affected load areas served by SMMPA and ITCM. The load levels in the table were used when planning and determining the need of the proposed Project.

**Table 5-11. Forecasted 2016 Load Levels Used for the Out-Year Study**

| Load | Summer Peak - 2012 load | | Applied Growth Rate | Summer Peak - 2016 Load | |
|---|---|---|---|---|---|
| | MW | MVAr | | MW | MVAr |
| New Prague Muni 2 | 8.6 | 1.74 | 0.8 % | 8.9 | 1.82 |
| New Prague Muni 1 | 4.6 | 0.94 | 0.8 % | 4.8 | 0.98 |
| Montgomery | 8.5 | 2.5 | 0.25 % | 8.6 | 2.5 |

The peak demand projection was made for the summer season using the recorded historical peak of the 2012-2013 season as the starting point. The weighted average annual load growth percentage, which is calculated from the 2012 historical substation peak demand and substation growth rates in **Table 5-8, Table 5-10** and **Table 5-11,** is used to forecast the peak demand shown in **Table 5-12**.

The maximum peak demand was calculated based on the five-year hourly historical peak demand data. To eliminate switching peaks, the coincident peaks were calculated for each month as provided in **Table 5-3**. The summer coincident peak load of the affected load area was found to be 156.6 MW that was observed in July 2012. This peak demand and the weighted average annual growth rate are used when forecasting the summer peak demand of the affected load area from Summer 2012-2013 through Summer 2022 -2023 as shown in **Table 5-12**. The weighted average annual load growth rate is calculated to be 2.2 percent.

The recorded 2012 historical energy consumption of the affected load area was used as a starting point when forecasting energy consumption for the affected load areas. For purposes of studying the transmission system and monitoring load growth, distribution substation data are used to calculate and forecast load. These distribution substations are closer to the load than bulk substations and the data from distribution substations are more reflective of load patterns. The growth rate used for forecasting energy is calculated from the historical five year (2008 -2012) annual energy usage data. The average annual energy growth rate of the affected area in the past five years is calculated to be 0.9 percent.

### 5.6.2 Demand Forecast Results

**Table 5-12** shows the Applicant's results of forecasting peak demand in the affected load area from Summer 2012-2013 through Summer 2022-23.

**Table 5-12. Summer Season Forecast Peak Demand per Year in MW**

| Summer Season | Peak Demand | Weighted Average Annual Growth Rate |
|---|---|---|
| 2012-2013 | 156.6 | - |
| 2013-2014 | 160.0452 | 2.20% |
| 2014-2015 | 163.5662 | 2.20% |
| 2015-2016 | 167.1647 | 2.20% |
| 2016-2017 | 170.8423 | 2.20% |
| 2017-2018 | 174.6008 | 2.20% |
| 2018-2019 | 178.442 | 2.20% |
| 2019-2020 | 182.3677 | 2.20% |
| 2020-2021 | 186.3798 | 2.20% |
| 2021-2022 | 190.4802 | 2.20% |
| 2022-2023 | 194.6708 | 2.20% |

### 5.6.3 Consumption Forecast Results

**Table 5-13** shows the Applicant's results of forecasting energy consumption in the affected load area from 2012 through 2022.

**Table 5-13. Forecasted Annual Energy Consumption**

| Year | Energy (MWh) | Growth Rate |
|---|---|---|
| 2012 | 621,242.65 | - |
| 2013 | 621,298.56 | 0.90% |
| 2014 | 621,354.48 | 0.90% |
| 2015 | 621,410.40 | 0.90% |
| 2016 | 621,466.33 | 0.90% |
| 2017 | 621,522.26 | 0.90% |
| 2018 | 621,578.20 | 0.90% |
| 2019 | 621,634.14 | 0.90% |
| 2020 | 621,690.09 | 0.90% |
| 2021 | 621,746.04 | 0.90% |
| 2022 | 621,801.99 | 0.90% |

#### 5.6.4 System Capacity

Minnesota Rule 7849.0280 provides that an applicant for a CON must provide information about the ability of the existing system to meet the demand for energy predicted to occur in upcoming years. The Applicant applied for an exemption from most of the requirements in this rule because they are applicable to proposed generating plants, not transmission lines. The Commission granted the exemption. The only two provisions in the rule that the Applicant must respond to are subpart A (relating to planning programs) and subpart H (relating to net demand and net capability), and those discussions are provided below.

#### 5.6.5 Transmission Planning/Net Demand and Net Capability

The Applicant was part of the Minnesota Transmission Owners that prepared the 2009 Biennial Transmission Projects Report, which was approved by the Commission on May 28, 2010. The 2009 Biennial Transmission Projects Report discusses a need for improvement in the affected load area and provided alternatives considered for addressing the inadequacies (tracking numbers 2009-TC-N5 and 2009-TC-N2). In addition, the NPAS, which is included in the **Appendix H**, looked at the need for any improvement to the transmission system serving the affected load area. The study showed inadequacies in the system, provided transmission alternatives and recommendations to address the inadequacies and reliably serve the affected areas for a long term.

Load duration curves were developed to illustrate the number of hours the affected load area is exposed to inadequacies in the system. **Figure 5-17** shows the load duration curve for 2012 and five years of forecasted load duration curves. The forecasted load duration curves are based on the 2012 historical hourly flows record in the system and the weighted average annual growth rate of 2.2 percent.

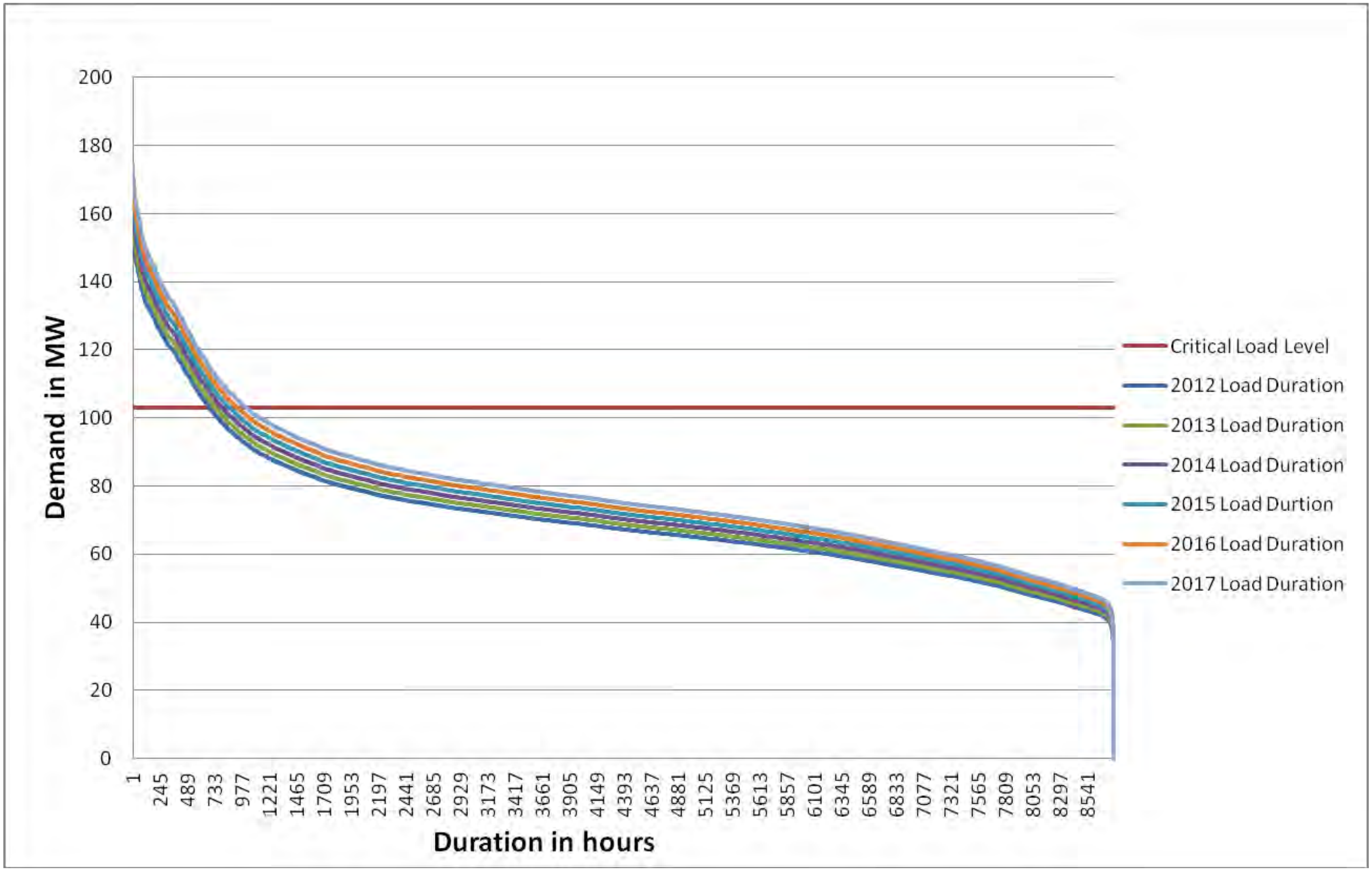
The system analysis showed that the existing transmission system serving the affected load area can reliably serve loads up to 103 MW level. The area was found at risk to experience low voltage concerns during critical contingencies when the peak load of the affected load area exceeds the critical load level of 103 MW. The load duration curve shows that the system was at a risk of experiencing low voltage and line overload concerns in the 2012 for about 690 hours of the year.

**Table 5-14** summarizes the number of hours the system will be at risk of experiencing inadequacies without the Project; both low voltage and line overload concerns.

**Table 5-14. Duration that the Affected Load Area is at Risk of Experiencing Inadequacies**

| Year | Duration at risk (hours ) |
|---|---|
| 2012 | 690 |
| 2013 | 740 |
| 2014 | 799 |
| 2015 | 863 |
| 2016 | 939 |
| 2017 | 1012 |

**Figure 5-17. Load Duration Curve**



The Applicant conducted computer modeling of various alternatives designed to address the identified electric system inadequacies to determine what the impact on the system would be under various operating conditions and contingencies. The modeling showed that the development of, in 2016 timeframe, a double circuit 69 kV line from the Elko – New Market area to Veseli to 115 kV standards, rebuild of existing transmission lines from Prior Lake Junction to Credit River Junction, Credit River Junction to Cleary Lake Substation, Cleary Lake Substation to Credit River Substation and, in 2022 timeframe, installation of a 115/69 kV source at Veseli, combined with converting the Chub Lake – Elko –Veseli line to 115 kV operation, would provide adequate and reliable service in the area up to the 2027, given anticipated growth levels. **Figure 5-18** shows the increase in available capacity of the transmission system with the proposed Project versus peak demand.

**Figure 5-18. Capacity of the Affected Load Area Transmission System with the Proposed Project versus Peak Demand**

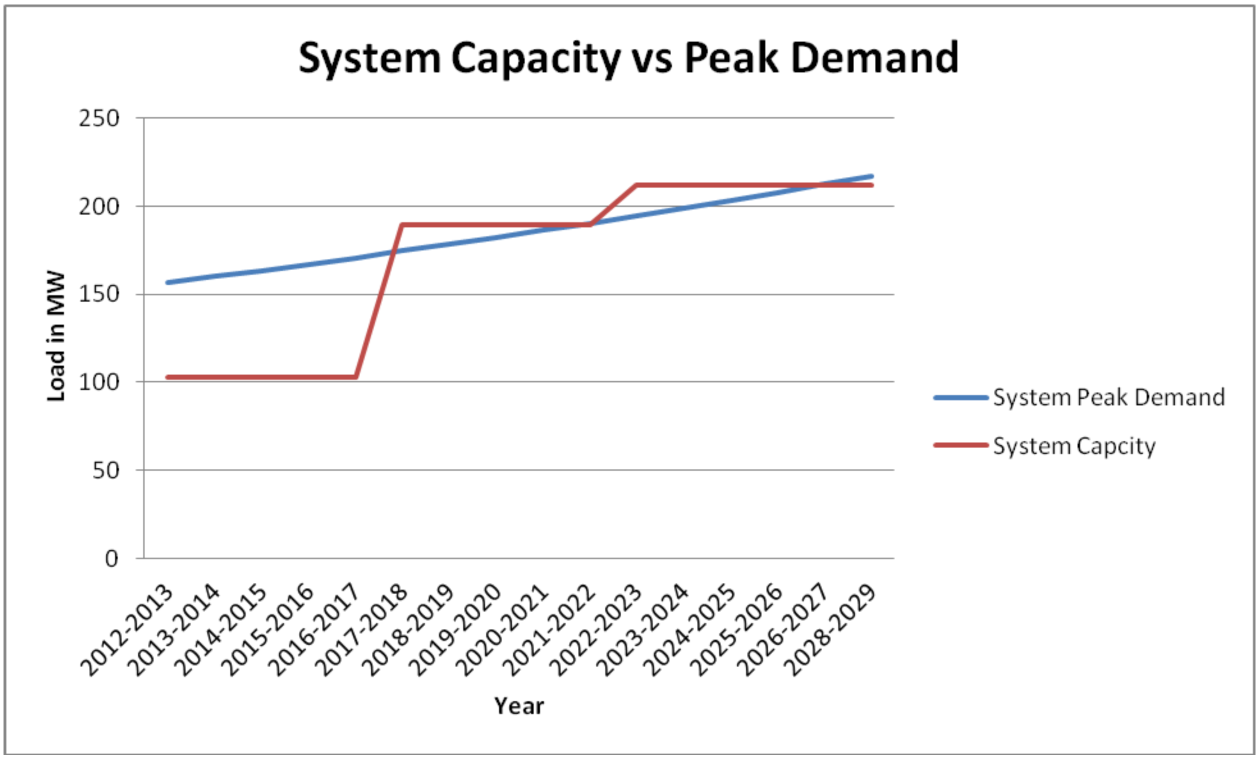
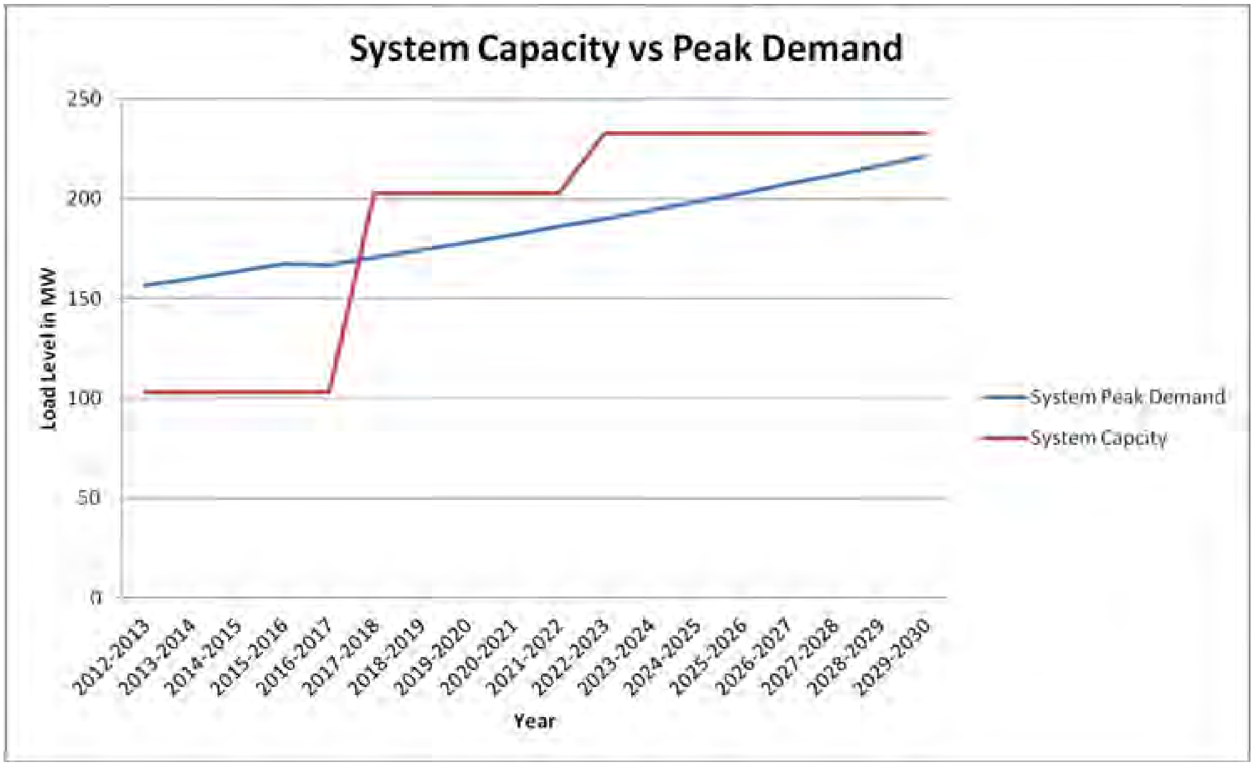



**Figure 5-18** shows that the transmission capacity follows the load growth of the affected load area provided that the load growth in the system will sustain as forecasted. As discussed in **Section 5.6.1**, a large mining load is expected to be in-service in the 2015 timeframe and will be served from the Gifford Lake distribution substation. For reliable service to loads in the affected load area and the mining load, the Gifford Lake distribution substation will be upgraded to receive service directly from the 115 kV transmission system located less than a mile from the substation. This upgrade will create more capacity in the transmission system. **Figure 5-19** shows the transmission capacity versus peak demand graph upon the conversion of Gifford Lake Substation to 115 kV as part of reliably serving the affected load area and the proposed mining load.

**Figure 5-19. Capacity of the Affected Load Area Transmission System with the Proposed Project and Upgrade of the Gifford Lake Distribution Substation Versus Peak Demand**




## 5.7 Increased Efficiency

The proposed Project includes rebuilding 4/0 A conductors in the New Market – Elko system and constructing a double circuit 69 kV line (build to 115 kV standards) from the New Market area to Veseli. The line rebuilds will be constructed with 795 ACSS conductor, which has lower impedance than the 4/0A conductor. As power loss on a conductor is linearly related with impedance, the 795 ACSS conductor will result in a power loss that is much less than the 4/0A conductor. In addition, the Glendale and Lake Marion sources in the New Market – Elko system send power to the Scott – Faribault system through the new double circuit line built between New Market and Veseli. This results in a reduced flow from existing sources in the Scott – Faribault system. As the Scott – Faribault system consists of some high impedance transmission lines, the reduction in power flow from the existing sources would also mean a reduction in power loss. Therefore, the proposed Project, in general, increases the efficiency of the transmission system and results in annual loss savings of approximately 2.8 MW and annual energy saving of 6,854 MWh annually as discussed in **Section 4.5**.

## 5.8 Load Management and Energy Conservation Programs

### 5.8.1 Load Management

Pursuant to Minnesota Statutes Section 216B.2422, Great River Energy has submitted separate Resource Plans to the Commission. These Resource Plans detail, among other things, the Applicants programs to manage customer demand and energy consumption. As a part of this effort, each of the "demand side management" (DSM) programs are directed at minimizing peak load conditions by reducing the load of participating customers at system peak conditions.

Current Great River Energy DSM activities include interruptible demand programs, off-peak storage programs and Conservation Improvement Program (CIP) programs offered in partnership with Great River Energy's member-owners. In aggregate, the load management programs for the entire Great River Energy system curtail an estimated 15 percent of maximum seasonal peak demand (360 MW summer/320 MW winter).

The impact of the load management program is included in the Great River Energy load forecasts, and does not provide enough capacity to delay or avoid the need for the proposed facilities.

### 5.8.2 Energy Conservation

Great River Energy has a robust portfolio of rebate programs, promotions and energy efficiency expertise. These programs help Great River Energy achieve the requirements outlined in Minnesota Statutes Section 216B.241. In 2011, Great River Energy and its member cooperatives invested approximately $18.3 million in the energy efficiency, conservation and DSM programs.

Great River Energy and its member owners not only provide rebates to meet the Minnesota Energy Conservation Policy goals, but also consider energy conservation and load management as an important resource in the planning process. Individual member-system participation goals are used in conjunction with Great River Energy's diversified demand assumptions and loss factors to calculate total system peak reduction. Great River Energy's goal is to maintain and enhance existing programs and continue to introduce new programs that provide net benefits to cooperative members, cooperatives and Great River Energy. The programs are designed to save natural resources and delay the need for additional transmission and/or generation resources.

Great River Energy's conservation programs are described in more detail in **Appendix I**.

### 5.8.3 Conclusion

The load levels shown in **Table 5-12** assume Great River Energy will be successful in reaching the DSM and CIP energy savings objectives in its Resource Plan. As shown in **Figure 5-18**, near-term summer peak load levels are already exceeding the capacity of the system to reliably serve all load in the affected load area without remedial actions such as switching operations to shift load off the system. For DSM or CIP to be feasible alternatives to the Project, these programs would not only need to meet their objectives, they would also have to provide additional reductions in demand to offset projected load growth in the affected load area. Based on historic DSM and CIP savings as well as forecasted load growth, it is not realistic to expect that DSM and conservation measures can achieve the level of reduction necessary within the affected load area.

## 5.9 Delay of the Project

Minnesota Rule 7849.0300 requires a discussion of anticipated consequences to its system, neighboring systems, and the power pool should the Project be delayed one, two, and three years, or postponed indefinitely. The 2016-17 summer peak has been designated as the in-service date for the Project; therefore, a One Year Delay translates to a 2015-16 summer date. As the proposed project is planned to address the inadequacies in both the Scott-Faribault System and Cleary-Elko System, the effects of delay of the proposed project is discussed for both systems.

The inadequacies in the affected load area are low voltage and transmission line overload concerns. As discussed in **Section 5.6**, the affected load areas have shown a rapid growth rate in the past five years. In addition, large mining loads are expected to come in-service and require service in the near term. A robust transmission system is required to address the deficiencies in the existing system and provide service to new loads that come to the affected load area.

The analysis using the historical load data shows that the loads in the affected load area have grown above the maximum load serving capability of the transmission system. Closing normally open switches (for example the normally open switch on Veseli to Circle Lake) to bring in additional sources to serve the Scott-Faribault System, is no longer an option as the transmission line between Valley Grove and Circle Lake overloads. Delay of the Project worsens low voltage and overload concerns. Maintenance of the transmission lines would also be more difficult as the Project is delayed. As discussed in **Section 5.6** and shown in the duration curve, the number of hours that the affected load area is vulnerable to inadequacies increases. To bring the transmission system within the proper operating conditions, curtailment of loads in the affected load area is required. This would result in an unavailability of power to a significant portion of consumers in the affected load area. The critical demand analysis in **Table 5-15** summarizes the duration at which load is at risk and the magnitude of the load that needs to be curtailed to bring the system in to normal operating conditions.

**Table 5-15. Critical Demand Analysis**

| Scenario | 2016-17 Summer Forecast | One Year Delay | Two Year Delay | Three Year Delay | Infinite Delay[2] |
|---|---|---|---|---|---|
| # Hours above Critical Demand | 939 | 1013 | 1102 | 1209 | 1613 |
| Curtailed Demand in MW[3] | 67.8 | 71.6 | 75.4 | 79.4 | 91.7 |
| % of Local Demand Curtailed | 39.7 | 41 | 42.3 | 50 | 47 |
| Annual # of Days at Risk[1] | 39 | 42 | 46 | 210 | 67 |

[1] Based on 2012 load curve
[2] Based on 2022-2023 demand projections
[3] Curtailment a

## 5.10 Effect of Promotional Practices

The growth in demand in the affected load area is a result of the growth in the number of customers and in the energy that each customer is consuming. Great River Energy has not engaged in any promotional practices to encourage the use of more power. Just the opposite, as described in **Section 5.8**, Great River Energy has spent significant sums of money promoting conservation and demand side management.

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# 6 ALTERNATIVES TO THE PROJECT

## 6.1 Analysis of Alternatives

In any CON proceeding on a proposed transmission line project, an applicant is required to consider various alternatives to the proposed project. Minnesota Statutes Section 216B.243, subdivision 3(6) provides that in assessing need, the Commission will evaluate "possible alternatives for satisfying the energy demand or transmission needs." The Commission has also provided in its rules that an applicant for a CON must discuss in the application the possibility of a number of alternatives. Minnesota Rule 7849.0260 provides:

Each application for a proposed large high voltage transmission line (LHVTL) must include:

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

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

Minnesota Rule 7849.0340 also requires an applicant to consider the option of not building the proposed facility.

In this section, the various alternatives to the proposed Project that were considered by Great River Energy are discussed. These alternatives include: 1) various generation options including peaking generation, distributed generation, and renewable (solar and wind) generation; 2) various transmission solutions, including upgrading other existing facilities, different voltage levels and different endpoints; and 3) a no-build alternative focusing on reactive power supply improvements and demand side management. Discussion of each alternative focuses on why that alternative is unacceptable or inferior to the Project.

## 6.2 Generation Alternative

### 6.2.1 Peaking Generation

Generation and distributed generation were considered as an alternative to the new transmission of the proposed Project. Because the Project is designed to address localized inadequacies in two different areas of the transmission system (Scott-Faribault System and Cleary-Elko System), a comparable generation solution must also address the issues in each of these areas. However, the sort of small generators that could reasonably be considered for such an alternative (typically 1.5 or 2 MW diesel or natural gas-fueled generators) would not be sufficient to meet the need in the either of these areas because the existing conductors are at or near capacity on the Cleary-Elko System. A rebuild of this system would be necessary if generation were added to the system.

The Project is proposed to address inadequacies in the 69 kV transmission systems in the Scott-Faribault and Cleary-Elko systems. The Project will provide approximately 37 MW of incremental load-serving capability beyond the 2016 load level. For comparison purposes, the generation solution must address the existing inadequacies of these systems and provide an equivalent level of load-serving capability.

The study performed, and included in **Appendix H**, showed that the equivalent load-serving capability could be achieved by operating four gas-fired diesel generators for a total of 18 MW at the City of New Prague and installing multiple other generation sources, including an 8 MW generator at Jordan, 7 MW generator at Spring Lake, and a 20 MW generator at Montgomery. The use of generation to address the needs this Project would address was not selected for the following reasons:

1. Operation of these generators to address system inadequacies at non-peak hours may be required, resulting in high operations costs.

2. Capital investment to install generation of this type is significantly higher than the Project. With a typical estimate of $1,000/kW, installation of 35 MW of diesel generators is estimated to cost approximately $35,000,000.

3. Operation and maintenance costs associated with generation units are significantly higher than that of transmission systems.

4. Reliability of peak generation is less than that of transmission lines. Installation of redundant generation would be necessary for equivalent reliability to be achieved.

5. Addition of generation would not improve transmission system reliability of the aged infrastructure at issue in the Project area.

### 6.2.2 Distributed Generation

A distributed generation alternative was analyzed. Distributed generation, however, is not a viable alternative to address the inadequacies identified in the existing transmission system. Due to the size of the affected load area and the performance achievable by the proposed Project, a large number of distributed generation units (1.5 to 2 MW each) would be required to address the load-serving performance achievable by the Project. This option was not selected for the following reasons:

1. Installation of the number of generators of this scale to address the inadequacies in the area and provide equivalent incremental load-serving capability is much more costly than the proposed Project.

2. Operation and maintenance cost of these generators is high.

3. The area also serves industrial loads that consist of large motors. Motors such as these require a large amount of power at startup. Distributed generators are not capable of providing the large amount of power that may be needed by these motors.

4. The Project rebuilds aged infrastructure. The rebuild will improve reliability of the system and reduce system losses. With the distributed generation alternative, this aged infrastructure will be sources of poor reliability and system losses on the transmission system.

5. Reliability of the generators, in general, is less than that of transmission.

### 6.2.3 Renewable Generation

The affected load area is in need of a system solution that will provide reliable and effective power. Renewable generation is dependent on natural events, such as sunlight or wind speed. Neither wind generation nor solar generation is considered a reasonable alternative to the Project. Energy from these resources is not necessarily available at the times when they are most necessary to serve customers. Residential loads peak between 4 p.m. and 6 p.m., when people are returning to their homes after being away for the day. This is the time when energy in the affected load area is needed the most. Solar energy output and wind energy output typically decrease during these hours of the day.

This option was not selected for the following reasons:

1. Unpredictable sources of energy and inability to make use of resources when power is demanded within the affected load area.

2. Installation costs of both wind and solar generation resources are significantly higher than those of the proposed Project.

## 6.3 Upgrade of Existing Facilities

The proposed Project involves an upgrade of the existing 69 kV lines between the Elko and New Market substations and the Credit River Substation and Prior Lake Junction. Great River Energy also initially investigated rebuilding the 69 kV transmission lines in this area instead of upgrading them to 115 kV. Engineers determined that 115 kV system support would be necessary in this area in the six to 15 years after the Project's in-service date, so upgrading was studied in greater detail. The rebuild of existing lines would utilize existing ROW corridors and upgrade aging infrastructure. To connect the Cleary-Elko System to the Scott-Faribault System, a transmission line must be constructed between these two systems. The new transmission line would connect the two systems at the Veseli Breaker Station. Although not part of this Project, the 69 kV Veseli Breaker Station will be constructed by Xcel Energy in the same area as its Veseli Distribution Substation.

Upgrading the existing Scott-Faribault System was also analyzed. The sources that support the affected load area are located at the Carver and Scott County 115 kV/69 kV substations at the north and the Owatonna and Loon Lake 115 kV/69 kV substations at the south. The distance between these sources and the relatively rapid load growth in the affected load area require an additional source to the system. Upgrade of the Scott-Faribault System would not be sufficient to address the overall transmission deficiencies identified in the affected load area.

## 6.4 Alternative Voltages

Great River Energy considered the possibility of resolving the inadequacies in the Project area and affected load area by implementing a solution of a different voltage level. Initially, Great River Energy considered constructing all lines proposed to be constructed or rebuilt as part of the Project to 69 kV. Upon further review of the existing system and projected load forecasts, however, Great River Energy determined that the facilities between Veseli, New Market, Elko, and Lake Marion would likely need to be upgraded to 115 kV by 2022. Additionally, the transmission facilities between Credit River Substation and Prior Lake Junction, based on forecasting for the Project area, would likely need to be upgraded to 115 kV by 2030. Transmission line facilities are estimated to have a service life of approximately 40 years. Because of these factors, Great River Energy concluded that construction to 115 kV standards at this time, which will enable upgrades in the timeframes discussed above without significant capital investment, would be the most cost-effective Project for Great River Energy, its cooperatives, and its cooperative members.

### 6.4.1 Distribution Voltage

Using distribution voltage to address the system inadequacies was analyzed as an alternative to the Project. Transferring load between distribution systems is feasible to solve transmission issues when the receiving distribution system is served from an independent transmission network. Loads in the affected load area are primarily served from a single, and lengthy, 69 kV transmission network. Loads can only be transferred between distribution substations, but remain on the same 69 kV transmission network throughout the Scott-Faribault System. This will not improve loading or low voltage concerns on the Scott-Faribault System. Distribution substations served by a transmission system separate from the Scott-Faribault System are not located in close proximity. To use an independent distribution system to provide support to the Scott-Faribault System would require constructing lengthy distribution lines to transfer loads. This transfer would, overall, result in weaker voltage and increased loss on a high impedance distribution system. For these reasons, this alternative is not considered a reasonable alternative to the Project.

### 6.4.2 Higher Voltages

A higher voltage solution, above 115 kV was not investigated at this time because Great River Energy determined that a 115 kV solution in the Project area would provide adequate and necessary support to the affected load area for the foreseeable planning horizon. Voltage solutions higher than 115 kV are typically implemented to facilitate the transfer of electricity over long distances and the overall Cleary-Elko System is made up of only 38 miles of transmission lines. Additionally, the other transmission system in the Project area and the Scott-Faribault System is a long-distance 345 kV transmission system. Neither the Scott-Faribault System nor the Cleary-Elko System contains any 161 kV or 230 kV transmission lines, and construction of these facilities in these areas would be non-standard. This transmission system is the backbone of the 115 kV transmission network, upon which the 69 kV network serving the affected load area is dependent. A 345 kV transmission system is not a load-serving system and was therefore not considered further as an alternative to the Project.

## 6.5 Different Conductor

Great River Energy uses several types of conductors for system transmission lines. The standard bare aluminum overhead transmission conductors, aluminum conductor steel reinforced (ACSR) and ACSS, offer known reliable power performance, operating at temperatures up to $100^{o}$C and $200^{o}$C, respectively. At these temperatures, for each of the 115 kV lines proposed for the Project, ACSR would provide 196 MVA of capacity and ACSS would provide 315 MVA of capacity. ACSS typically costs approximately 10 percent more than ACSR conductor. A smaller conductor than 795 ACSS would be sufficient for the Project, but the incremental cost of going from a 477 ACSR conductor to 795 ACSS conductor is minimal. Further, the 795 ACSS conductor provides 220 percent capacity compared to the smaller 477 ACSR conductor. Therefore 795 ACSS is the choice of conductor for most 115 kV transmission lines.

Two-composite conductor alternatives can offer substantial increases in capacity and the ability to span greater distances between poles by use of innovative modern composites, but at a significantly increased cost and lower efficiency. The modern materials and manufacturing process required for these composite conductors result in a material cost that is 300-500 percent higher compared to standard ACSR and ACSS. Composite conductors also experience higher losses because they are operated at higher temperatures. As a result, this type of conductor is used only in special circumstances, where long spans are required. In the case of this Project, circumstances do not warrant the use of this type of conductor.

## 6.6 Alternative Endpoints

During its analysis of how to address operational concerns on the Scott-Faribault System, Great River Energy investigated three other projects. The Project was ultimately selected because its cost was less than the other alternatives and its system performance addressed many system needs, not only in the affected load area but also in the Project area, which had experienced operational issues under certain contingencies. The following discussion of alternative projects to address operational concerns on the Scott-Faribault System focuses on three alternative ways of addressing the affected load area’s inadequacies and why each of these alternatives is inferior to the proposed Project. The endpoints of the Project were selected to provide additional incremental load-serving capability to serve future load growth in the affected load and Project areas.

### 6.6.1 New Sheas Lake 69 kV Source

Great River Energy analyzed whether adding a new 69 kV source to the Scott-Faribault System from the Sheas Lake Substation would address concerns identified in the affected load area. This alternative includes construction of a new 69 kV transmission line from the Sheas Lake Substation to the New Prague Substation. This alternative would address low voltage and transmission line overload concerns on the transmission system serving the area south of Jordan, serving loads at the Sand Creek, New Prague, Veseli, French Lake, and Waseca substations. As part of this alternative, the Carver County—Belle Plaine 4/0 A 69 kV transmission line would need to be rebuilt with 795 ACSR conductor. Rebuilding this line would address overload concerns identified on the Carver County—Belle Plaine 69 kV transmission line and improve the loads served between the Scott County and Carver County substations, serving loads at the Assumption, Belle Plaine, Jordan, Merriam, and Gifford Lake substations.

Though this alternative would be an effective solution for strengthening the system in the affected load area, the cost of this alternative was estimated to be substantially higher than that of the Project. Additional costs would be incurred rebuilding other area facilities that were identified as limiting conductor current carrying capacity, and replacing switches that also contribute to these limits.

Additionally, this alternative does not address the existing operational concerns identified on the existing transmission lines between the Credit River Substation and Prior Lake Junction. These existing 69 kV lines would also require reconductoring. Further, this alternative would require construction of a 10-mile 69 kV transmission line on new right-of-way in addition to over six miles of rebuilt 69 kV transmission line on existing right-of-way. For these reasons, this alternative was considered inferior to the proposed Project.

### 6.6.2 New Sheas Lake 69 kV and 115 kV Sources

A second alternative was analyzed that would connect the Sheas Lake Substation to the affected load area, providing both 69 kV and 115 kV sources to the affected load area. This alternative includes upgrading existing 69 kV transmission lines from the Scott County Substation to the Jordan Substation. The alternative also requires construction of a new 115 kV transmission line from Sheas Lake Substation to Jordan Substation, which would allow completion of a 115 kV loop in the area. Further, Gifford Lake, Merriam Junction, and Jordan substations would require upgrades to accept 115 kV service. A new 115 kV/69 kV substation at Belle Plaine is also recommended to provide support to the Assumption and Belle Plaine substations under system intact conditions and provide contingency support to loads south of the Jordan Substation.

In analyzing this alternative, Great River Energy attempted to introduce a redundant 69 kV source from the east in the study. To do this, an attempt was made to close the normally open switch at Veseli by connecting it to the West Faribault Substation through the Circle Lake Substation. Introducing this redundant source, however, resulted in transmission line overload concerns on the Valley Grove—Circle Lake 69 kV transmission line. This overload would require rebuilding the 9.5-mile 1/0 A conductor along this line with 477 ACSR or larger conductor. This alternative also requires construction of a new breaker station at Valley Grove Junction to avoid creating a three terminal line interconnection at Valley Grove Junction.

Though this alternative would provide voltage support and reduce overload concerns on the Scott-Faribault System, it was determined to be inferior to the Project. The additional transmission line upgrades that would be required to make this alternative operationally equivalent to the Project would cost over twice as much as the proposed Project. This alternative would require construction of a new 10-mile 69 kV transmission line, construction of a new 10-mile 115 kV transmission line, upgrading the 8.5-mile Scott County—Jordan 69 kV transmission line to 115 kV, rebuilding nearly 25 miles of existing 69 kV transmission lines, and making additional substation and breaker station upgrades. Additionally, this alternative would not address the existing overload and low voltage concerns identified on the transmission lines between the Credit River Substation and Prior Lake Junction. For these reasons, this alternative was considered inferior to the Project.

#### 6.6.3 New Lake Marion 115 kV Source

A third alternative that was analyzed to address the operational concerns of the Scott-Faribault System was to introduce a new 115 kV source to the affected load area. The Lake Marion Substation is the closest source to the Scott-Faribault System. Additionally, the Black Dog Generating Station is located nearby and provides an additional redundant source for load-serving purposes. This alternative includes constructing a new, nearly 14-mile 115 kV transmission line from the Lake Marion Substation to the new Veseli Substation, installing a 115 kV/69 kV transformer at the new Veseli Substation, and installing 115 kV breakers at Lake Marion. This alternative would leave a 2.5-mile 69 kV line from the Lake Marion Substation to serve loads between the Lake Marion and Glendale Substations as the Cleary-Elko System is entirely 69 kV. Analysis determined that loss of this line overloads the 69 kV transmission line between Prior Lake Junction and Credit River Junction. This would require the 3.5-mile 4/0 A conductor to be rebuilt with 795 ACSS or ACSR conductor.

Though this alternative would address the concerns on both the Scott-Faribault and Cleary-Elko systems, the initial 2016 investment was more expensive than the proposed Project. This alternative, however, would not address the forecast needs in the Cleary Lake area for 115 kV transmission lines. Constructing the 3.5-mile transmission line to 115 kV would result in an even greater cost differential between this alternative and the Project. This alternative, therefore, was determined to be inferior to the Project for overall improvements to the Cleary-Elko System.

### 6.7 Double Circuiting

Double circuiting is the construction of two separate circuits (three phases per circuit) on the same structures. The proposed Project includes approximately 5.4 miles of double circuit 115 kV/115 kV line between the New Market Substation and the Veseli Breaker Station. In this area, double circuit construction has been analyzed and Great River Energy determined that simultaneous outage of both circuits in this segment is not significantly worse than an individual outage of one circuit in the segment. Double circuiting in this area is cost-effective. Great River Energy has proposed double circuit construction to the greatest extent practical in the Project area. Other opportunities for double circuit construction were not identified. Between the New Market Substation and the Veseli Breaker Station, there is no existing transmission line with which double circuiting could be proposed. Along the other segments of the Project, the existing transmission line is proposed to be rebuilt along its existing centerline and double circuiting with other facilities in these areas is not practical.

## 6.8 Direct Current Alternative

High voltage direct current (HVDC) lines are typically proposed for transmitting large amounts of electricity over long distances because line losses are significantly less over long distances on a HVDC line than on an alternative current (AC) line. A HVDC line is not a reasonable alternative to the proposed Project. The Project is being proposed for local load-serving purposes, whereas HVDC lines are typically proposed for regional transmission projects. The Project must be readily tapped now and in the future to serve customers in the Project area. HVDC lines require expensive conversion stations at each delivery point because the direct current (DC) power must be converted to AC power before it can be used by customers. Such conversion stations would add significantly to the cost of the Project. There is no justification – in terms of reliability, economy, performance, or otherwise – for a HVDC line in this case.

## 6.9 Undergrounding

Undergrounding is an alternative that is seldom used for high voltage transmission lines such as those proposed for the Project. One of the primary reasons underground high voltage transmission lines are seldom used is that they are significantly more expensive than overhead lines. The cost range depends on the design voltage, the type of underground cable required, the extent of underground obstructions such as rock formations, the thermal capability of the soil, the number of river crossings, and other factors, but the construction cost of locating the entire length of the Project's proposed transmission underground is estimated to be as much as 8 to 10 times greater per mile than if it were to be constructed overhead as proposed. This cost does not include the large reactors that would likely be required at each substation to counteract the large line charging currents present on underground high voltage lines. In addition, there are increased line losses and additional maintenance expenses incurred throughout the useful life of an underground high voltage line that further increase the total additional cost of building an underground line instead of an overhead line.

A common argument in favor of implementing underground lines is that they will minimize the human and environmental impacts above ground. However, there are still human and environmental impacts both during and after construction. The predominant environmental impact from the construction, operation, and maintenance of underground transmission lines arises from the need to obtain and maintain completely cleared ROWs. While construction activities for overhead transmission lines are typically concentrated around the line's structures, leaving areas between structures relatively undisturbed apart from some vegetation removal, construction of underground transmission lines requires the entire ROW to be completely cleared and utilized for construction activities. This results in increased impact to wetland areas due to the likely need to install an access road capable of supporting the heavy construction equipment required for trenching activities, and cable installation. After construction, the ROW needs to be maintained free of woody vegetation to reduce soil moisture loss, because high voltage underground conductors make use of soil moisture for conductor cooling. A permanent road must also be maintained along the ROW for maintenance and repair.

Underground lines can also be more challenging to operate and maintain. While overhead lines are typically subject to more frequent outages than underground cables, service can usually be quickly restored. This is accomplished by automatic reclosing of circuit breakers, which results in only a momentary outage of the line. Because circuit breakers on underground lines are typically not reclosed until it can be verified that a fault has not occurred on the underground cable, the smaller number of outages is typically offset by their increased duration. A faulted underground line takes much longer to restore because of the difficulty in locating the fault and accessing the site to make repairs. If the fault is due to a failure in the cable, the segment of failed cable must typically be replaced. This usually involves completely replacing the failed cable between two man-hole splice points, which are ordinarily located every 1,500 to 2,000 feet along the line. To replace a failed cable, it must be possible to bring heavy equipment, including cable reels weighing 30,000 to 40,000 pounds, into the ROW during all seasons of the year. If the fault occurs in a wetland area where all-season roads are not maintained, restoration can be delayed due to the need to install wetland matting to gain access to the manholes involved in replacing the failed cable. Additionally, specialized equipment is often required to repair 115 kV underground transmission facilities and, as Great River Energy has no 115 kV underground facilities on its transmission system, this specialized equipment is not readily available in case of an outage.

Due to the construction, maintenance, reliability, and cost drawbacks of high voltage underground transmission lines, Great River Energy believes that undergrounding is not a viable alternative for any segment of the proposed Project.

## 6.10 No-Build Alternative

Before proposing a transmission or generation solution, Great River Energy considered the viability of managing the existing system such that building additional facilities could be avoided. As discussed in **Section 5.9**, a true "do-nothing" alternative would leave the transmission system in the affected load area and Project area strained by load growth and vulnerable to localized voltage collapses. Specifically, as shown in **Figure 5-18**, the affected load area peak demand already exceeds system capacity. The following discussion of the no-build alternative focuses on two different ways that the inadequacies in the affected load area and Project area might be addressed without building new transmission or generation.

### 6.10.1 Demand Side Management and Conservation

As documented in **Section 5.8** and **Appendix I**, effective conservation measures in the affected load area have deferred, but cannot eliminate, the need for additional voltage support and reliability improvements. Conservation is particularly inadequate in the Scott-Faribault System and Project area, where load growth driving the need for the Project is primarily due to high residential load growth. Additionally, peak demand in the affected load area already exceeds system capacity. Although conservation programs will continue to be implemented in the affected load area and the Project area to maximize efficient use of electricity, these programs cannot slow load growth sufficiently to mitigate the projected inadequacies in the transmission system.

### 6.10.2 Reactive Power Supply

One method of addressing voltage inadequacies is to install equipment, such as capacitor banks, that will supply the needed reactive power locally. While low voltage problems can be addressed by installing reactive power sources in the area, these facilities will do very little to address transmission line overload concerns or aging infrastructure. This alternative, therefore, was not considered viable for the particular inadequacies identified on the transmission facilities on the Cleary-Elko System and the Scott-Faribault System.

# 7 ALTERNATIVE ROUTES

## 7.1 Alternative Requirement

Under the alternative review process, under which this Application was submitted, an applicant for a Route Permit is not required to identify and evaluate an alternative route to the preferred route, as is under the full review process.

Because the preferred routes in the rebuild areas are existing routes, there is little likelihood that other routes would be preferable to the preferred route in most of those areas. However, the Applicant has identified a possible route deviation to the existing line on the very north end of the Project and has identified more than one possible route for the new double circuit transmission line to the Veseli Breaker Station, as discussed in **Section 4.4.1**.

Minnesota Statutes Section 216E.04, subdivision 3 and Minnesota Rule 7850.3100 require an applicant to identify any alternative routes that were considered and rejected. The Applicant did evaluate two alternative routes (**Figure 7-1**) for the new double circuit transmission line to the Veseli Breaker Station. These routes are described below, along with the reasons they were rejected.

## 7.2 Rejected Route Alternatives

### 7.2.1 Elko New Market Area New Transmission Line (Zachary Avenue)

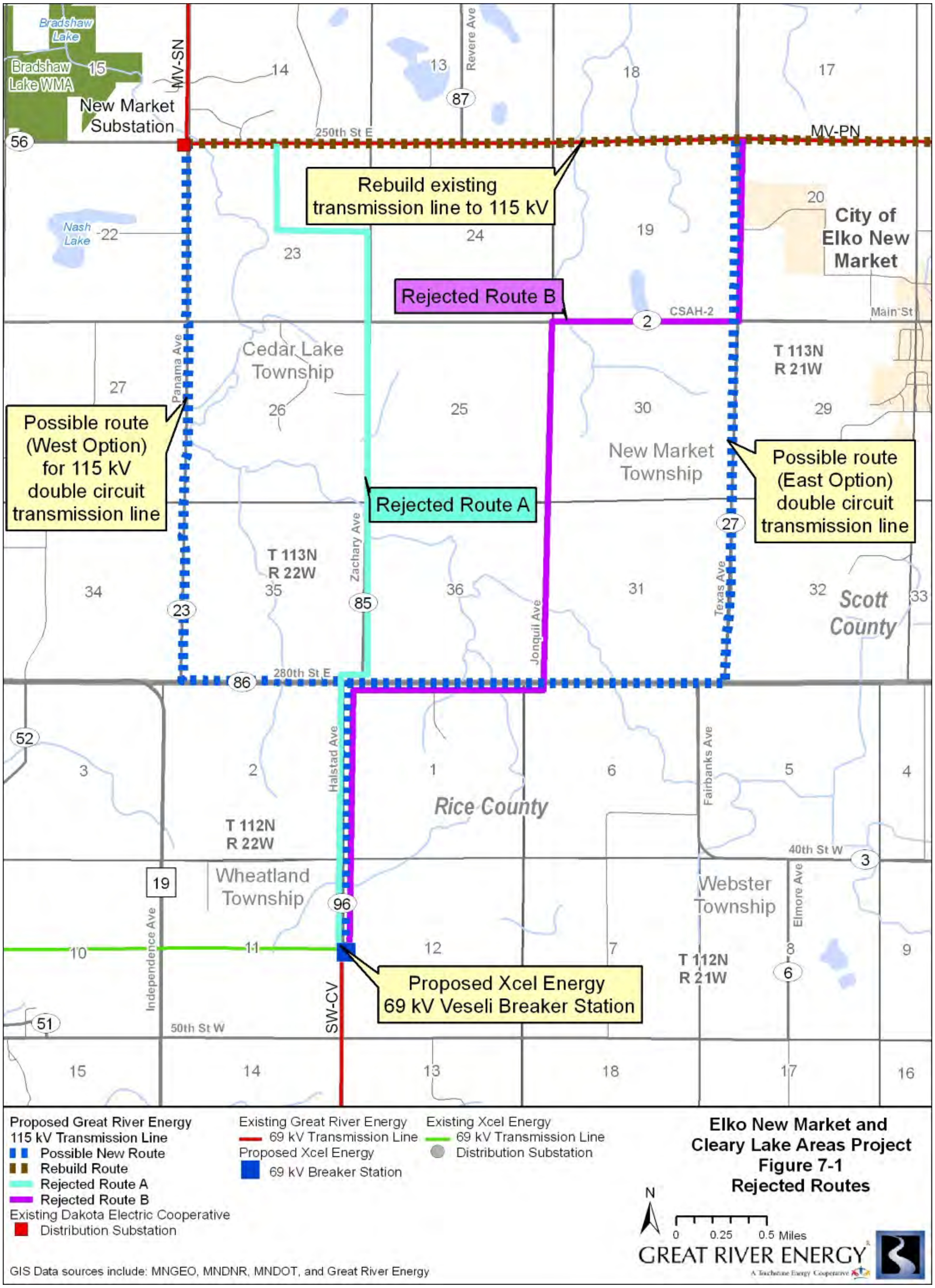
The Applicant evaluated a route (approximately 5.0 miles in length) for the new double circuit transmission line that would start from MV-PN line at the intersection of 250$^{th}$ Street and Hadley Avenue, then run south 0.5 mile along Hadley Avenue (to where the road turns east and becomes 255$^{th}$ Street East). From there, the line would go east following 255$^{th}$ Street East for 0.5 mile and then turn south, where the road turns into Zachary Avenue. The line would follow Zachary Avenue south for about 2.5 miles to CSAH 2, where Zachary Avenue becomes Halstad Avenue. The line would then follow Halstad Avenue for 1.5 miles to the Xcel Energy Veseli Breaker Station (Rejected Route A). This route was rejected because, in comparison to the other possible routes, it would: 1) add an additional crossing of Porter Creek and a DNR wetland on Zachary Avenue; 2) have to be constructed in more rolling topography; 3) require more angle structures, which would add cost to the Project and increase aesthetic impacts; and 4) be located along more rural residential roads rather than county/state roads on which the proposed routes are located.

### 7.2.2 Elko New Market Area New Transmission Line (CSAH 27/Jonquil Avenue)

The Applicant evaluated a route (approximately 6.5 miles in length) for the new double circuit transmission line that would start from the MV-PN line at the intersection of 250$^{th}$ Street and CSAH 27 (Texas Avenue), run south on CSAH 27 for 1.0 mile to CSAH 2, turn west and follow CSAH 2 for 1.0 mile to Jonquil Avenue, run 2.0 miles south on Jonquil Avenue, turn west onto

CSAH 86 for one 1.0 mile to Halstad Avenue, and then turn south and follow Halstad Avenue for 1.5 miles to the Xcel Energy Veseli Breaker Station (Rejected Route B). This route was rejected because, in comparison to the other possible routes, it would: 1) add an additional crossing of Porter Creek on Jonquil Avenue; 2) have to be constructed in more rolling topography; 3) require more tree clearing; 4) add approximately 1.0 mile to easement acquisition and material costs; and 5) be located along more rural residential roads rather than county/state roads on which the proposed routes are located.

**Figure 7-1. Rejected Routes**



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# 8 ENGINEERING, DESIGN, CONSTRUCTION AND RIGHT-OF-WAY ACQUISITION

## 8.1 Transmission Line Engineering and Operation Design

### 8.1.1 Transmission Structure Design and Right-of-Way Requirements

Transmission structure design and the ROW requirements are discussed in **Section 4.1.1**. A schematic of typical structures is provided in **Figure 4-2**.

### 8.1.2 Design Options to Accommodate Future Expansion

The new and rebuilt sections of the transmission line will be designed and constructed to 115 kV standards. The Project, however, will be initially energized at 69 kV. The existing 69 kV tap switches for the distribution substations will also be replaced with 115 kV switches. The 115 kV design will allow for future loading requirements.

The new and rebuilt sections of the transmission line will utilize 795 ACSS conductor. The increase in conductor size over the existing 4/0A conductor will address immediate loading issues while energized at 69 kV and at 115 kV for the foreseeable future. These design considerations will maximize longevity and is consistent with good utility practices. In addition, the Applicant proposed the ACSS conductor instead of a similar sized ACSR conductor because it provides additional capacity above that allowable on an ACSR conductor. This will ensure that the Project will be viable into the future and will not have to be rebuilt as electrical demand increases or changes in the electrical network configuration are made.

## 8.2 Identification of Existing Utility and Public Rights-of-Way

The rebuild portions of the Project parallel existing 69 kV ROW, as discussed below. The proposed possible routes for the new line also follow road ROW for their entire length. Offsets may be used as necessary to provide additional setback from structures on the ROW or to incorporate requests from landowners and/or agencies.

There are existing transmission line easements for approximately 10.8 of the 11.3 miles of the routes the Applicant proposes to rebuild, although prescriptive easement rights exist for the approximately 0.5 mile of existing line without easements. Existing easements may be amended or replaced with new easements and new easements will be obtained where prescriptive easements currently exist that will describe the new transmission centerline on the property and have provisions that are typical of today's easements.

### 8.2.1 Utility Rights-of-Way

The transmission lines the Applicant proposes to rebuild have distribution lines underbuilt on portions of the lines. Unless engineering considerations dictate otherwise, Great River Energy does not propose to change the existing configurations.

In the event the approved new transmission line route between the MV-PN line and the Veseli Breaker Station overtakes existing distribution lines, Great River Energy will work with the owner of the distribution lines (either MVEC or Xcel Energy) to place the distribution lines in a manner that will efficiently utilize the utility easements and minimize the impact to adjoining property owners.

### 8.2.2 Public Rights-of-Way

The rebuilt transmission lines will parallel road ROW for about 8.7 of the approximately 11.3 miles of the rebuild routes. The entire lengths of both options for the new double circuit transmission line to the Veseli Breaker Station are along public road ROW.

## 8.3 Transmission Line Right-of-Way Acquisition Procedures

Although Great River Energy has existing easements for the routes to be rebuilt (consisting of granted, condemned, and prescriptive easement rights), where necessary, the intent is to amend the existing easement or enter into new easements with the landowners to update the easement width or the language to reflect typical provisions included in today's easements. Under certain circumstances, the 115 kV facilities may be designed within existing ROW. In the event the Commission should authorize a different route requiring new ROW, the Applicant will be required to obtain new easements for a 70-foot ROW. New easements will be acquired for the new transmission line from the MV-PN line to the Veseli Breaker Station. Great River Energy will have a ROW agent or title specialist complete a search of the public records of all lands involved in the Project. This search will result in a title report to determine the legal description of the property, the owner(s) of record of the property, and other information regarding easements, liens, restrictions, encumbrances, and other conditions of record. Once this information has been verified and the easement and parcel exhibit has been prepared, a ROW agent will contact the property owners or their representative to provide information about the Project and discuss the easement and how it may affect their property. The Applicant did notify by mail and invite all landowners of record to the open houses held on January 15 and 16, 2013. The Applicants will notify the landowners again when this Application is filed, therefore it should not be new information when the ROW agent contacts the landowner.

Great River Energy will complete the preliminary survey work for the transmission line after landowner notification. Soil investigations will be performed after the owner has granted permission. As the design of the transmission line nears completion, survey crews will stake the transmission centerline.

The ROW agent will begin the negotiating process by presenting the Route Permit and parcel-specific documents and Project information, including the easement and parcel exhibit, along with an offer of compensation for the easement rights requested. The property owner will be allowed a reasonable amount of time in which to consider the offer and to present material to Great River Energy that the owner believes is relevant to determining the value of the property.

During easement negotiations, Great River Energy will also discuss ingress to and egress from the transmission line ROW during construction, tree and vegetation removal, potential damage and its mitigation and the Project schedule. The offer of compensation will include reasonable compensation for trees and/or vegetation that needs to be removed for the Project.

The ROW agent will work with the landowner to negotiate the terms of a new easement that are acceptable to the landowner and Great River Energy. If Great River Energy cannot come to terms on a new easement where an existing line exists, then Great River Energy may continue to exercise its rights that it already has from the previous easement. In the event that Great River Energy and the landowner cannot come to agreement on the terms of an easement, then Great River Energy would consider exercising its rights of eminent domain under Minnesota Statutes Chapter 117.

## 8.4 Construction Procedures

Procedures to be used for construction of the transmission lines are discussed below.

After land rights have been secured, landowners will be notified prior to the start of the construction phase of the Project, including an update on the Project schedule and other related construction activities.

The first phase of construction activities will involve survey staking of the transmission line centerline and/or pole locations, followed by removal of trees and other vegetation from the ROW. As a general practice, low-growing brush or tree species are allowable at the outer limits of the easement area. Taller tree species that endanger the safe and reliable operation of the transmission facility will be removed. In developed areas and to the extent practical, existing low-growing vegetation that will not pose a threat to the transmission facility or impede construction may remain in the easement area, as agreed to during easement negotiations.

The NESC states that "vegetation that may damage ungrounded supply conductors should be pruned or removed." Trees beyond the easement area that are in danger of falling into the energized transmission line ("danger trees") will be removed or trimmed to eliminate the hazard as shown in **Figure 8-1**, as allowed by the terms in the existing or the new easement that is acquired. Danger trees generally are those that are dead, weak or leaning towards the energized conductors. In special circumstances, tree trimming agreements may be possible to minimize tree removal based on negotiations with individual landowners.

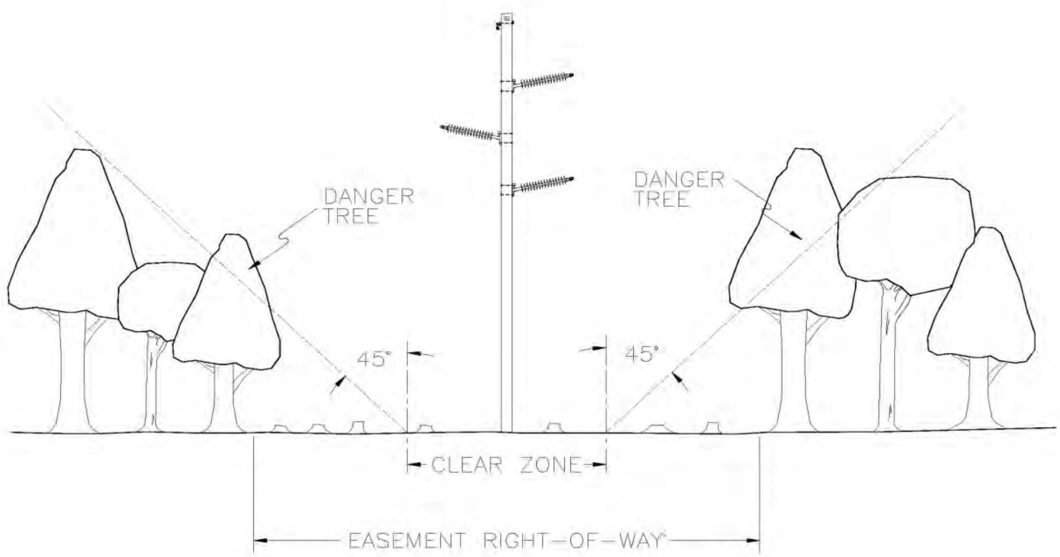
All materials resulting from the clearing operations will be either chipped on site and spread on the ROW, stacked in the ROW for use by the property owner, or removed and disposed of otherwise as agreed to with the property owner during easement negotiations.

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

The second phase of construction will involve structure installation and stringing of conductor wire. During this phase, underground utilities are identified through the required One Call process to minimize conflicts with existing utilities along the routes.

If temporary removal or relocation of fences is necessary, installation of temporary or permanent gates would be coordinated with the landowner. The ROW agent may work with the property owner for early harvest of crops, where possible, with compensation to be paid for any actual crop losses. During the construction process, it may be necessary for the property owner to remove or relocate equipment and livestock from the ROW. Compensation related to these activities will be discussed with the landowner during easement negotiations.

**Figure 8-1. Standard Tree Removal Practices**




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

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

Actual line construction will begin with removal of existing structures closest to the location of the new structures, unless an off-set is necessary so the existing transmission line can remain energized, whereas it would be left in place. The new structures are installed directly in the ground, by augering or excavating a hole typically 7 to 10 feet deep and 2 to 3 feet in diameter for each pole. Any excess soil from the excavation will be spread and leveled near the structure or removed from the site, if requested by the property owner or regulatory agency.

The new structures will then be set and the holes back-filled with the excavated material, native soil, or crushed rock. Based on the known soil types in southeastern Minnesota, it is anticipated that the average structure depth of a typical 65-foot long pole would be approximately 8.5 feet deep. In poor soil conditions, a galvanized steel culvert is sometimes installed vertically with the structure set inside. Concrete foundations may be necessary in special cases. Drilled pier foundations may vary from 4 to 8 feet in diameter. Concrete trucks are normally used to bring the concrete in from a local concrete batch plant.

After a number of new structures have been erected, Great River Energy will begin to install the new static wire by establishing stringing setup areas within the ROW. These stringing setup areas are usually located every two miles along a project route and occupy approximately 15,000 square feet of land. Conductor stringing operations require brief access to each structure to secure the conductor wire to the insulators or to install shield wire clamps once final sag is established. Temporary guard or clearance structures are installed, as needed, over existing distribution or communication lines, streets, roads, highways, railways or other obstructions after any necessary notifications are made or permits obtained. This ensures that conductors will not obstruct traffic or contact existing energized conductors or other cables. In addition, the conductors are protected from damage.

Crossing of rivers, streams and wetlands will require particular attention during construction. The transmission lines will cross a number of wetlands and will span the Credit River and Porter Creek. Great River Energy will not allow construction equipment to be driven across waterways except under special circumstances and only after discussion with the appropriate resource agency. Where waterways must be crossed to pull in the new conductors and shield wires, workers may walk across, use boats, or drive equipment across ice in the winter. In areas where construction occurs close to waterways, BMPs help prevent soil erosion and ensure that equipment fueling and lubricating occur at a distance from waterways.

## 8.5 Restoration Procedures

During construction, limited ground disturbance at the structure sites will occur. Staging areas for temporary storage of materials and equipment are established under agreements with the property owner or agency. Typically, a previously-disturbed or developed area is used, and includes sufficient space to lay down material and pre-assemble some structural components or hardware and store construction equipment. Portions of the ROW or property immediately adjacent to the ROW may be used for structure laydown and framing prior to structure installation. Additionally, stringing setup areas are used to store conductors and equipment necessary for stringing operations. Disturbed areas are restored to their original condition to the maximum extent practicable, or as negotiated with the landowner.

Post-construction reclamation activities will include removing and disposing of debris, removing all temporary facilities (including staging and laydown areas), employing appropriate erosion control measures, reseeding areas disturbed by construction activities with vegetation similar to that which was removed with a seed mixture certified as free of noxious or invasive weeds, and restoring the areas to their original condition to the extent possible. In cases where soil compaction has occurred, the construction crew or a restoration contractor uses various methods to alleviate the compaction, or as negotiated with landowners.

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

## 8.6 Operation and Maintenance

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

The ROW will be managed to remove vegetation that interferes with the operation and maintenance of the transmission line. Native shrubs that will not interfere with the safe operation of the transmission line will be allowed to reestablish in the ROW. The Applicant’s practice provides for the inspection of 115 kV transmission lines every two years to determine if clearing is required. ROW clearing practices include a combination of mechanical and hand clearing, along with herbicide application (where allowed), to remove or control vegetation growth. Noxious weed control with herbicides will be conducted on a two-year cycle around structures and anchors.

The estimated annual cost of ROW maintenance and operation and maintenance of Great River Energy’s transmission lines (69 kV to 500 kV) in Minnesota currently average about $2,000 per mile. Actual transmission line specific maintenance costs will depend on setting, the amount of vegetation management necessary, storm damage occurrences, structure types, age of the line, etc. The Project facilities will primarily be routed along road ROW, which will minimize tree maintenance required.

## 8.7 Electric and Magnetic Fields (EMF)

As it pertains to the Project, the term “EMF” refers to the extremely low frequency (ELF) decoupled electric and magnetic fields that are present around any electrical device or conductor and can occur indoors or outdoors. Electric fields are the result of electric charge, or voltage, on a conductor. The intensity of an electric field is related to the magnitude of the voltage on the conductor. Magnetic fields are the result of the flow of electricity, or current, traveling through a conductor. The intensity of a magnetic field is related to magnitude of the current flow through the conductor. Electric and magnetic fields can be found in association with transmission lines, local distribution lines, substation transformers, household electrical wiring, and common household appliances.

### 8.7.1 Electric Fields

Voltage on a wire produces an electric field in the area surrounding the wire. The voltage on the conductors of a transmission line generates an electric field extending from the energized conductors. The intensity of transmission line electric fields is measured in kilovolts per meter (kV/m), and the magnitude of the electric field rapidly decreases with distance from the transmission line conductors. The presence of trees, buildings, or other solid structures in the path of the field can also significantly reduce the magnitude of the electric field. Because the magnitude of the voltage on a transmission line is near-constant (ideally within ±5 percent of nominal), the magnitude of the electric field will be near-constant for each of the proposed configurations, regardless of the power flowing on the line.

Although there is no state or federal standard for transmission line electric field exposures, the EQB developed a standard of a maximum electric field limit of 8 kV/m at one meter above ground. This standard has been adopted by the Commission. The Applicant has calculated the approximate electric field for the Project's transmission configurations and estimates the peak magnitude of electric field density among all possible configurations to be well below the EQB standard at approximately 2.64 kV/m underneath the conductors, one meter (3.28 feet) above ground. **Table 8-1** summarizes the electric fields calculated for the proposed single and double circuit transmission lines on the Project. These electric field calculations are also shown graphically in **Figures 8-2** through **8-4**.

**Table 8-1. Calculated Electric Fields (kV/M) for Proposed Transmission Line Designs (One meter (3.28 feet) above ground)**

| Scenario | Max. Operating Voltage (kV) | Distance to Proposed Centerline | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -300' | -200' | -100' | -50' | -25' | Max. | 25' | 50' | 100' | 200' | 300' |
| 115/115 kV Double Circuit (Figure 8-2) | 121/121 | 0.014 | 0.03 | 0.092 | 0.088 | 0.686 | 2.639 | 0.686 | 0.088 | 0.092 | 0.03 | 0.014 |
| 115 kV with 69 kV Underbuild (Figure 8-3) | 121/72.5 | 0.008 | 0.019 | 0.081 | 0.294 | 0.586 | 1.069 | 0.811 | 0.269 | 0.067 | 0.018 | 0.008 |
| 115 kV Single Circuit (Figure 8-4) | 121 | 0.007 | 0.016 | 0.062 | 0.237 | 0.541 | 1.487 | 0.71 | 0.21 | 0.07 | 0.018 | 0.008 |

**Figure 8-2. 115/115 kV Double Circuit Line Electric Field Profile**

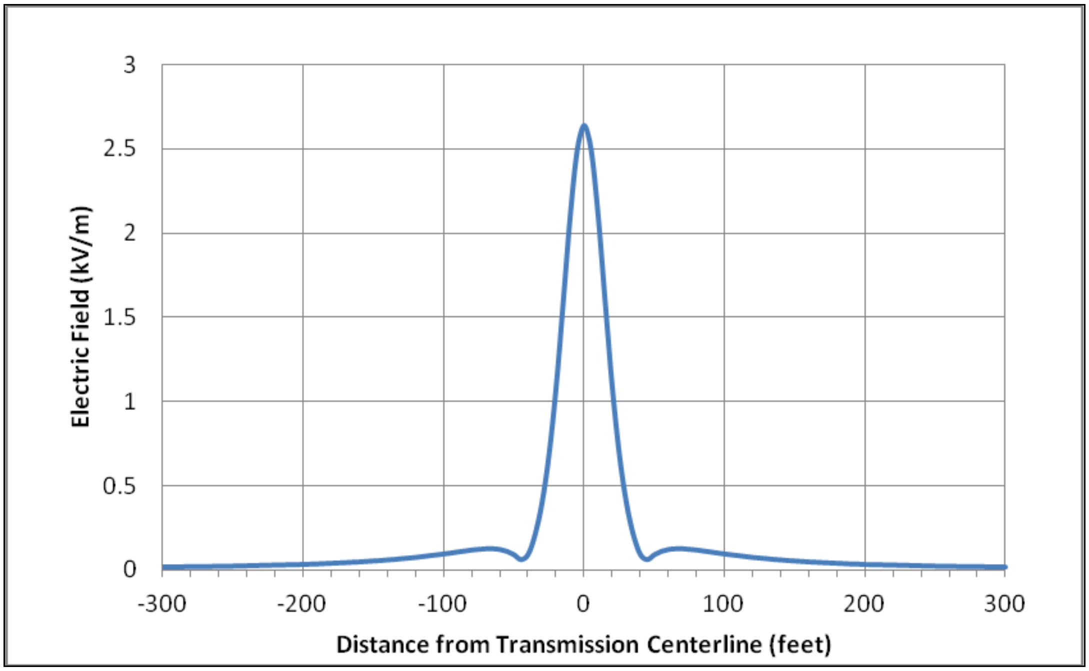



**Figure 8-3. 115 kV with 69 kV Underbuild Line Electric Field Profile**

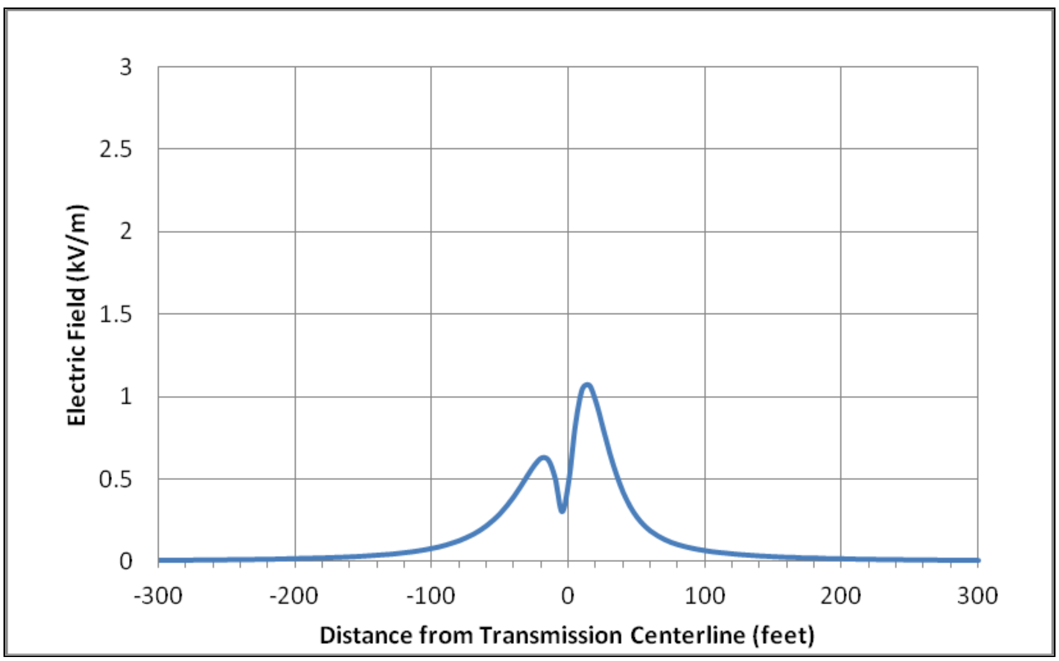
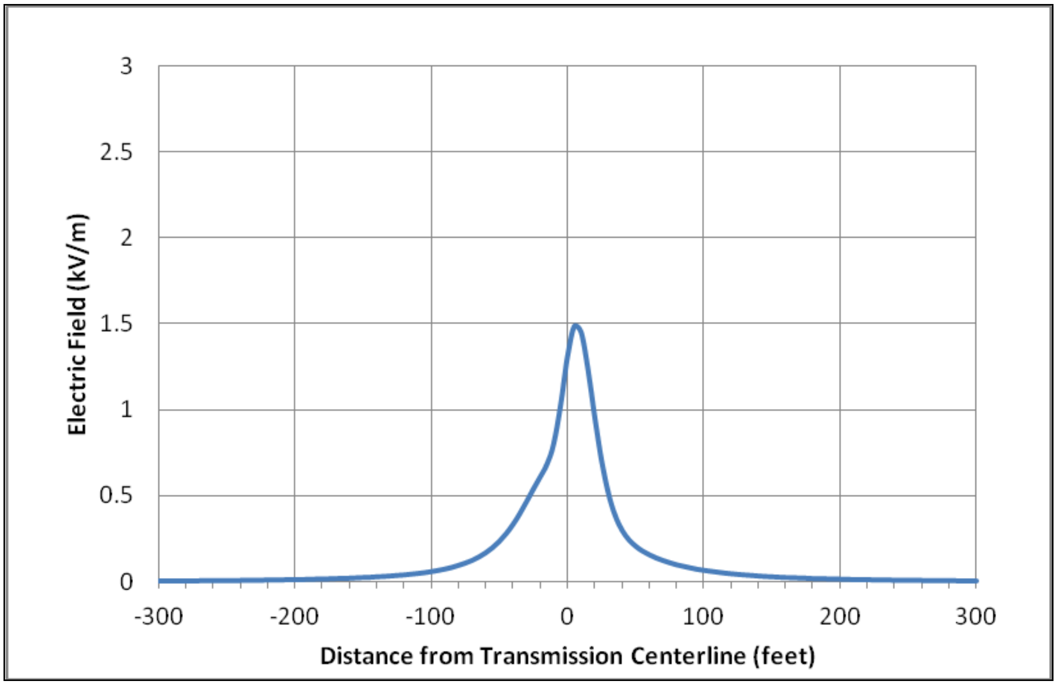


**Figure 8-4. 115 kV Single Circuit Line Electric Field Profile**




Induced Voltage

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

The main concern with induced voltage is not the magnitude of the voltage induced, but the current that would flow through a person to the ground should the person touch the object. To ensure the safety of persons in the proximity of high voltage transmission lines, the NESC requires that any discharge be less than five (5) milliAmperes root mean square (mA rms). The Applicant would ensure that any fixed conductive object in close proximity or parallel to the Project, such as a fence or other permanent conductive fixture, would be grounded so any discharge would be less than the 5 mA rms NESC limit.

Implantable Medical Devices

High intensity EMF can have adverse impacts on the operation of implantable medical devices (IMDs) such as pacemakers and defibrillators. While research has shown that the magnetic fields associated with high voltage transmission lines do not reach levels at which they could cause interference with such devices, it is possible that the electric fields associated with some high voltage transmission lines could reach levels high enough to induce sufficient body currents to cause interference. However, modern "bipolar" cardiac devices are much less susceptible to interactions with electric fields. Medtronic and Guidant, manufacturers of pacemakers and other IMDs have indicated that electric fields below 6 kV/m are unlikely to cause interactions affecting operation of most of their devices. The older "unipolar" designs of cardiac devices are more susceptible to interference from electric fields. Research from the early 1990s indicates that the earliest evidence of interference with these types of IMDs could occur in electric fields ranging from 1.2 to 1.7 kV/meter. **Table 8-1** and **Figures 8-2** to **8-4** show that the electric fields for all of the Project's structure alternatives are well below levels at which modern bipolar devices are susceptible to interaction with the fields. For older style unipolar designs, the electric fields do exceed levels that research from the 1990s has indicated may produce interference. However, recent research conducted in 2005 concluded that the risk of interference to unipolar cardiac devices from high voltage power lines in everyday life is small. In 2007, Minnesota Power and Xcel Energy conducted studies with Medtronic, Inc. under 115 kV, 230 kV, 345 kV, and 500 kV transmission lines to confirm these 2005 findings. The analysis was based on real life public exposure levels under actual transmission lines in Minnesota and found no adverse interaction with pacemakers or IMDs. The analysis concluded that although interference may be possible in unique situations, device interference as a result of typical public exposure would be rare.[3]

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

### 8.7.2 Magnetic Fields

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

There are no federal or Minnesota exposure standards for magnetic fields. The EQB and the Commission have recognized Florida (a 150-mG limit) and New York (a 200-mG limit) state standards. Both state standards are to be considered at the edge of ROW. Recent studies of the

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[3] 2007 Minnesota Power Systems Conference Proceedings (University of Minnesota), *Electromagnetic Compatibility of Active Implantable Medical Devices (AIMD) and Their Interaction with High Voltage Power Lines*, at 23.

health effects from power frequency fields conclude that the evidence of health risk is weak.[4] The general standard is one of prudent avoidance.

Magnetic field levels associated with some common electric appliances are provided in **Table 8-2.**

**Table 8-2. Magnetic Fields of Common Electric Appliances (mG)** [5]

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

**Table 8-3** summarizes the magnetic fields calculated for each of the Project's proposed transmission line configurations with power flow at peak loading and at the average loading. The magnetic field calculations are also shown graphically in **Figures 8-5** through **8-7.** Out of all the possible transmission line configurations, the maximum magnetic field under expected peak demand conditions is 105.11 mG, which is below most of the levels shown in **Table 8-2**.

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

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

[5] *EMF In Your Environment* (EPA 1992)

## Table 8-3. Calculated Magnetic Fields (mG) for Proposed Transmission Line Designs in 2030 (One meter (3.28 feet) above ground)

| Scenario | Max. Operating Voltage (kV) | Line Current (Amps) | Distance to Proposed Centerline | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | -300’ | -200’ | -100’ | -50’ | -25’ | Max. | 25’ | 50’ | 100’ | 200’ | 300’ |
| 115/115 kV Double Circuit Peak Load (Figure 8-5) | 121/121 | 115 kV: 552.8<br>115 kV: 344 | 1.00 | 2.22 | 8.26 | 26.35 | 59.44 | 105.11 | 64.98 | 28.32 | 8.63 | 2.27 | 1.02 |
| 115/115 kV Double Circuit Average Load (Figure 8-5) | 121/121 | 115 kV: 368<br>115 kV: 229 | 0.67 | 1.48 | 5.50 | 17.55 | 39.59 | 70.00 | 43.28 | 18.86 | 5.75 | 1.51 | 0.68 |
| 115 kV with 69 kV Underbuild Peak Load (Figure 8-6) | 121/72.5 | 115 kV: 480.5<br>69 kV: 124.6 | 0.63 | 1.37 | 4.81 | 13.51 | 26.28 | 49.70 | 33.41 | 16.36 | 5.40 | 1.45 | 0.65 |
| 115 with 69 kV Underbuild Average Load (Figure 8-6) | 121/72.5 | 115 kV: 320<br>69 kV: 83 | 0.42 | 0.91 | 3.20 | 9.00 | 17.50 | 33.10 | 22.25 | 10.90 | 3.60 | 0.97 | 0.43 |
| 115 kV Single Circuit Line Peak Load (Figure 8-7) | 121 | 619 | 0.76 | 1.69 | 6.25 | 19.96 | 45.95 | 92.78 | 54.73 | 22.83 | 6.78 | 1.76 | 0.79 |
| 115 kV Single Circuit Line Average Load (Figure 8-7) | 121 | 412 | 0.51 | 1.12 | 4.16 | 13.29 | 30.60 | 61.79 | 36.45 | 15.21 | 4.51 | 1.17 | 0.52 |

**Figure 8-5. 115/115 kV Double Circuit Line Magnetic Field Profile**

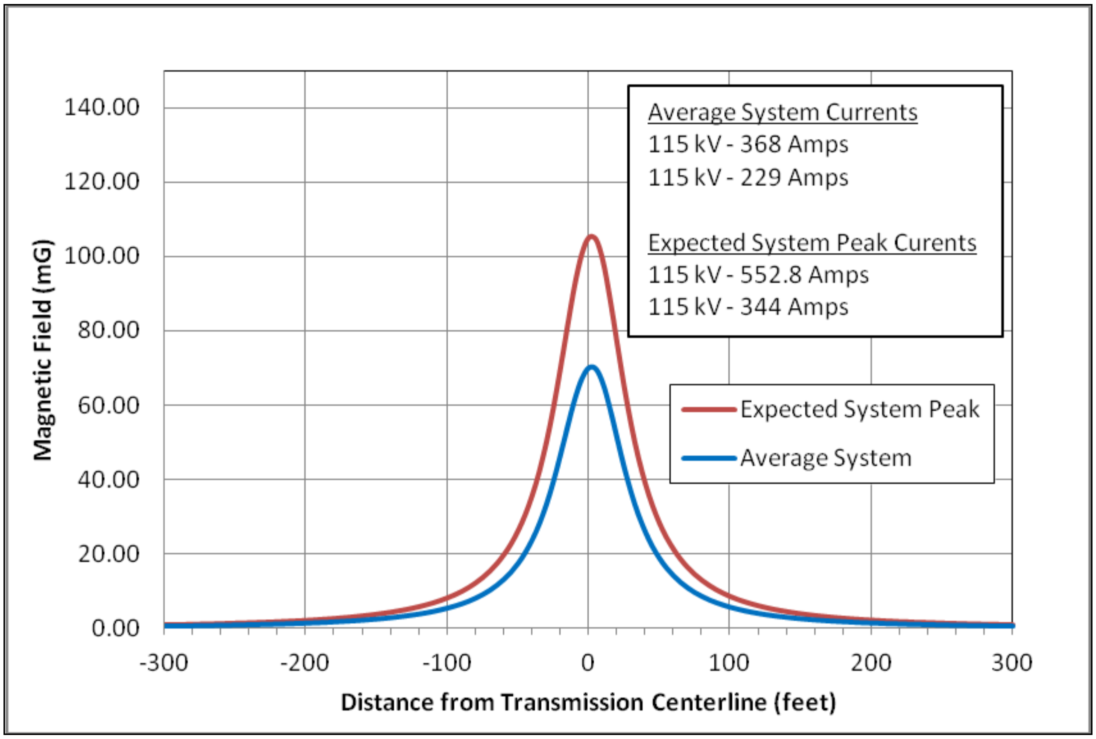



**Figure 8-6. 115 kV with 69 kV Underbuild Line Magnetic Field Profile**

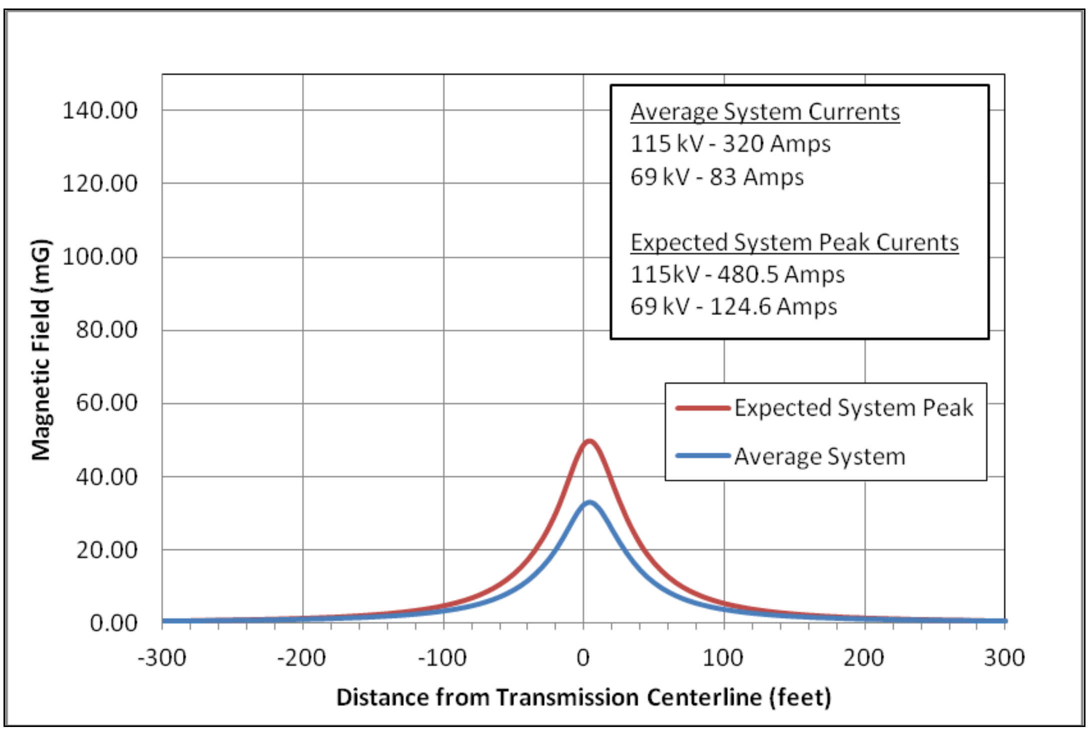
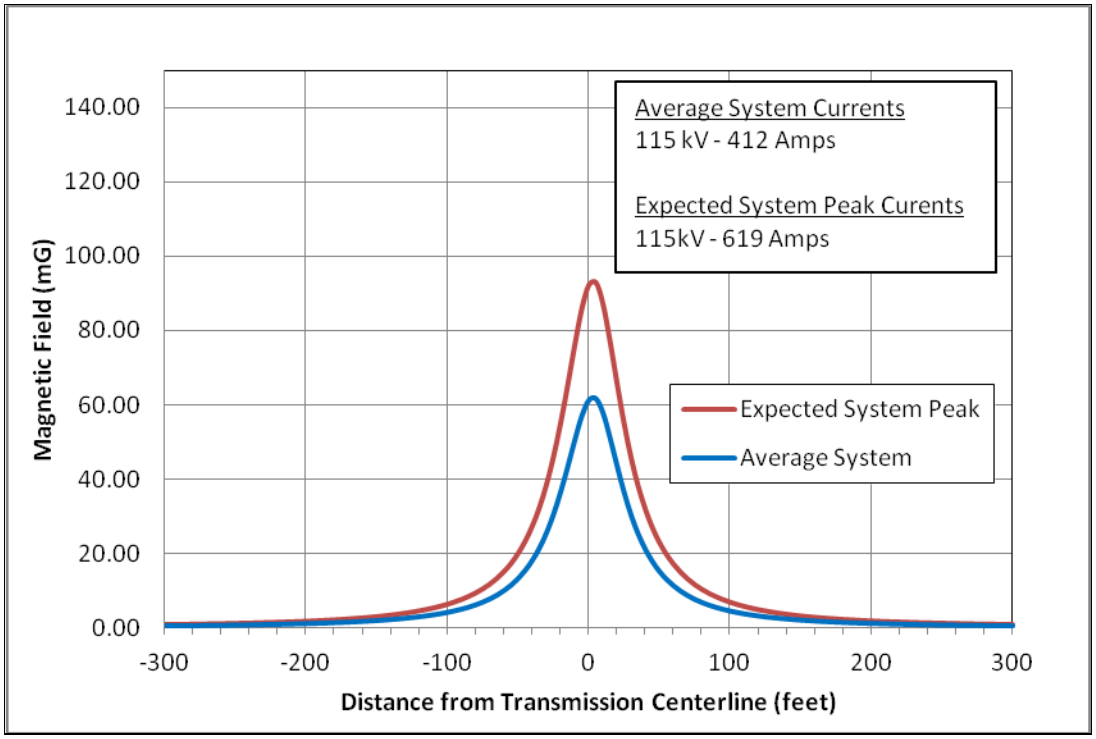


**Figure 8-7. 115 kV Single Circuit Line Magnetic Field Profile**




## 8.8 Stray Voltage

"Stray voltage" is a condition that can occur on the electric service entrances to structures from distribution lines. More precisely, stray voltage is a voltage that exists between the neutral wire of the service entrance and grounded objects in buildings such as barns and milking parlors.

Transmission lines do not, by themselves, create stray voltage because they do not connect to businesses and residences. Transmission lines can, however, induce a current on a distribution circuit that is parallel and immediately under the transmission line. Appropriate measures would be taken to mitigate problems associated with induced currents on distribution circuits when the proposed Project parallels or crosses distributions lines.

## 8.9 Corona

Under certain conditions, the localized electric fields near an energized transmission line conductor can produce small electric discharges, ionizing nearby air. This is commonly referred to as the "corona" effect. Most often, corona formation is related to some sort of irregularities on the conductor, such as scratches or nicks, dust buildup, or water droplets. The air ionization caused by corona discharges can result in the formation of audible noise and radio frequency noise. If the discharges are excessive, the audible noise can reach annoyance levels and the radio frequency discharges can cause interference with radio and television reception. The potential for radio and television signal interference, however, is largely dependent on the magnitude of the corona-induced radio frequency noise *relative to* the strength of the broadcast signals.

Corona formation is a function of the conductor radius, surface condition, line geometry, weather condition, and most importantly, the line's operating voltage. Corona-induced audible noise and radio and television interference are typically not a concern for power lines with operating voltages below 161 kV, because the electric field intensity is too low to produce significant corona. The expected electric field intensity due to the Project's transmission lines is provided in **Section 8.7.2**.

### 8.9.1 Radio and Television Interference

Because the likelihood of significant corona formation on the Project's 115 kV lines is minimal, the likelihood of radio and television interference due to corona discharges associated with the Project's transmission is also minimal. The Applicant is unaware of any complaints related to radio or television interference resulting from the operation of existing 115 kV facilities in the Project area and does not expect radio and television interference to be an issue along the proposed route.

### 8.9.2 Audible Noise

Transmission lines can cause audible noise due to corona discharges from the conductors. This noise, which resembles a crackling sound, is typically only within the threshold of human hearing during rainy or foggy conditions, and even then is largely imperceptible due to background noise. The impacts and mitigation of audible noise due to the Project are discussed further in **Section 9.2.3**.

### 8.9.3 Ozone and Nitrogen Oxide Emissions

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

Like audible and radio frequency noise, corona-induced ozone and nitrogen oxides are typically not a concern for power lines with operating voltages below 161 kV, because the electric field intensity is too low to produce significant corona. Therefore, the Applicant expects ozone and nitrogen oxide concentrations associated with the Project to be negligible, and well below all federal and state standards.

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# 9 ENVIRONMENTAL ANALYSIS OF ROUTES

This portion of the Application provides a description of the land use and environmental resources in the Project area, potential impacts, and proposed mitigative measures.

The name of each owner whose property is within the proposed routes is provided in **Appendix J.**

The Project has been reviewed by a number of state and federal agencies. All environmental review correspondence related to the proposed Project is provided in **Appendix K.**

## 9.1 Environmental Setting

The Project lies in the Big Woods Subsection of the Eastern Broadleaf Forest province, according to the DNR Environmental Classification Systems. The Big Woods Subsection is characterized by gentle to moderate rolling hills and large forested areas.

The Project area is dominated by agricultural land, lakes, and wetlands, with a few areas of forested land. There are several communities near the Project, including the cities of Elko New Market, Prior Lake, and Savage and the Mdewakanton Sioux Community.

The environmental setting of the Project area includes hydrologic features such as rivers, creeks, ditches, wetlands and riparian areas. A mix of groundcover is present along the proposed routes. The physiographic features (topography, soils, geology and farmland) are typical of this area and do not preclude the development of this Project. Wildlife habitat exists in pockets throughout the Project area.

Land use in the Project area includes a mix of public, residential, business, open space, and agricultural lands. The residential areas within the Project area are primarily single-family homes of varying density. Open space areas include cultivated land, grassland, shrub land, wetlands, and some forested areas.

## 9.2 Human Settlement

### 9.2.1 Public Health and Safety

Proper safeguards would be implemented for construction and operation of the transmission facilities. The Project will be designed in compliance with local, state, NESC, and Great River Energy standards regarding clearance to the ground, clearance to crossing utilities, strength of materials and ROW widths. Construction crews and/or contract crews would comply with local, state, and NESC standards regarding installation of facilities and standard construction practices. The Applicant’s established safety procedures, as well as industry safety procedures, would be followed during and after installation of the transmission lines, including clear signage during all construction activities.

The Project would be equipped with protective devices to safeguard the public if an accident occurs and a structure or conductor falls to the ground. The existing substations are already equipped with breakers and relays located where existing transmission lines connect to the substations. The protective equipment is designed to de-energize the transmission lines should such an event occur.

The MnDOT Office of Aeronautics was contacted[6] requesting information on the possible effects of the proposed Project on airports or airstrips in the Project area. In a letter[7] dated January 10, 2013 (**Appendix K**), MnDOT indicated that the Project will not affect the airspace of any public airports, and the Project is far enough away from all private and personal use airports that it is not expected to have any impact on those airports.

The proposed Project is approximately 3.7 miles from the Airlake Airport in Lakeville and approximately 7.0 miles from the Flying Cloud Airport in Eden Prairie, Minnesota.

Electric and Magnetic Fields

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

In 1999, the National Institute of Environmental Health Sciences (NIEHS) issued its final report on "Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields" in response to the Energy Policy Act of 1992. In the report, the NIEHS concluded that the scientific evidence linking EMF exposures with health risks is weak and that this finding does not warrant aggressive regulatory concern. However, in light of the weak scientific evidence supporting some association between EMF and health effects and the fact that exposure to electricity is common in the United States, the NIEHS stated that passive regulatory action, such as providing public education on reducing exposures, is warranted.[8]

The United States Environmental Protection Agency (EPA) seems to have come to a similar conclusion about the link between adverse health effects, specifically childhood leukemia, and power-frequency EMF exposure. On its website, the EPA states:

> Many people are concerned about potential adverse health effects. Much of the research about power lines and potential health effects is inconclusive. Despite

[6] Letter from Carole Schmidt, Great River Energy to Gene Scott, MnDOT. 12 December 2012. *See* Appendix K.
[7] Letter from Richard Braunig, MnDOT Aeronautics, to Carole Schmidt, Great River Energy. 10 January 2013. *See* Appendix K.
[8] Report is available at http://www.niehs.nih.gov/health/topics/agents/emf/

> more than two decades of research to determine whether elevated EMF exposure, principally to magnetic fields, is related to an increased risk of childhood leukemia, there is still no definitive answer. The general scientific consensus is that, thus far, the evidence available is weak and is not sufficient to establish a definitive cause-effect relationship.[9]

Minnesota, California, and Wisconsin have each conducted their own literature reviews or research to examine this issue. In 2002, Minnesota formed an Interagency Working Group to evaluate the research and develop policy recommendations to protect the public health from any potential problems arising from EMF effects associated with HVTLs. The Minnesota Department of Health published the Working Group's findings in *A White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options*. The Working Group summarized its findings as follows:

> Research on the health effects of EMF has been carried out since the 1970s. Epidemiological studies have mixed results – some have shown no statistically significant association between exposure to EMF and health effects, some have shown a weak association. More recently, laboratory studies have failed to show such an association, or to establish a biological mechanism for how magnetic fields may cause cancer. A number of scientific panels convened by national and international health agencies and the United States Congress have reviewed the research carried out to date. Most researchers 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.[10]

In 2007, the World Health Organization (WHO) conducted an intensive review of the health implications of ELF-MFs. WHO concluded that "virtually all of the laboratory evidence and the mechanistic evidence fail to support a relationship between low-level ELF magnetic fields and changes in biological function or disease status."[11] Based on its review, WHO did not recommend exposure limits but provided that "[t]he best source of guidance for both exposure levels and the principles of scientific review are international guidelines."[12] The guidelines referred to by WHO are those of the International Commission on Non-Ionizing Radiation Protection (ICNIRP)[13] and the Institute of Electrical and Electronic Engineers (IEEE) exposure limit guidelines.[14] At the time WHO completed its review, the ICNIRP continuous general

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[9] http://www.epa.gov/radtown/power-lines.html

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

[11] World Health Organization. 2007. *Environmental Health Criteria Volume No. 238 on Extremely Low Frequency Fields* at 12.

[12] *Id.* at 12-13.

[13] ICNIRP is a non-governmental organization in formal relations with WHO.

[14] *Id.*

public exposure guideline was 833 mG and the IEEE continuous general public exposure guideline was 9,040 mG. In 2010, ICNIRP revised its continuous general public exposure guideline to 2,000 mG. The WHO has not provided any analysis of the 2010 ICNIRP continuous general public exposure guideline to date.

Based on findings like those of the Working Group and NIEHS, the Commission has consistently found that "there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects."[15] This conclusion was further justified in the Route Permit proceedings for the Brookings County – Hampton 345 kV Project ("Brookings Project"). In the Brookings Project Route Permit proceedings, the Applicants (Great River Energy and Xcel Energy) and one of the intervening parties both provided expert evidence on the potential impacts of ELF-EF and ELF-MF, including the WHO findings. The ALJ in that proceeding evaluated written submissions and a day-and-a-half of testimony from the two expert witnesses. The ALJ concluded: "there is no demonstrated impact on human health and safety that is not adequately addressed by the existing State standards for [EF and MF] exposure."[16] The Commission adopted this finding on July 15, 2010.[17]

Impacts and Mitigation

No impacts to public health and safety are anticipated as a result of the Project. The Project will be designed in compliance with local, state, NESC, and Great River Energy standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and right-of-way widths. The proposed transmission lines will be equipped with protective devices to safeguard the public from the transmission line if an accident occurs, such as a structure or conductor falling to the ground.

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

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

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

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

### 9.2.2 Displacement

No displacement of residential homes or businesses will occur as a result of this Project. The NESC and Great River Energy standards require certain clearances between transmission line facilities and buildings for safe operation of the proposed transmission line. Great River Energy will acquire a ROW for the transmission line that is sufficient to maintain these clearances.

Great River Energy will work with landowners to address alignment adjustments or pole placement, as necessary. It may be possible to install taller transmission line structures to meet clearances to existing structures in the ROW, place all energized conductors on one side of the transmission line structure away from the home, or avoid the home completely by placing the transmission line on the other side of the road or further away than the existing transmission line if conditions warrant these measures.

Impacts and Mitigation

Because no displacement will occur, no mitigative measures are proposed.

### 9.2.3 Commercial, Industrial and Residential Land Use

The route (300 feet wide, 150 feet either side of the proposed transmission line centerline) for which the Applicant has applied is shown on the detailed maps in **Appendix G**. Proximity of the transmission centerline to homes and businesses along each route is summarized in **Table 9-1**. There are only two businesses within 150 feet of the transmission line centerline (both on the Cleary Lake portion of the Project), one commercial (Savage Tower Animal Hospital) and one commercial/industrial complex (Abhe & Svoboda Inc.; Bohnsack & Hennen Excavating).

**Table 9-1. Proximity of Homes and Businesses to Transmission Line Centerline**

| Transmission Line Segment | Number of Residences or Businesses within Various Distances (feet) Either Side of Transmission Line Centerline | | | | | |
|---|---|---|---|---|---|---|
| | 0-35’ | 36-50’ | 51-75’ | 76-100’ | 101-150’ | Total |
| Cleary Lake Area Rebuild – Existing MV-PN | 2* | 4 | 14 | 18 | 15 | 53 |
| Cleary Lake Area Existing MV-PN Line with Possible Deviation | 0 | 0 | 6 | 19 | 37 | 62 |
| Cleary Lake Area Rebuild – Existing MV-CR Line | 0 | 0 | 0 | 1 | 3 | 4 |
| Elko New Market Area Rebuild – Existing MV-PN Line | 0 | 1 | 0 | 0 | 5 | 6 |
| Elko New Market Area New Transmission Line (West Option) | 0 | 0 | 1 | 1 | 3 | 5 |
| Elko New Market Area New Transmission Line (East Option) | 0 | 0 | 1 | 1 | 9 | 11 |

* Of these two homes, one is within 15 feet and one is within 18 feet of the existing 69 kV transmission line.

Although there are two homes within 35 feet of the possible Cleary Lake Area MV-PN rebuild, Great River Energy reviewed this area in detail. Design engineers determined that it was possible to construct the 115 kV facilities along the existing 69 kV transmission line within the existing right-of-way and maintain all requisite safety clearances. No displacement is anticipated if the rebuild of the MV-PN line is selected for the Project.

Along the Cleary Lake Area MV-PN rebuild, there are 20 homes within 75 feet of the existing transmission line centerline (the houses were built after the transmission line). With the possible deviation from the existing line, there are more total homes within 150 feet of the centerline (62 versus 53) but there are no homes within 50 feet of the transmission line (versus six homes within 50 feet of the existing line) and six homes within 75 feet of the transmission line (versus 14 within 75 feet of the existing line).

Along the Elko New Market Area new transmission line portion of the Project, the West Option has five homes within 150 feet of the route centerline. The East Option has 11 homes within 150 feet of the route centerline.

Impacts and Mitigation

The Project will be designed in compliance with local, state, NESC, and Great River Energy standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and right-of-way widths. The proposed transmission lines will be equipped with protective devices to safeguard the public from the transmission line if an accident occurs, such as a structure or conductor falling to the ground.

### 9.2.4 Noise

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

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

Because human hearing is not equally sensitive to all frequencies of sound, the most noticeable frequencies of sound are given more "weight" in most measurement schemes. The A-weighted scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA, which is the A-weighted sound level recorded in units of decibels.

A noise level change of 3 dBA is barely perceptible to human hearing. A 5 dBA change in noise level, however, is clearly noticeable. A 10 dBA change in noise level is perceived as a doubling of noise loudness, while a 20 dBA change is considered a dramatic change in loudness. **Table 9-2** shows noise levels associated with common, everyday sources.

**Table 9-2. Common Noise Sources and Levels**

| Sound Pressure Level (dBA) | Noise Source |
|---|---|
| 140 | Jet Engine (at 25 meters) |
| 130 | Jet Aircraft (at 100 meters) |
| 120 | Rock and Roll Concert |
| 110 | Pneumatic Chipper |
| 100 | Jointer/Planer |
| 90 | Chainsaw |
| 80 | Heavy Truck Traffic |
| 70 | Business Office |
| 60 | Conversational Speech |
| 50 | Library |
| 40 | Bedroom |
| 30 | Secluded Woods |
| 20 | Whisper |

Source: Minnesota Pollution Control Agency (2008)

The MPCA established daytime and nighttime noise standards by Noise Area Classifications (NAC) are provided in **Table 9-3**. The standards are expressed as a range of permissible dBA within a one hour period; $L_{50}$ is the dBA that may be exceeded 50 percent of the time (30 minutes) within an hour, while $L_{10}$ is the dBA that may be exceeded 10 percent of the time (6 minutes) within the hour.

Land areas, such as picnic areas, churches, or commercial spaces, are assigned a NAC based on the type of activities or use occurring in the area and the sensitivity of the activities to noises. The NAC is listed in the MPCA noise regulations to distinguish the categories. Residential areas, churches, and similar type land use activities are included in NAC 1; commercial-type land use activities are included in NAC 2; and industrial-type land use activities are included in NAC 3.

Typically the most noise-sensitive receptors along the routes will include residences, businesses, churches, and schools. Current average noise levels in these areas are typically in the 30 to 40 dBA range and are considered acceptable for residential land use activities. Ambient noise in rural areas is commonly made up of rustling vegetation and infrequent vehicle pass-bys. Higher ambient noise levels, typically 50 to 60 dBA, will be expected near roadways, urban areas and commercial and industrial properties in the Project area.

**Table 9-3. MPCA Noise Limits by Noise Area Classification (dBA)**

| Noise Area Classification | Daytime | | Nighttime | |
|---|---|---|---|---|
| | $L_{50}$ | $L_{10}$ | $L_{50}$ | $L_{10}$ |
| **1**<br>Residential-type Land Use Activities | 60 | 65 | 50 | 55 |
| **2**<br>Commercial-type Land Use Activities | 65 | 70 | 65 | 70 |
| **3**<br>Industrial-type Land Use Activities | 75 | 80 | 75 | 80 |

The industry standard for utilities is calculated based on $L_{50}$ and $L_5$ for audible noise emissions. The worst-case scenario is when the transmission line is exposed to heavy rain conditions (one inch per hour). Anticipated levels for heavy rain conditions for a typical 115 kV line based on the results from the Bonneville Power Administration Corona and Field Effects Program version 3 (U.S. Department of Energy, Bonneville Power Administration (BPA), Undated) are listed in **Table 9-4**.

**Table 9-4. BPA Program Results – Heavy Rain Case**

| $L_5$ | $L_{50}$ | Location |
|---|---|---|
| 17.7 dBA | 14.2 dBA | edge of right-of-way |
| 18.8 dBA | 15.3 dBA | directly under line |

Impacts and Mitigation

Noise related to the Project is associated with both the construction and operation of the energy transmission system.

Construction noise is expected to occur during daytime hours as the result of heavy equipment operation and increased vehicle traffic associated with the transport of construction personnel and materials to and from the work area. Noise associated with transportation and equipment operation will be temporary in nature. To mitigate noise impacts associated with construction activities, work will be limited to daytime hours between 7 a.m. and 10 p.m. weekdays. Occasionally there may be construction outside of those hours mentioned or on a weekend if the Applicant has to work around customer schedules, line outages, or if the schedule has been significantly impacted due to other factors. Heavy equipment will also be equipped with sound attenuation devices such as mufflers to minimize the daytime noise levels.

Operational noise levels produced by a 115 kV transmission line are generally less than outdoor background levels and are therefore not usually perceivable. Proper design and construction of the transmission line in accordance with industry standards will help to ensure that noise impacts are not problematic.

Operational noise levels are expected to be well below the state noise limits, therefore no mitigation is proposed.

### 9.2.5 Aesthetics

Approximately 68 percent of the proposed Project consists of rebuilding existing transmission lines, therefore there will not be a significant change to the visual and aesthetic character of these areas. In Project segments involving rebuilding of existing lines**,** existing poles will be removed and replaced in generally the same location. The existing transmission line structures vary in height between 43 and 79 feet above ground, with an average of 52 feet above ground. By comparison, the proposed transmission line structures will generally be slightly taller, ranging from 52 to 92 feet in height above ground, with an average of 61 feet above ground. The overall spacing of the poles will be comparable to the current layout, which varies by engineering and land use constraints.

In the portion of the Project involving new construction (from MV-PN line between the Elko and New Market substations to the Veseli Breaker Station), the transmission line will be a new feature visible along the route. The structures will be double circuit wood poles approximately 52 to 92 feet above ground with an average span of 325 feet between poles. A maximum span will be used between the structures as necessary while still keeping the conductor within the ROW under blowout conditions. The typical ROW required for 115 kV structures is 70 feet wide.

Like the existing 69 kV transmission lines, the new and rebuild segments of 115 kV transmission lines will be visible in the general area of the Project. The landscape in the Project area is a mix of rural residential development, agricultural land, recreational areas, open space, and urban commercial and residential development. The visual effect will depend largely on the perceptions of the observers across these various landscapes. The visual contrast added by the transmission structures and lines may be perceived as a visual disruption or as points of visual interest. The transmission lines and substations that already exist in the vicinity of the proposed Project will limit the extent to which the new line construction and upgraded transmission line is viewed as a disruption to the area’s scenic integrity.

<u>Impacts and Mitigation</u>

Aesthetic impacts are expected to be minimal in the rebuild areas of the proposed Project. The proposed Project will result in minimal perceptible changes to the viewshed in these areas, as the proposed structures will be similar to, but somewhat taller (9 to 13 feet) than, the existing structures along the routes. The existing structures are approximately 43 to 79 feet above ground and the new structures will be approximately 52 to 92 feet above ground. The structures proposed for the rebuild areas will have a narrow profile that is designed to be less intrusive than other types of structures.

To minimize impacts to the aesthetics and visual character of the Project area, the Applicant has identified proposed routes that predominantly use existing transmission line and road corridors and avoid residences and businesses to the greatest extent practicable.

The Applicant will work with landowners to identify concerns related to the transmission lines and aesthetics. In general, mitigation includes enhancing positive effects as well as minimizing or eliminating negative effects. Potential mitigation measures 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 shall 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, either through easement negotiations or on a separate basis.
- Structures will be placed at the maximum feasible distance from highway, trail, and water crossings, within limits of structure design.
- To the extent practicable, rivers shall be crossed in the same location as existing transmission lines.

### 9.2.6 Socioeconomic

The Project is located primarily within Scott County with a small portion in Rice County in southeastern Minnesota.

The socioeconomic setting of the proposed Project area was evaluated on a regional basis, comparing data for the area along the Project route with average data for Scott and Rice counties and the state of Minnesota. Data were compiled from the 2000 and 2010 U.S. Census. **Table 9-5** summarizes the socioeconomic characteristics within the Project area.

Impacts and Mitigation

Constructing the new transmission line and rebuilding the existing transmission lines will result in some minor short and long term economic impacts for the surrounding communities. Long term benefits will result from the new utility infrastructure and will include improved utility service, which supports local economies.

Increasing the transmission outlet capability within the Project area will benefit the surrounding communities in general. Upgrading the utility lines will serve the growing demand of the region.

Short term impacts will result from the activities associated with construction. Impacts to social services would be unlikely because of the short-term nature of the construction project. In the short-term, revenue would likely increase for some local businesses, such as hotels, restaurants, gas stations, and grocery stores, due to workers associated with construction of the Project.

**Table 9-5. Socioeconomic Characteristics within the Project Area**

| LOCATION | POPULATION 2000 | POPULATION 2010 | CHANGE (%) | PER CAPITA INCOME | POPULATION BELOW POVERTY LEVEL (%) |
|---|---|---|---|---|---|
| State of Minnesota | 4,919,479 | 5,303,925 | 7.8% | $30,310 (2007-2011) | 11.0 (2007-2011) |
| Scott County | 89,498 | 129,928 | 45.2% | $34,532 (2007-2011) | 5.0 (2007-2011) |
| Rice County | 56,665 | 64,142 | 13.2% | $24,783 (2007-2011) | 10.8 (2007-2011) |
| City of Prior Lake | 15, 917 | 22, 796 | 43.2% | $41,249 (2007-2011) | 4.7 (2007-2011) |
| Elko New Market | 1,090 | 4,110 | 411.0% | $31,073 (2006-2010 ) | 1.2 (2000) |
| Cedar Lake Township, Scott County | 2,197 | 2,779 | 26.5% | $28,404 (2000) | 2.1 (2000) |
| Credit River Township, Scott County | 3,895 | 5,096 | 30.8% | $43,500 (2000) | 3.1 (2000) |
| New Market Township, Scott County | 3,057 | 3,440 | 12.5% | $36,336 (2006-2010) | 2.3 (2000) |
| Webster Township, Rice County | 1,825 | 1,768 | -3.1% | $23,040 (2000) | 3.3 (2000) |
| Wheatland Township, Rice County | 1,358 | 1,237 | -8.9% | $20,402 (2000) | 3.6 (2000) |

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

### 9.2.7 Cultural Values

Cultural values include those perceived community beliefs or attitudes in a given area, which provide a framework for community unity. According to the U.S. Census Bureau, the populations of both counties derive from a diverse ethnic heritage. However, a majority (66-68 percent) of the reported ethnic backgrounds are of European origin (German, Norwegian, Irish)[18].

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[18] http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml

In Scott County, German heritage comprises the largest percentage of the total county population (41 percent), followed by Norwegian (15 percent) and Irish (12 percent). Cultural representation in community events appears to be more closely tied to geographic features (such as the Minnesota River), seasonal events, national holidays, and municipal events than to those based in ethnic heritage. Scott County boasts museums, festivals, and many outdoor recreation areas, parks and wildlife preservation areas. It is also home to numerous entertainment facilities including Valleyfair, Canterbury Park, the Renaissance Festival and Elko Speedway. Regional cultural events include the annual River City Days held in July in Chaska, Derby Days held every August, the Scott County Art Crawl and the Happy Birthday America parade held every July in Shakopee.

Rice County has a similar heritage, with German heritage comprising the largest percentage of the total county population (38 percent), followed by Norwegian (16 percent), and Irish (12 percent). The county boasts many outdoor recreation areas, historic sites, museums and art institutions. Examples of cultural events in Rice County include the county fair, Heritage Days, the Candlelit Winter Walk, and annual music festivals.

Construction of the proposed Project is not expected to conflict with the cultural values of the area.

Impacts and Mitigation

The construction of the proposed transmission facilities will provide the region with a stable power supply. As the urban centers of the south metro region continue to grow and the diverse economic base continues to expand, the available power supplied by upgraded and additional facilities will provide essential support and contribute to a stable economic environment in which to live and work. In addition, opportunities presented by the diverse economy may continue to encourage civic pride, and tourism may benefit from this unity as well.

Because no adverse impacts to cultural values are anticipated, no mitigation is proposed.

### 9.2.8 Recreation

There are many existing recreational resources within the Project vicinity, including parks, trails, rivers, and lakes. Popular activities include camping, fishing, hunting, bird watching, canoeing, boating, swimming, biking, hiking, and riding ATVs and snowmobiles. The parks and DNR Wildlife Management (WMAs) provide opportunities for viewing wildlife and intact ecosystems.

Recreational resources in the vicinity of the Project are listed in **Table 9-6** and shown on **Figure 9-1.**

**Table 9-6. Recreational Resources in the Project Vicinity**

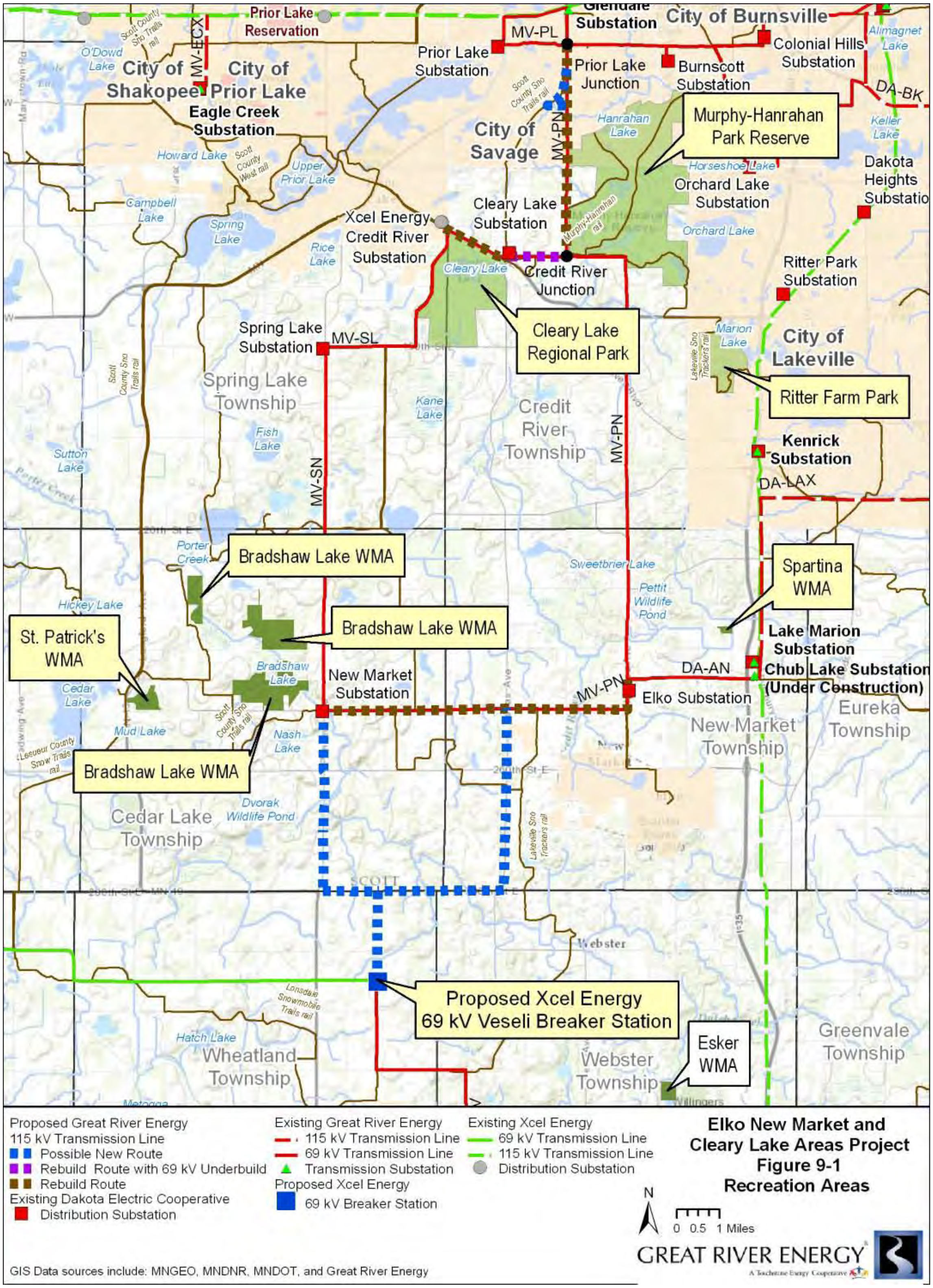
| Location | Resource | Characteristics/Uses |
|---|---|---|
| **State** | Bradshaw Lake WMA (DNR) | Purpose is to preserve wetland, grassland and oak woodland habitat for wildlife<br>Hunting/Wildlife Viewing |
| **State** | Spartina WMA (DNR) | Located in a drained wetland basin, consists of lowland shrubs/trees and some wetland and grassland vegetation<br>Hunting/Wildlife Viewing |
| **County/Regional** | Cleary Lake Regional Park (Three Rivers Park District) | Popular year-round recreation area<br>Golfing/Camping/Swimming/Picnics/ Hiking/Snowmobiling/ Cross-Country Skiing |
| **County/Regional** | Murphy Hanrehan Park Reserve (Three Rivers Park District) | Mostly undeveloped park reserve with trails<br>Hiking/Skiing/Biking/Fishing/Bird Watching |

<u>Impacts and Mitigation</u>

In the rebuild areas of the proposed transmission line project, there will be little additional impact on recreation. In the north area of the Project, the transmission lines to be rebuilt cross the Credit River and a tributary and border Murphy Hanrehan Park Reserve and Cleary Lake Regional Park, but they do not cross state forest lands, Scientific and Natural Areas (SNAs) or any WMAs (**Figure 9-1**). Where rebuilt lines are constructed, the visual setting for people biking, hiking, boating, or birding near the rebuilt lines may be slightly affected. It is also possible that clearing vegetation underneath the utility lines will decrease the wildlife habitat within the immediate vicinity, potentially impacting viewing opportunities for the short term. However, because there is an existing line in place in these areas and the easement width will remain the same, vegetation clearing will be limited.

Rebuilding the existing utility lines along the existing transmission ROW will minimize any additional impacts to recreational resources and use of these resources should not be affected. Because structures will be placed within existing utility ROW, impacts to previously undisturbed parks or management areas is unlikely. Permanent disturbance of wildlife habitat will also be minimized, to avoid impacts to hunting and wildlife observation.

**Figure 9-1. Recreation Areas**



There should be no impacts to recreation in the southern portion of the Project area where there will be one rebuilt line and one new transmission line. The proposed lines will not affect the Bradshaw Lake or St. Patrick's WMAs (**Figure 9-1**). The Applicant will coordinate with the DNR, USFWS, and other resource agencies to ensure utility line construction will not impact the surrounding natural resources.

No impacts to local recreational resources such as the golf courses, museums, city parks, or campgrounds are expected.

Because no impacts to recreation are anticipated, no mitigation is proposed.

#### 9.2.9 Public Services and Transportation

The City of Savage provides water and sewer service to its residents in housing developments north of 154$^{th}$ Street. South of 154$^{th}$ Street, to the city boundary, the majority of properties are connected to wells and septic systems. Outside the city limits, all other areas of the proposed Project (in both Scott and Rice counties), are served by private wells and septic systems.

Based on comments provided by City staff, no public utility or road improvement projects are currently planned for the area near the existing Great River Energy transmission line within the cities of Prior Lake or Savage. The Project is not expected to directly impact public services to area residents.

According to the Rice County Capital Improvement Plan for 2013 to 2017, an overlay project is scheduled for County Highway (CH) 86 from Fairbanks Avenue west to the county border. Scott County will actually be doing the work, as the road is the boundary between Scott and Rice counties. No other Rice County projects are scheduled in the Project area.

The 2012 – 2021 Scott County Transportation Improvement Program indicates that in 2016, County Highway 56 (250$^{th}$ Street) is slated for "reconstruction and paving" from CH 23 (Panama Ave.) to CH 87 (Revere Ave.). The County Engineer stated that this will likely include a widening of the existing road ROW easement to 50 or 60 feet either side of road centerline.

Additionally, the City Engineer stated that Scott County would like to expand CSAH 27 to a four-lane divided highway, from CH 21 (Eagle Creek Avenue, SE) to the southern boundary of the City of Savage in 2019. However, this is outside the proposed Project area.

Ongoing and future road projects within the general area are not anticipated to affect the planning or construction of the proposed transmission line Project.

<u>Impacts and Mitigation</u>

Minimal to no impacts to public services are anticipated to occur as a result of the proposed Project. Great River Energy will coordinate with the cities of Prior lake and Savage, Scott County and Rice County regarding structure placement in any new transmission line ROW.

Temporary access for the rebuild of transmission lines along the routes would be along the existing transmission line ROW or by short spur trails from the existing road network to the ROW. Temporary guard structures would be used to string conductor over existing roads and railroads. The structures typically consist of directly-imbedded poles with a horizontal cross piece to support the conductor at sufficient height above traffic. Temporary traffic impacts associated with equipment are material delivery and worker transportation.

Short-term localized traffic delays are anticipated. The impacts resulting from construction and operation of the proposed transmission lines would be minimal for transportation.

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

## 9.3 Land-based Economies

### 9.3.1 Agriculture

Rice County has a strong economic dependence on agricultural production. According to the 2007 United States Department of Agriculture (USDA) Census of Agriculture, Rice County has 1,494 individual farms. Agricultural lands cover 253,094 acres, representing over 76 percent of all lands in Rice County with an average farm size of 169 acres. Rice County ranks 46$^{th}$ out of all the counties in Minnesota (by value of sales) in production of fruits, tree nuts, and berries (ranking 6th statewide); nursery, greenhouse, floriculture, and sod (ranking 9th statewide); and milk and other bovine dairy products (ranking 31st statewide). Over $137 million was generated from both crop and livestock sales in 2007.

Scott County has moderate economic dependence on agricultural production. According to the 2007 USDA Census of Agriculture, Scott County has 795 individual farms, marking a 21 percent decrease in total number of farms over the previous five years. Agricultural lands cover 117,551 acres, representing over 51 percent of all land in Scott County with an average farm size of 148 acres. Scott County ranks among the top twenty counties (by value of sales) in production of fruits, tree nuts, and berries (ranking 5th statewide); cut Christmas trees and short rotation woody crops (ranking 6th statewide); and horses, ponies, mules, burros, and donkeys (ranking 13th statewide). Over $63 million was generated from both crop and livestock sales in 2007.

The USDA Natural Resources Conservation Service (NRCS) defines prime farmland soils as having:

> "…the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops…" is "…an adequate and dependable water supply from precipitation or irrigation. They have a favorable temperature and growing season with acceptable levels of acidity or alkalinity, content of salt

> or sodium, and few or no rocks. They are permeable to water and air, are not excessively erodible and are not saturated with water for long periods of time. They do not flood frequently or are protected from flooding (7 C.F.R. § 657)."

Soils listed as farmland of statewide importance are defined as:

> "…those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high a yield as prime farmlands if conditions are favorable (7 C.F.R. § 657)."

There are approximately 60 acres of prime farmland within the proposed ROWs, as summarized in **Table 9-7**. The transmission lines would cross approximately seven miles of prime farmland and a total of approximately 16 miles of agricultural land.

**Table 9-7. Prime Farmland within the Proposed ROWs**

| Transmission Line Segment | Approximate Acres of Prime Farmland within the Proposed ROWs |
|---|---|
| Cleary Lake Area Rebuild- Existing MV-PN Line | 10 |
| Cleary Lake Area Existing MV-PN Line with Possible Deviation | 9 |
| Cleary Lake Area Rebuild- Existing MV-CR Line | 12 |
| Elko New Market Area Rebuild – Existing MV-PN Line | 8 |
| Elko New Market Area New Transmission Line (West Option) | 9 |
| Elko New Market Area New Transmission Line (East Option) | 12 |

Impacts and Mitigation

Some agricultural land will be temporarily removed from production during transmission line construction, but permanent agricultural land conversion associated with the transmission line poles will be minimal. In the rebuild areas where the proposed transmission lines are along existing routes, impacts will be limited to the existing utility corridor. In those areas, Project construction will not cause additional impacts to agriculture within the Project area.

The determination of precise acreage of the temporary access during construction is dependent upon final engineering design. The acreage anticipated to be included in temporary construction access points is comprised of numerous small agricultural properties in the vicinity of the Proposed Route. Construction of new transmission structures and removal of existing structures will require repeated access to structure locations to install foundations, structures and conductors. Equipment used in the construction process includes drill rigs, concrete trucks, backhoes, cranes, boom trucks and assorted small vehicles. Operation of these vehicles on adjoining farm fields can cause rutting and compaction, particularly during springtime and otherwise wet conditions.

Permanent impacts will occur as a result of structure placement along the Project centerline. The area of impact will be the footprint of the pole itself and the area immediately surrounding the pole (approximately 20 square feet), although the majority of the ROW easement will be available for agricultural cultivation.

The Applicant will work with landowners to minimize impacts to all farming operations along the routes, and will compensate landowners for any crop damage and soil compaction that may occur during construction. Areas disturbed during construction will be repaired and restored to pre-construction contours as required so that all surfaces drain naturally, blend with the natural terrain and are left in a condition that will facilitate natural revegetation, provide for proper drainage and prevent erosion.

Specific mitigation measures to be implemented include:

- Movement of crews and equipment will be limited to the ROW to the greatest extent possible, including access to the routes. Contractors employed by the Applicant will limit movement on the ROW to minimize damage to grazing land, crops, or property. If movement outside of the ROW is necessary during construction, permission will be obtained and any crop damage will be paid to the landowner.

- When weather and ground conditions permit, deep ruts that are hazardous to farming operations will be repaired or compensation will be provided as an alternative if the landowner desires. Such ruts will be leveled, filled and graded or otherwise eliminated in an approved manner. In hay meadows, alfalfa fields, pastures and cultivated productive lands, compacted soils will be loosened and ruts will be leveled by scarifying, harrowing, disking, or by other approved methods. Damage to ditches, tile drains, terraces, roads, and other features of the land will be corrected using approved methods and indigenous plants where necessary. The land and facilities will be restored as nearly as practicable to their original conditions.

- ROW easements will be purchased through negotiations with each landowner affected by the Project. Restoration or compensation will subsequently be made for reasonable crop damages or other property damage that occurs during construction or maintenance as negotiated.

- Construction will be scheduled during periods when agricultural activities will be minimally affected to the extent possible or the landowner will be compensated accordingly.

- Fences, gates and similar improvements that are removed or damaged will be promptly repaired or replaced.

Some temporary construction space will be needed for the Project. For temporary marshalling yards, which will provide space to store material and equipment, the Applicant will lease the space by agreement with the respective landowner(s), remove and properly dispose of all material and debris, and repair all damages and perform restoration, as necessary. It is anticipated that minimal temporary construction space on property immediately adjacent to the ROW and on private property will be needed, with the exception of limited equipment access.

### 9.3.2 Forestry

Scott County consists of 14 percent forested land and Rice County consists of 10 percent forested land. These areas are a combination of both deciduous and evergreen forests. The transmission line would cross approximately 0.1 mile of forested land, nearly all of which (0.09 mile) is on the edge of Cleary Lake Regional Park.

Impacts and Mitigation

The minimal forest resources located along the proposed route alignments will not be significantly affected from a composition or economic standpoint. Because the proposed routes primarily follow existing transmission lines, additional forest impacts due to additional ROW acquisition and subsequent clearing will be minimal. Clearing of the ROW in forested areas will be limited to the amount necessary to permit the safe and reliable operation of the transmission line.

Mitigation measures for potential impacts to forest resources would be as follows:

- Clearing for access to the ROW that is necessary for passage of construction equipment will be limited to only those trees necessary.
- Vegetation within these temporary access points will be restored.
- Native shrubs that will not interfere with the safe operation of the transmission line will be allowed to reestablish in the ROW.
- Great River Energy will replace or compensate for windbreaks as determined through negotiations with individual landowners.

### 9.3.3 Tourism

Tourist destinations within the Project vicinity include state and county parks, trails, rivers, and State WMAs. Popular activities include camping, fishing, hunting, bird watching, canoeing, boating, golfing, swimming, biking, hiking, skiing, riding ATVs and snowmobiles. The WMAs and state and county forests within the Project area provide opportunities for viewing wildlife and intact ecosystems. Historic areas provide the chance to learn about the regional and local history.

Impacts and Mitigation

No impacts on tourism are expected, therefore no mitigation is proposed.

### 9.3.4 Mining

Notable mining resources in Scott and Rice counties include crushed stone and horticultural peat.

A mining area is present (south of Kane Lake) within the Project area in Scott County, and there may be new gravel mining operations west of the Project area in the near future.

There are no active or inactive gravel pits located within the Project area in Rice County.

Impacts and Mitigation

Based on a review of available pit maps for Scott and Rice counties, the Project would not result in any impacts to active mining or quarrying operations. Therefore, no mitigation is proposed.

## 9.4 Archaeological and Historic Resources

A cultural resource site review of the proposed transmission lines and a one-mile buffer was conducted online and at the Minnesota State Historic Preservation Office (SHPO) located at the Minnesota History Center in St. Paul, Minnesota. Historic property location maps and site forms were the sources consulted. The archaeological and architectural site files were examined to obtain a list of all previously recorded archaeological sites and architectural properties in the Project's study area, defined as a one mile buffer around the routes.

Previously Recorded Archaeological Sites

There are seven previously recorded archaeological sites within the study area, all located in the northern Cleary Lake Area portion of the Project (**Table 9-8).** Five of these sites are associated with the precontact period, and two of these sites are associated with the historic time period. The precontact sites include three isolated lithic finds and two lithic scatters. The historic sites consist of a sawmill and a depression with associated artifact scatter.

The study area is located within the Prairie Lakes archaeological region of Minnesota and is situated amongst rolling hills and uplands with numerous small to midsize lakes (including Cleary Lake), and transects drainages, creeks, and streams, including the Credit River and its tributaries. The majority of identified precontact sites within the study area are located in areas near permanent water sources or along prominent landforms, most notably terraces along the Credit River. The previously identified historic sites were also identified near the Credit River. Based on an examination of the precontact and historic period site distribution within the Prairie Lakes archaeological region and the distribution of the previously identified archaeological sites within the study area, there may be additional archaeological sites of this type and nature within the study area.

**Table 9-8. Previously Recorded Archaeological Sites in the Vicinity of the Project**

| Site Number | Township | Range | Section | Site Type | NRHP Eligibility |
|---|---|---|---|---|---|
| 21SC0041 | 115N | 21W | 29 | Precontact Lithic Scatter | Unevaluated |
| 21SC0042 | 115N | 21W | 29 | Precontact Isolated Lithic Find | Unevaluated |
| 21SC0043 | 115N | 21W | 28 | Precontact Isolated Lithic Find | Unevaluated |
| 21SC0044 | 115N | 21W | 33 | Precontact Lithic Scatter | Unevaluated |
| 21SC0053 | 115N | 21W | 32 | Historic Depressions and Artifact Scatter | Unevaluated |
| 21SC0083 | 115N | 21W | 32 | Precontact Isolated Lithic Find | Unevaluated |
| 21SCu | 114N | 21W | 4 | Historic Sawmill | Unevaluated |

Previously Recorded Architectural Properties

There are two previously recorded architectural properties within the study area (**Table 9-9),** consisting of a farmhouse and a farmstead. One of the architectural properties, SC-NMT-005, a farmstead, is listed on the National Register of Historic Places (NRHP). The presence of a NRHP-listed farmstead, along with numerous other residences/farmsteads in the study area, indicate there is potential for encountering additional historically significant architectural properties within the study area, as buildings and structures in a localized area tend to be built around the same time with the same construction techniques.

**Table 9-9. Previously Recorded Architectural Properties in the Vicinity of the Project**

| Property Number | Township | Range | Section | Property Type | NRHP Eligibility |
|---|---|---|---|---|---|
| SC-CRV-001 | 114N | 21W | 17 | Farmhouse | Unevaluated |
| SC-NMT-005 | 113N | 21W | 19 | Farmstead | Listed |

Impacts and Mitigation

Because the proposed Project is primarily the rebuild of existing lines and the lines (existing and proposed new) are adjacent to roads for 84 percent of their length, portions of the corridor have already been disturbed and the likelihood of affecting archaeological resources in these previously disturbed areas is relatively low. Impacts to archaeological sites outside of previously disturbed areas may occur during construction of transmission structures, maintenance structures, staging areas or access roads. Historic buildings or other sites may be impacted as well in that construction of modern transmission structures may compromise the integrity of a historic architectural viewshed or above ground precontact and/or historic archaeological resources. However, because there is a line already in place in the majority of the Project area and because the nature of the structures for the Project will not significantly alter what is already present in these areas, the Applicant does not foresee a significant visual change in the rebuild areas. The new double circuit transmission line to the Veseli Breaker Station will be a new visual feature in the area.

The Minnesota Historical Society (MHS) was contacted[19] requesting information on the possible effects of the proposed Project on historic properties in the Project area. In an email dated January 14, 2013[20], MHS indicated that because certain areas of the Project will require a Corps permit, SHPO will need to consult with the Corps under Section 106 and the terms of their Programmatic Agreement with the Corps. This consultation would be initiated after the route permit is issued.

If a Corps permit is required and Section 106 consultation is initiated, the Applicant anticipates conducting a Phase I archaeological reconnaissance survey of the Project ROW once the routes are well defined. Indirect visual effects on architectural properties may also need consideration; no direct effects on architectural properties are anticipated. If any archaeological sites are identified during placement of the poles along the permitted routes, construction work will be stopped and MHS staff consulted as to how to proceed.

The Applicant will make every effort to avoid impacts to identified archaeological and architectural resources. In the event that an impact would occur, the Applicant will consult with the appropriate reviewing agency to determine the necessary steps regarding treatment of the resource. While avoidance of the resource would be a preferred action, mitigation for Project-related impacts on NRHP-eligible archaeological and architectural resources may include an effort to minimize Project impacts on the resource and/or additional documentation through data recovery.

## 9.5 Natural Environment

### 9.5.1 Air Quality

The only potential air emissions from a transmission line result from corona, which may produce ozone and oxides of nitrogen. This can occur when the electric field intensity exceeds the breakdown strength of the air. For a 115 kV transmission line, the conductor surface gradient is typically below the air breakdown level. As such, it is unlikely that any measurable emissions would occur from the conductor surface.

Impacts and Mitigation

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

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

[19] Letter from Carole Schmidt, Great River Energy to Mary Ann Heidemann, MHS. 4 January 2013. Appendix K.

[20] Email from Kelly-Gragg Johnson, MHS to Carole Schmidt, Great River Energy. 14 January 2013. Appendix K.

magnitude of emissions is influenced heavily by weather conditions and the specific construction activity taking place. Appropriate dust control measures will be implemented.

### 9.5.2 Water Resources

Hydrologic features in the Project area and along the proposed routes are shown in **Figures 9-2A** and **9-2B**. Hydrologic features, such as wetlands, lakes, rivers and floodplains perform several important functions within a landscape, including flood attenuation, groundwater recharge, water quality protection and wildlife habitat production.

The Project lies within the Lower Minnesota River watershed of the Minnesota River Basin.[21]

Ground Water

The DNR divides Minnesota into six groundwater provinces. Scott and Rice counties fall into the South Central Province, which is described as thick clayey glacial drift with limited extent sand aquifers overlying Paleozoic sandstone, limestone and dolostone aquifers.[22]

Lakes

Lakes in the Project area include Lower Prior Lake (957 acres), Hanrehan Lake (67 acres) Murphy Lake (45 acres), Cleary Lake (143 acres), and Nash Lake[23] (**Figures 9-2A** and **9-2B**). The route comes the closest to Cleary Lake (adjacent to the riparian area) and about 384 feet from open water.

Rivers and Streams

There are a number of rivers and streams in the Project area, including the Credit River, Vermillion River, Porter Creek and their tributaries (**Figures 9-2A** and **9-2B**).

The existing transmission lines cross the Credit River (twice), an unnamed tributary to the Credit River, an unnamed tributary to Porter Creek, and Porter Creek. The East Option for the new transmission line in the south Project area would result in an additional crossing of Porter Creek.

Floodplains

The transmission line would cross the floodplains of the rivers listed above.

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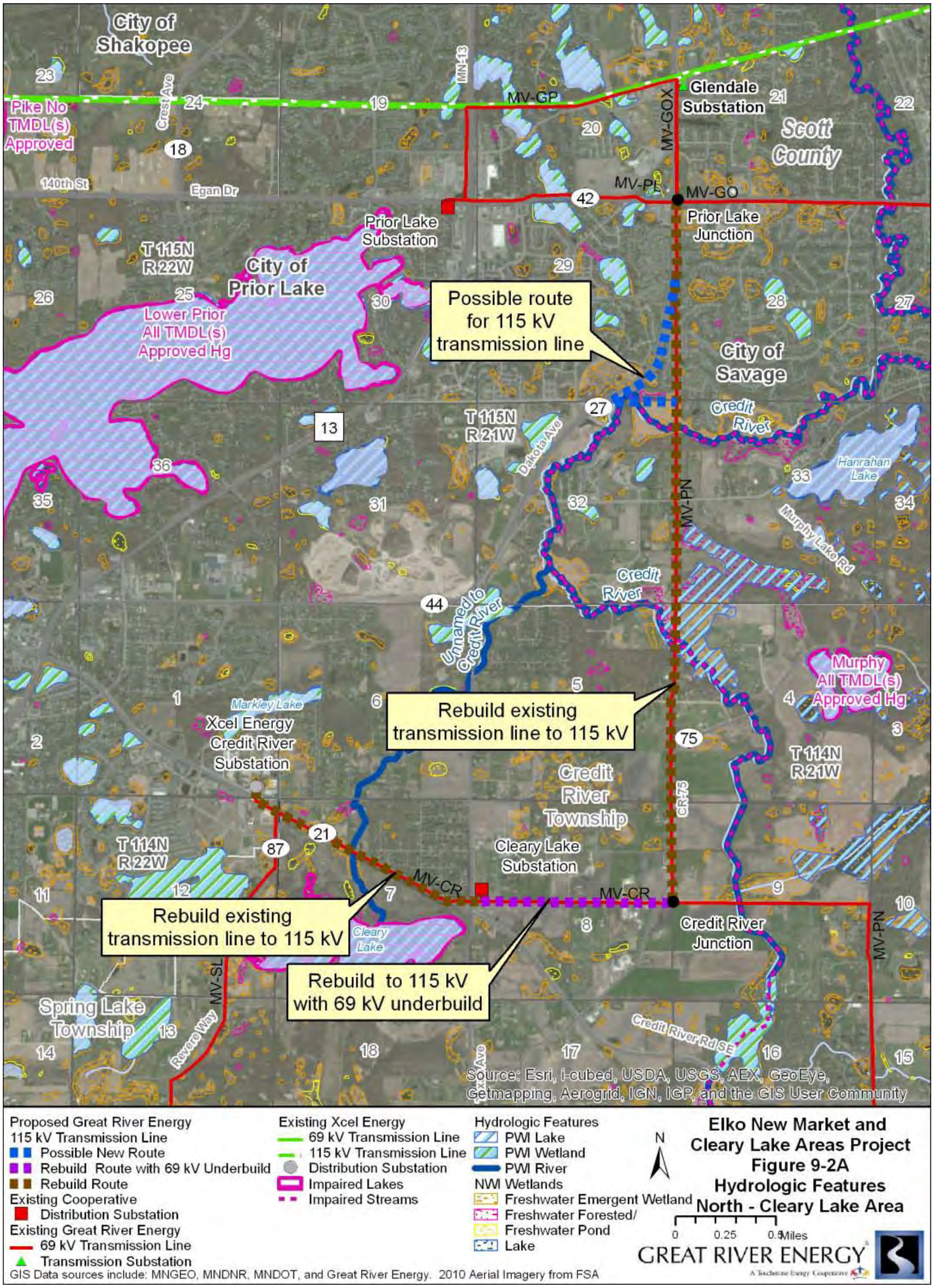
[21] http://www.pca.state.mn.us/water/basins/Lake Superior/index.html (2010)

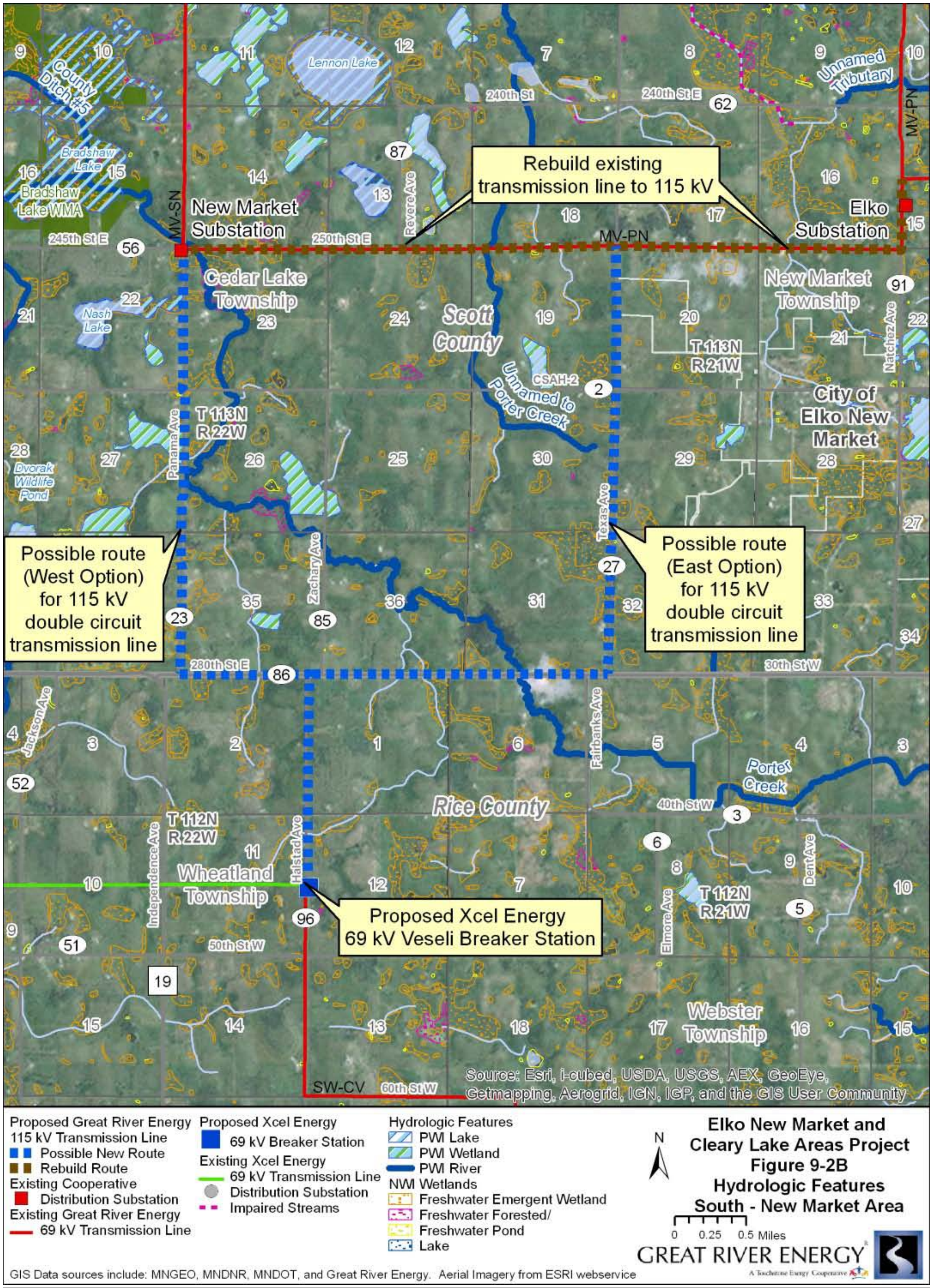
[22] http://files.dnr.state.mn.us/natural_resources/water/groundwater/provinces/gwprov.pdf (2010)

[23] http://www.dnr.state.mn.us/lakefind/index.html; http://www.dnr.state.mn.us/maps/compass.html (2010)

**Figure 9-2A. Hydrologic Features North – Cleary Lake Area**



## Figure 9-2B. Hydrologic Features South – New Market Area



Riparian Areas

Riparian areas are ecosystems that occur along watercourses or at the fringe of water bodies. For purposes of this Application, the riparian areas are defined as the land within 300 feet of streams and within 1,000 feet of lakes. These distances were selected because they are consistent with the definition of shoreland in the DNR Statewide Standards. These statewide standards set guidelines for the use and development of shoreland (riparian) property around all lakes greater than 25 acres (10 acres in municipalities) and rivers with a drainage area of two miles or greater.

The proposed routes cross riparian areas associated with the rivers and streams listed above.

Public Waters

Public Waters are wetlands, water basins and watercourses of significant recreational or natural resource value in Minnesota as defined in Minnesota Statutes Section 103G.005. The DNR has regulatory jurisdiction over these waters, which are identified on the DNR Public Waters Inventory (PWI) maps[24].

The existing transmission lines cross five Public Waters in Scott County. If the East Option for the new transmission line in the south Project area were chosen, there would be an additional crossing of Porter Creek. The Public waters are shown on **Figure 9-2A** and **Figure 9-2B** and listed in **Table 9-10**.

**Table 9-10. PWI Waters (Scott County)**

| Name | Type | Location |
|---|---|---|
| Credit River | River | T115N, R21W, Section 32 or 33 |
| Credit River | River | T114N, R21W, Section 4 |
| Unnamed Tributary of Credit River | Stream | T114, R21W, Section 7 |
| Unnamed Tributary of Porter Creek | Stream | T113N, R22W, Section 19 |
| Porter Creek | Creek | T113N, R22W, Section 23 |
| Porter Creek (Possible Crossing on East Option) | Creek | T113N, R21W, Section 31 |

Impaired Waters

Section 303(D) of the Federal Clean Water Act requires states to publish, every two years, a list of streams and lakes that are not meeting their designated uses because of excess pollutants (impaired waters). The list, known as the 303(d) list, is based on violations of water quality standards. In Minnesota, the MPCA has jurisdiction over determining 303(d) waters. These waters are described as "impaired." Cleary Lake is impaired for nutrients/eutrophication and mercury in fish tissue, Murphy Lake is impaired for mercury in fish tissue, and the Credit River and Porter Creek are impaired for turbidity (**Figure 9-2A** and **Figure 9-2B**).

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[24] MNDNR: *Public Waters Inventory Maps.*
http://files.dnr.state.mn.us/waters/watermgmt_section/pwi/CARL1OF1.pdf (2010)
http://files.dnr.state.mn.us/waters/watermgmt_section/pwi/STLO1OF7.pdf (2010)

Wetlands

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

The USFWS produced maps of wetlands based on aerial photographs and NRCS soil surveys starting in the 1970s. These wetlands are known as the National Wetland Inventory (NWI). Wetlands listed on the NWI may be inconsistent with current wetland conditions; however, NWIs are the most accurate and readily available database of wetland resources within the Project area and were therefore used to identify wetlands along the existing and proposed routes.

The wetland types and lengths within the existing and proposed routes are provided in **Table 9-11.** Palustrine emergent wetlands are by far the dominant wetland types.

Impacts and Mitigation

No impacts to groundwater in the Project area are anticipated.

The transmission lines do not cross any of the lakes in the area, and no navigable waters will be affected by the Project.

Because all rivers and streams will be spanned by transmission structures, no structures will be located within these features and no direct impacts to rivers or streams are anticipated. Indirect impacts could include sedimentation reaching surface waters during construction due to ground disturbance by excavation, grading, construction traffic, and dewatering of holes drilled for transmission structures. This could temporarily degrade water quality due to turbidity. These impacts will be avoided or minimized using appropriate sediment control practices and BMPs.

Once the Project is completed, there would be no significant impact on surface water quality because wetland impacts will be minimized and mitigated, disturbed soil will be restored to previous conditions or better, and the amount of land area converted to an impervious surface will be small.

The transmission line could cross up to six DNR Public Waters, depending on which new route is permitted to the Veseli Breaker Station on the south end of the Project.[25] Great River Energy will apply for a license to cross these waters once design details are available and will follow any recommendations to minimize erosion and other impacts.

The Project should have no impact on the impairment status of the waters in the Project area. There is potential to increase turbidity due to sedimentation from construction activities;

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[25] MNDNR: Public Waters Inventory Maps.
http://files.dnr.state.mn.us/waters/watermgmt_section/pwi/CARL1OF1.pdf (2010)
http://files.dnr.state.mn.us/waters/watermgmt_section/pwi/STLO1OF7.pdf (2010)

however, appropriate erosion and sediment control measures will be implemented to avoid or minimize such impacts.

Potential impacts to riparian areas along the routes would be limited to ground disturbances due to pole placement. Due to the flexibility to avoid placing poles in sensitive areas, the anticipated impacts to the riparian areas along the routes are minimal.

Construction of the transmission lines is not expected to alter existing water drainage patterns or floodplain elevations due to the small cross section per pole and their relatively wide spacing. The small area of impermeable surfaces created by the pole structures will not cause an increase in susceptibility of flooding in the region.

**Table 9-11. Wetland Types within the Routes (NWI)**

| Cowardin Type[1] | No. of Basins | Length of Crossing (feet) | Percent of Wetland Type within Proposed Route |
|---|---|---|---|
| **Cleary Lake Area Rebuild- Existing MV-PN** | | | |
| PEM/SS1C/SS1Cd | 3 | 281 | 2.0% |
| PEMA | 1 | 569.2 | 1.79% |
| PEMC | 7 | 2254.4 | 9.8% |
| PEMF | 3 | 127.6 | 0.95% |
| PFO/SS1C | 3 | 211.7 | 2.41% |
| **Total** | **17** | **3443.9** | **17.00%** |
| **Cleary Lake Area Existing MV-PN Line with Possible Deviation** | | | |
| PEM/SS1C | 7 | 2127.2 | 10.38% |
| PEMA | 1 | 569.2 | 2.00% |
| PEMF | 4 | 48.1 | 1.01% |
| PFO/SS1C | 2 | 56.7 | 1.55% |
| **Total** | **14** | **2,801.2** | **15.00%** |
| **Cleary Lake Area Rebuild- Existing MV-CR Line** | | | |
| PEMC/PEMCd/PEMCh | 7 | 287.8 | 3.35% |
| PEMF | 1 | 0 | 0.35% |
| PSS1C | 1 | 0 | 0.08% |
| PUBGh | 1 | 0 | 0.21% |
| **Total** | **10** | **287.8** | **4.00%** |
| **Elko New Market Area Rebuild – Existing MV-PN Line** | | | |
| PEMC/FO1C/PEMCd/PFO1Cd/PEMCx | 10 | 235 | 2.90% |
| PEMA | 3 | 0 | 1.01% |
| PEMF | 1 | 0 | 0.41% |
| PUBF | 1 | 0 | 0.01% |
| PUBGx | 1 | 0 | 0.02% |
| **Total** | **16** | **235** | **4.35%** |

| Cowardin Type[1] | No. of Basins | Length of Crossing (feet) | Percent of Wetland Type within Proposed Route |
|---|---|---|---|
| **Elko New Market Area New Transmission Line (West Option)** | | | |
| PEMC/PSS1C/PEMCd | 18 | 166 | 6.09% |
| PEMA/PEMAd | 4 | 0 | 0.56% |
| PEMF | 2 | 0 | 0.54% |
| PUBGx | 1 | 0 | 0.00% |
| **Total** | **25** | **166** | **7.19%** |
| **Elko New Market Area New Transmission Line (East Option)** | | | |
| PEM2F | 1 | 0 | 0.25% |
| PEMA/PEMAd | 11 | 582.1 | 3.99% |
| PEMC/PEMCd | 6 | 664.3 | 2.18% |
| PUBF | 1 | 0 | 0.07% |
| **Total** | **19** | **1,246.4** | **6.49%** |

[1]Cowardin et. al. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. US Department of the Interior, USFWS, Washington D.C.

The wetland type was classified using the Cowardin system that defines the habitat system, vegetative and sediment class and water regime. The wetland classification system is hierarchical, with wetlands and deepwater habitats divided among five major systems at the broadest level. The five systems include Marine (open ocean and associated coastline), Estuarine (salt marshes and brackish tidal water), Riverine (rivers, creeks, and streams), Lacustrine (lakes and deep ponds), and Palustrine (shallow ponds, marshes, swamps, sloughs). Systems are further subdivided into subsystems that reflect hydrologic conditions. Below the subsystem is the class that describes the appearance of the wetland in terms of vegetation or substrate. Each class is further subdivided into subclasses; vegetated subclasses are described in terms of life form, and substrate subclasses in terms of composition. The classification system also includes modifiers to describe hydrology (water regime), soils, water chemistry (pH and salinity), and special modifiers relating to man’s activities (e.g., impounded, partly drained).

Some common symbols used in the wetland classification system include:

| | | |
|---|---|---|
| SYSTEM: | P - Palustrine | L - Lacustrine |
| CLASS: | RB - Rock Bottom | UB - Unconsolidated Bottom |
| | EM - Emergent | SS - Scrub-Shrub |
| | FO - Forested | OW - Open Water |
| MODIFIERS: | A - Temporarily flooded | B - Saturated |
| | C - Seasonally flooded | D - Seasonally well drained |
| | E - Seasonally saturated | F - Semipermanently flooded |
| | G - Intermittently flooded | H - Permanently flooded |
| SPECIAL MODIFIERS: | b - beaver | d - partially drained/ditched |
| | f - farmed | s - spoil |
| | x - excavated | |

Temporary impacts to wetlands may occur if they need to be crossed during construction of the transmission line. No staging or stringing setup areas will be placed within or adjacent to water resources, as practicable. Wetland impact avoidance measures that will be implemented during design and construction of the transmission lines include spacing and placing the power poles at variable distances to span and avoid wetlands, where possible. When it is not possible to span the wetland, several measures will be utilized to minimize impacts during construction:

- When possible, construction will be scheduled during frozen ground conditions.
- Construction crews will attempt to access the wetland with the least amount of physical impact to the wetland (*i.e.*, shortest route) and will access poles near/in wetlands from roadways whenever possible to minimize travel through wetland areas.
- The structures will be assembled on upland areas before they are brought to the site for installation, when practicable.
- When construction during winter is not possible, construction mats (wooden mats or the Dura-Base Composite Mat System) will be used to protect wetland vegetation. Additionally, all-terrain construction vehicles may be used, which are designed to minimize impact to soils in damp areas.

Permanent impacts to wetlands occur where structures must be located within wetland boundaries (approximately 20 square feet of permanent impacts per structure). Wetland vegetation would be restored in the disturbed areas following construction.

It is anticipated that a Regional General Permit under Section 404 of the Clean Water Act from the Corps will be required for the Project. If so, Great River Energy will apply for a permit once design details are available, restore the wetlands as required by the Corps, and comply with the requirements of the Wetland Conservation Act.

Vegetation maintenance procedures under transmission lines prohibit trees from establishing. Existing trees must be removed throughout the entire ROW, including forested wetlands. Although there are very few forested wetlands that would be affected by the Project, these wetlands would undergo permanent vegetative changes within the ROW, and mitigation for the conversion of forested wetlands to emergent and shrub/scrub wetlands may be required by the Corps.

In the event that impacts to hydrologic features are unavoidable, the Applicant will work with the jurisdictional agencies to determine the best ways to minimize the impacts and create appropriate mitigation measures.

### 9.5.3 Flora and Fauna

Flora

Presettlement vegetation in the area consisted of elm, basswood, sugar maple, bur oak, ironwood, northern red oak, and aspen. The primary present day land uses in the Project area are agriculture, pasture, wetlands, and recreation and tourism.

Although none are crossed by the proposed routes, there are several areas in the Project area where natural vegetation is being managed, including:

- Murphy Hanrehan Park Reserve
- Cleary Lake Regional Park
- Bradshaw Lake WMA
- SpartinaWMA

These resources provide potential habitat for native vegetation, wildlife and rare and unique resources.

Fauna

The USFWS website[26] indicated there are no threatened or endangered species listed for Scott County. The website list included the Dwarf trout lily (endangered) and Prairie bush clover (threatened) in Rice County; however, the Applicant does not believe the proposed Project will affect either of these species. The USFWS was contacted by letter[27], and in their email response of January 11, 2011[28], they concurred that there are no listed species near the proposed transmission lines in Scott and Rice counties.

The USFWS identified two USFWS conservation easements located in the South ½ of Section 34, Township 113N, Range 22W. Because this is an important waterfowl area, if the West Option for the new 115 kV line is permitted, USFWS recommends installing bird flight diverters

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[26] US Fish and Wildlife Webpage Endangered Species. http://www.fws.gov/Midwest/Endangered/LISTS/minnesot-cty.html

[27] Letter from Carole Schmidt, Great River Energy to Nick Rowse, US Fish and Wildlife Service. 20 December 2012. *See* Appendix K.

[28] Email from Andrew Horton, US Fish and Wildlife Service to Carole Schmidt, Great River Energy. 7 January 2013. *See* Appendix K.

along the SW1/4 of Section 35 to prevent bird collisions and raptor perch deterrents on top of the transmission poles. The West Option also crosses between wetland complexes along the western 1/2 of Section 27 and the SE¼, NE¼ of Section 22, Township 113N, Range 22W. Because there may be migratory bird movement between these locations, USFWS recommends bird flight diverters be installed in this location if the West Option is permitted.

The 115 kV rebuild route located at the SE¼, SE¼ of Section 32 and the NE¼, NE¼ of Section 5, Township 114N, Range 21W is adjacent to the Murphy-Hanrehan Park Reserve Important Bird Area designated by the National Audubon Society. To prevent bird collisions in this area, USFWS recommends installing bird flight diverters along the SE¼ of Section 32 and the NE¼, NE ¼ of Section 5.

The parks and WMAs in the vicinity of the Project provide habitat for a variety of animal species, including deer, small game and waterfowl. There are no USFWS Waterfowl Production Areas in the Project area.

Impacts and Mitigation

No impacts to native vegetation are anticipated. The proposed transmission line will follow existing transmission ROWs for two-thirds of the Project, minimizing impacts to previously-undisturbed vegetation.

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

Raptors, waterfowl and other bird species may be affected by the construction and placement of the transmission lines. Avian collisions are a possibility after the completion of the transmission lines. Waterfowl are typically more susceptible to transmission line collision, especially if the transmission line is placed between agricultural fields that serve as feeding areas, or between wetlands and open water, which serve as resting areas.

The Applicant will address avian issues by working with the DNR and USFWS to identify any areas that may require marking transmission line shield wires and/or to use alternate structures to reduce the likelihood of collisions.

The Applicant will continue to work with the USFWS office and the Minnesota Valley Wildlife Refuge if the West Option for the new 115 kV route is permitted, to insure that wetland impacts are minimized and that construction within an established ROW does not interfere with the conservation easement designations.

### 9.5.4 Invasive Species Management

The movement of construction equipment to, from, and between various work sites has the potential to introduce and/or spread invasive species. Such species include reed canary grass, common buckthorn, purple loosestrife, and leafy spurge, in addition to various invasive aquatic species.

Impacts and Mitigation

Invasive aquatic species, including Eurasian water-milfoil, flowering rush, and zebra mussels, are not expected to a significant issue for construction of the Project. Great River Energy anticipates a construction schedule that would allow for stringing of conductor over potentially-infested waters during winter months over the ice. To minimize the potential for the introduction or spread of invasive species, Great River Energy proposes to follow BMPs during Project construction:

- All disturbed areas will be revegetated using weed-free seed mixes. If practicable, native plant species will be used to revegetate disturbed areas. Weed-free straw or hay will be used for erosion control;

- Herbicidal or manual vegetation removal may be implemented to minimize the spread of invasive species where such removal is consistent with easement conditions or landowner restrictions;

- Construction vehicles will be cleaned and inspected to remove dirt, mud, plants, and debris from vehicles and equipment prior to arriving at, and leaving from, construction sites; and

- The Construction Field Representative will oversee BMP installation and effectiveness.

After detailed design for the Project is complete, Great River Energy will coordinate with the DNR to determine if any additional invasive species mitigation measures are required on DNR lands or across DNR waterways.

## 9.6 Rare and Unique Natural Resources

Rare and unique natural features within one-mile of the routes include state protected and rare species, and remnant areas of native vegetation.

The DNR was contacted[29] requesting information on the possible effects of the proposed Project on rare and unique features in the Project area. In an email dated February 20, 2013, the DNR encouraged an assessment of potential effects to rare features prior to the determination of a final route.[30] A desktop review of the Natural Heritage Inventory System records provided by the DNR indicates that rare and unique resources occur within one mile of the proposed routes. These resources are listed in **Table 9-12** and shown on **Figure 9-3A** and **Figure 9-3B**.

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[29] Letter from Carole Schmidt, Great River Energy to Lisa Joyal, Minnesota Department of Natural Resources. December 20, 2012. *See* Appendix K.

[30] Email from Lisa Joyal, Minnesota Department of Natural Resources to Carole Schmidt, Great River Energy. February 20, 2013. *See* Appendix K.

In the northern portion of the Project, the existing MV-PN line passes just to the west of a DNR Site of Outstanding Biodiversity Significance at Murphy-Hanrehan Park Reserve. This line is proposed to be rebuilt along the existing alignment in this area and no additional clearing of forested habitat is planned.

All of the occurrences listed in **Table 9-12** are located outside of the proposed routes. The Applicant conducted a cursory review of habitats along the proposed routes to identify sites that could harbor the species listed in **Table 9-12**. Habitats for the cerulean warbler are too fragmented along the routes to be useful to this species. Although there is habitat for the loggerhead shrike in the Project area, the nest records from 1990 were surveyed by the DNR in subsequent years and no shrikes were found. This site was checked in May of 2013 and the habitat is no longer suitable for shrikes – the pasture area is now planted in trees and grassland habitats used by shrikes have been eliminated.

Two areas along the proposed Project include habitats that could harbor Henslow's sparrows.

**Table 9-12. Rare and Unique Resources within One Mile of the Proposed Routes**

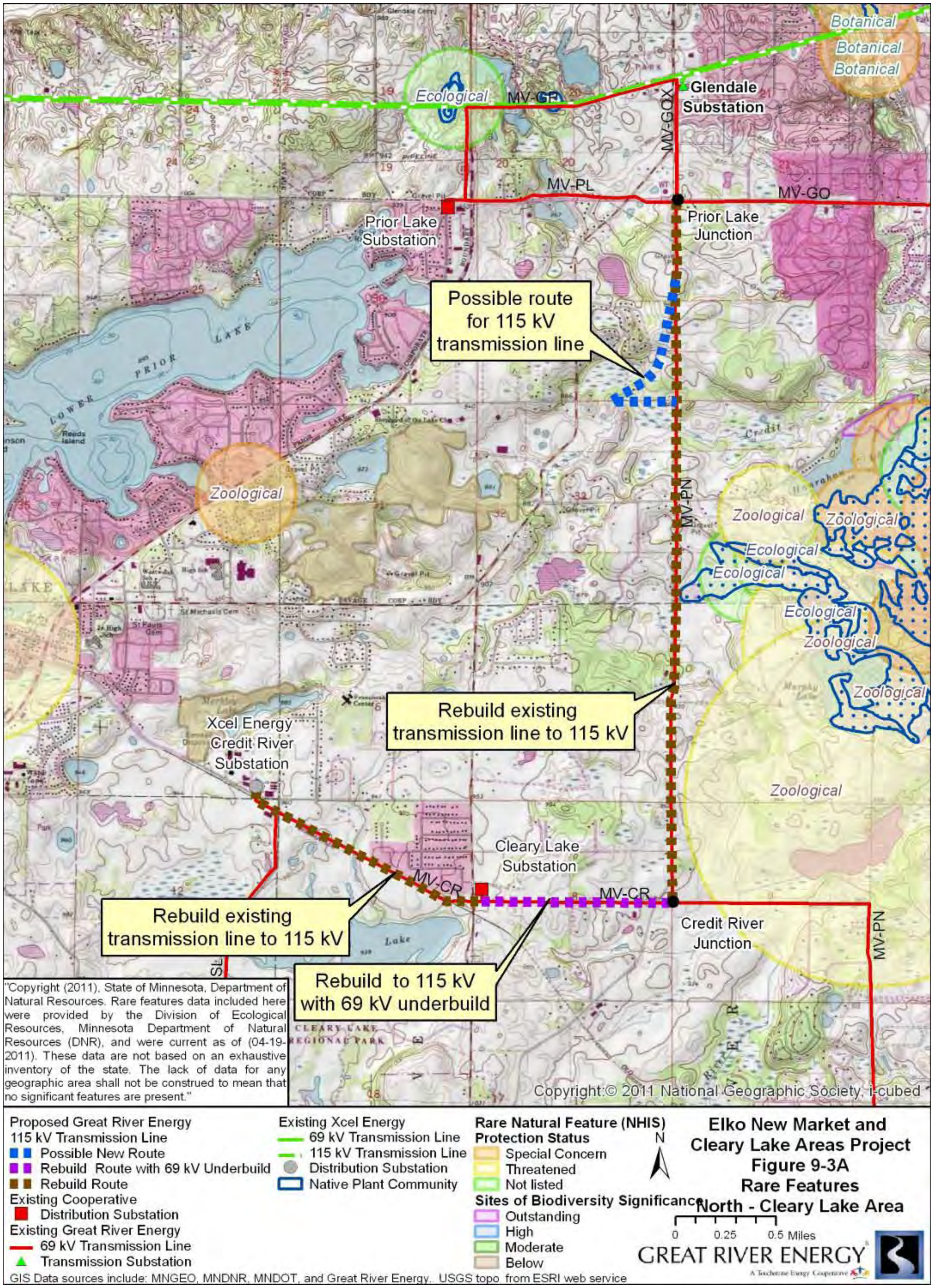
| Common Name | Scientific Name | Number of Occurrences | Federal Status | MN Status* | State Rank** | Habitat |
|---|---|---|---|---|---|---|
| Blanding's Turtle | *Emydoidea blandingii* | 4 | None | THR | S2 | Wetland complexes and adjacent sandy uplands |
| Cerulean Warbler | *Setophaga cerulea* | 1 | None | NON | SNR | Mature, mesic deciduous forest with large trees |
| Henslow's Sparrow | *Ammodramus henslowii* | 1 | None | END | S1B | Old fields, grassland parcels, native prairie |
| Native Community Undetermined Class | | 2 | None | NON | SNR | Oak Woodland Brushland |
| Willow-dogwood Shrub Swamp | | 1 | None | NON | S4 | Willow-Dogwood Swamp |
| Loggerhead Shrike | *Lanius ludovicianus* | 1 | None | THR | S2B | Upland grasslands, sometimes agricultural areas where short grass vegetation and perching sites such as hedgerows, shrubs and small trees are found. Both native and non-native grasslands, including native prairie, pastures, old fields, shelterbelts, farmyards, and cemeteries. |

** END – Endangered; THR – Threatened; SPC – Special Concern; NON – no legal status, data being gathered for possible future listing; None – Terrestrial communities do not have assigned status, but are considered important ecologically.*

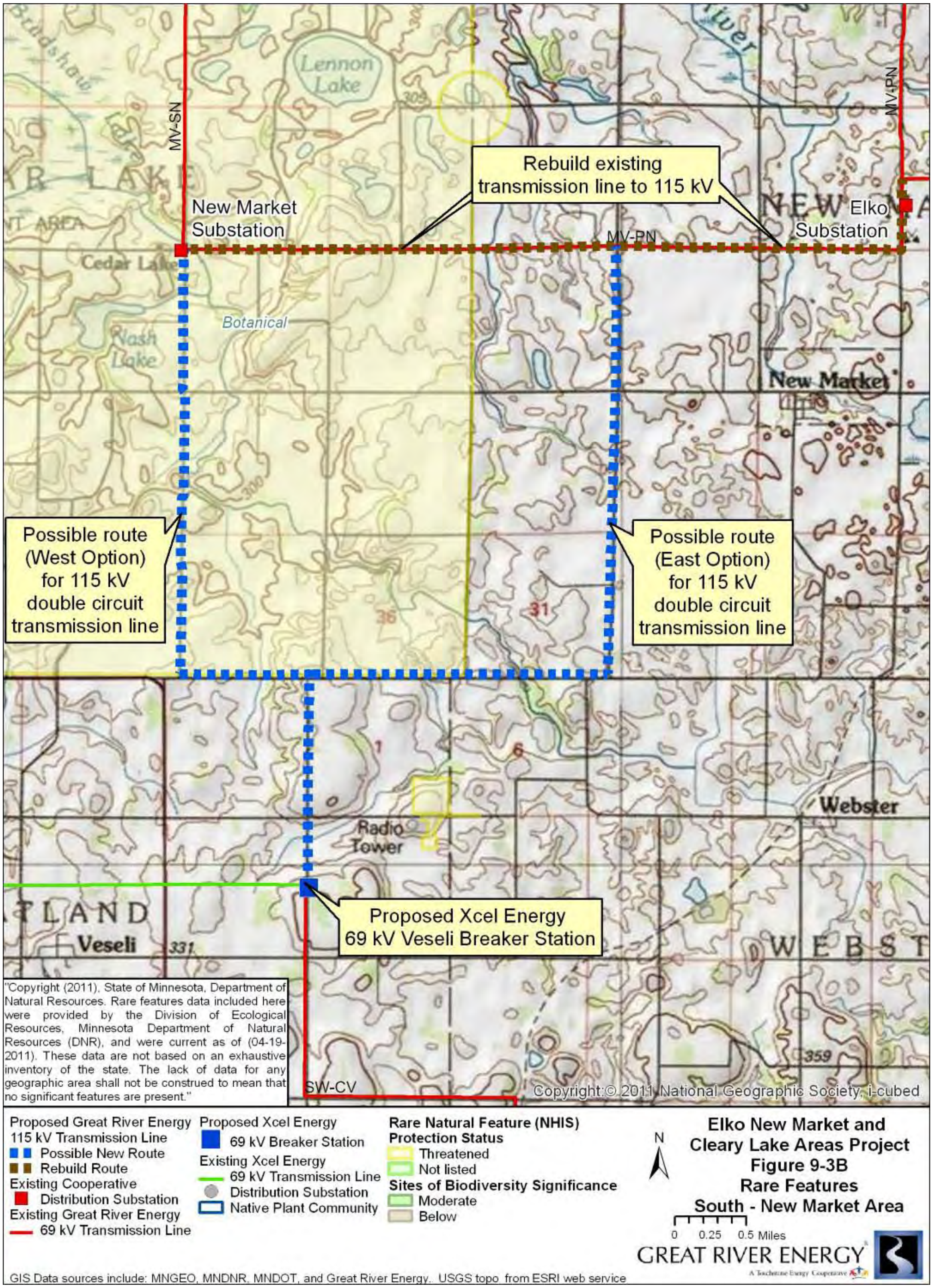
*** State rank is assigned to species and terrestrial communities to reflect the relative rarity or endangerment of the species or plant community in Minnesota. Ranks range from 1 – in greatest need of conservation, to 5 – secure under present conditions. SNR – not ranked; X – extirpated, species believed to be extirpated from the State; H – historical, species occurred historically in State but has not been verified in the last 20 years.*

*Source: Minnesota Natural Heritage Information System: Rare Features Database through License Agreement #LA6471. Data current as of August 2012.*

## Figure 9-3A. Rare Features North – Cleary Lake Area



## Figure 9-3B. Rare Features South – New Market Area



Impacts and Mitigation

Rebuilding along existing transmission ROWs will avoid impacting undisturbed habitat along the rebuild areas. The Applicant will continue to coordinate with the DNR and USFWS to ensure that sensitive species in the Project area are not impacted by construction of the Project.

The Applicant will conduct surveys for Henslow's sparrow if construction takes place during the breeding season. Construction crews will also be trained in the identification and removal of this species from construction sites if they are encountered during the placement of structures during the nesting season.

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

- Minimize tree felling and shrub removal that are important to area wildlife.
- Utilize BMPs to prevent erosion of the soils in the areas of impact.
- Implement sound water and soil conservation practices during construction and operation of the Project to protect topsoil and adjacent water resources and minimize soil erosion. Practices may include containing excavated material, protecting exposed soil, and stabilizing restored soil.
- Re-vegetate disturbed areas with native species and wildlife conservation species where applicable.
- Implement raptor protection measures, including placement of bird flight diverters on the line at water crossings after consultation with local wildlife management staff.

## 9.7 Physiographic Features

### 9.7.1 Topography

The proposed Project lies within the Big Woods subsection of the Minnesota and NE Iowa Morainal Section of the Eastern Broadleaf Forest Province under the DNR Ecological Classification System.

The landscape in the Big Woods subsection is dominated by gently to moderately rolling topography.

The topography of the proposed routes is nearly level to moderately rolling.

Impacts and Mitigation

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

### 9.7.2 Geology

Depth to bedrock in the Big Wood Subsection varies from 100 to 400 feet. Underlying bedrock is Ordovician and Cambrian sandstone, shale and dolomite in the southern part of the subsection and Cretaceous shale, sandstone and clay in the northern part of the subsection.

Impacts and Mitigation

Few geological constraints on design, construction, or operation are anticipated in the Project area. If dewatering is found to be necessary during construction (i.e., during pole embedding), the effects on water tables would be localized and short term, and would not affect geologic resources. Construction of the Project will not alter the geology along the routes; therefore, no mitigation is proposed.

### 9.7.3 Soils

NRCS soil survey data[31] were reviewed to describe the soil resources in the vicinity of the Project. Soils are generally grouped into categories known as "associations." A soil association has a distinctive pattern of soils, relief and drainage, and is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. There are four soil associations along the proposed routes. These soil associations are listed in **Table 9-13** and shown in **Figure 9-4A** and **Figure 9-4B**.

**Table 9-13. Soil Associations in the Vicinity of the Project**

| Soil Association | General Description |
|---|---|
| Muskego-Lester-Hayden | **Muskego-Lester-Hayden** soils are nearly level to undulating, deep to very deep, well to very poorly drained soils that formed in herbaceous organic deposits over sedimentary peat on glacial lake plains and floodplains, calcareous loamy glacial till on glacial moraines and till plains. |
| Lester-Le Sueur-Cordova | **Lester-Le Sueur-Cordova** soils are nearly level to undulating, very deep, well to poorly drained soils that formed in calcareous, loamy glacial till on ground moraines and till plains. |
| Lester-Hamel | **Lester-Hamel** soils are nearly level to hilly, very deep, well to somewhat poorly to poorly drained soils that formed in slope colluvium and glacial till on moraines. |
| Lerdal-Kilkenny-Hamel | **Lerdal-Kilkenny-Hamel** soils are nearly level to hilly, very deep, well to poorly drained soils that formed on a mantle of clayey glacial till or flow till and underlying loamy glacial till on moraines, and slope colluvium. |

[31] http://soils.usda.gov/survey/online_surveys/minnesota/
http://ortho.ftw.nrcs.usda.gov/osd/dat/S.html

**Figure 9-4A. Soils North – Cleary Lake Area**

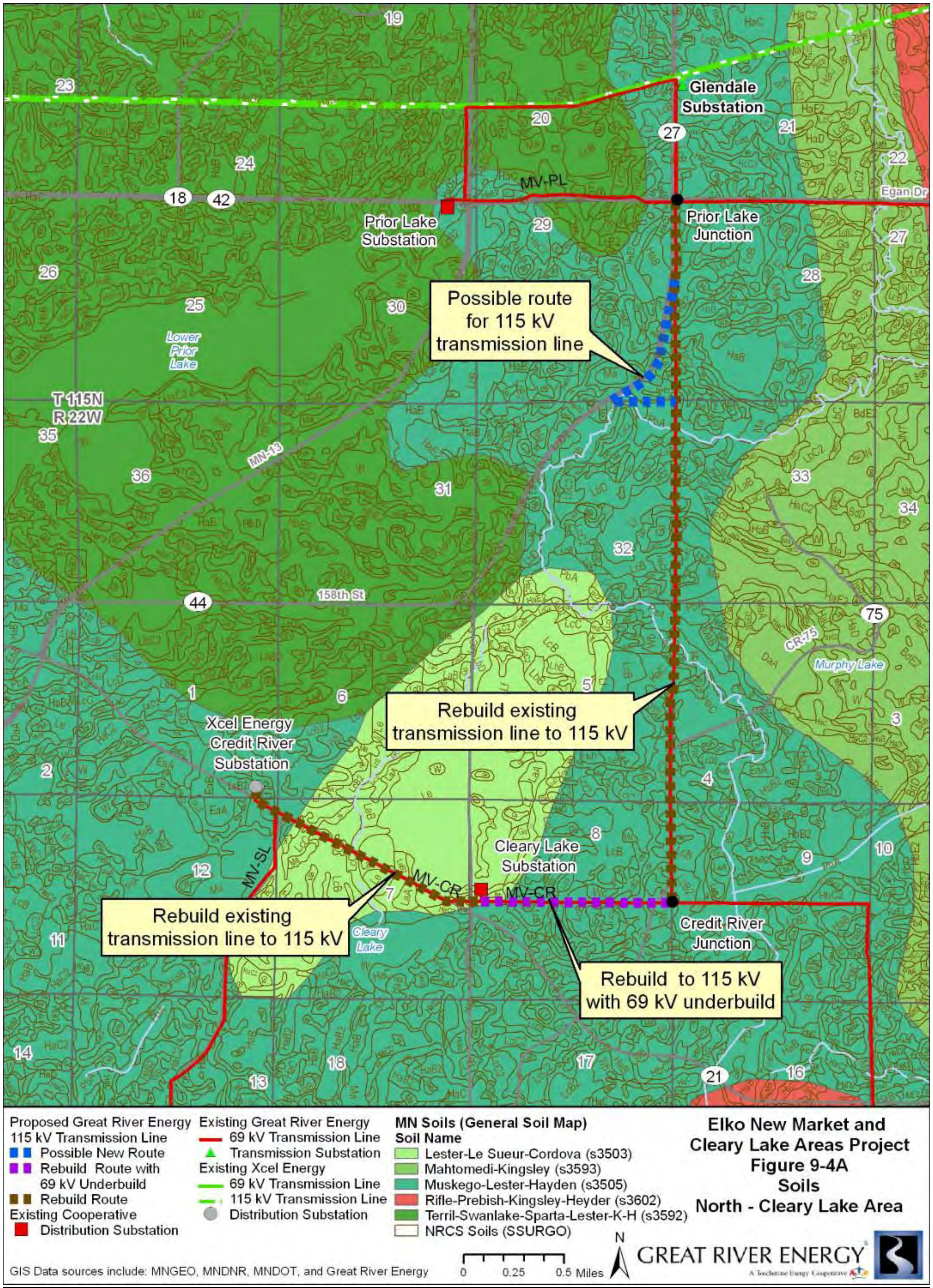
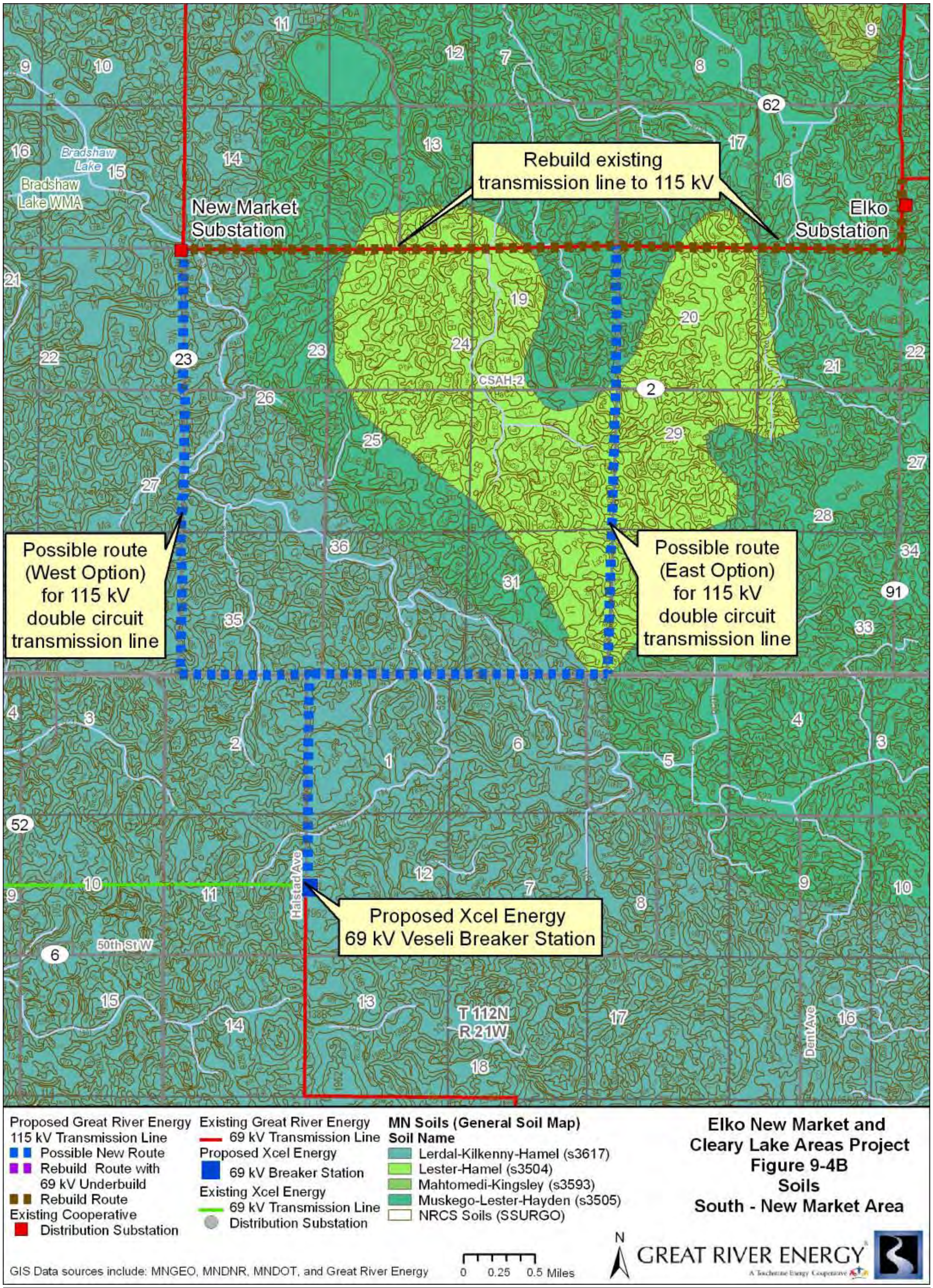


**Figure 9-4B. Soils South – New Market Area**



Impacts and Mitigation

Potential impacts of construction are compaction of the soil and exposing the soils to wind and water erosion. Impacts to physiographic features should be minimal during and after installation of the transmission line structures, and these impacts will be short term. There should be no long-term impacts resulting from this Project.

Soils will be revegetated as soon as possible to minimize erosion or some other method used during construction to prevent soil erosion.

If over an acre of soil will be disturbed during the construction of the transmission lines, Great River Energy will obtain a NPDES construction stormwater permit from the MPCA and will prepare a SWPPP. Erosion control methods and BMPs will be utilized to minimize runoff during line construction.

## 9.8 Land Use

The Project covers a variety of land use patterns in urban and rural environments. The existing lines follow CR 75 (MV-PN line) and CSAH 21 (MV-CR line) on the north end of the Project. A possible deviation from the existing line on this end of the Project follows CSAH 27 (Dakota Avenue). On the south end of the Project, the existing routes follow CR 62 ($245^{th}$ St.), County Highway 91 (Natchez Avenue) and $250^{th}$ Street. The possible new routes on the south end of the Project follow either CSAH 23 (Panama Avenue) or CSAH 27 (Texas Avenue), plus CSAH 86 ($280^{th}$ St.) and Halstad Avenue. Land use along the routes is a mix of urban/residential, park lands, cropland, grassland, wetlands and waters, with limited commercial and industrial, shrub land and forested areas (**Figure 9-5A** and **Figure 9-5B**).

A zoning map of the Project area is provided in **Figure 9-6A** and **Figure 9-6B**.

Scott County

The north end of the Project is located in northeastern Scott County and passes through the City of Savage and Credit River Township. This part of the Project is dominated by residential, agricultural land and park land, with limited commercial and industrial areas (**Figure 9-6A**).

The south end of the Project (located in southeastern Scott County) passes through New Market Township and Cedar Lake Township and is dominated by residential and agricultural land (**Figure 9-6B**).

Rice County

The south end of the Project (located in northwestern Rice County) passes through Webster Township and Wheatland Township, and is dominated by rural residential and agricultural land (**Figure 9-6B**).

Impacts and Mitigation

Impacts to land use as a result of the Project are expected to be minimal. In the rebuild areas, construction within transmission ROW will minimize land use conflicts. Construction of the facilities would not change the possible land uses for any area. No impacts to residential, commercial or industrial land uses are anticipated; therefore no mitigation is proposed.

## 9.9 Unavoidable Impacts

The rebuild portions of the Project are anticipated to have no significant unavoidable adverse impacts. The rebuild portions of the Project would not have the same level of impacts usually associated with the construction of a new transmission line due to the fact it is a rebuild of an existing line. As the Project is primarily a rebuild, the bulk of new impacts would be those associated with short-term construction impacts. Long-term impacts of the rebuild portions of the Project have already been realized with the existing line. Given that the majority of the rebuild portions of the Project would be located primarily in the same location as the existing 69 kV transmission line, the incremental long-term impacts of changing out structures would not result in significant changes.

The new construction portion from the MV-PN line between the Elko and New Market substations to the Veseli Breaker Station would have similarly nominal unavoidable impacts.

Operating the transmission line at 115 kV would also not result in a significant environmental impact. Further, the significant ROW sharing associated with the Project would mitigate the direct impacts associated with the new line construction.

The Project will require only minimal commitments of resources that are irreversible and irretrievable. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources have on future generations. Irreversible commitments of resources are those that result from the use or destruction of a specific resource that cannot be replaced within a reasonable time frame. Irretrievable resource commitments are those that result from the loss in value of a resource that cannot be restored after the action.

Those commitments that do exist are primarily related to construction. Construction resources include aggregate resources, concrete, steel, and hydrocarbon fuel. During construction, vehicles necessary for these activities would be deployed on site and would need to travel to and from the construction area, consuming hydrocarbon fuels. Other resources would be used in pole construction, pole placement, and other construction activities.

**Figure 9-5A. Land Use North – Cleary Lake Area**

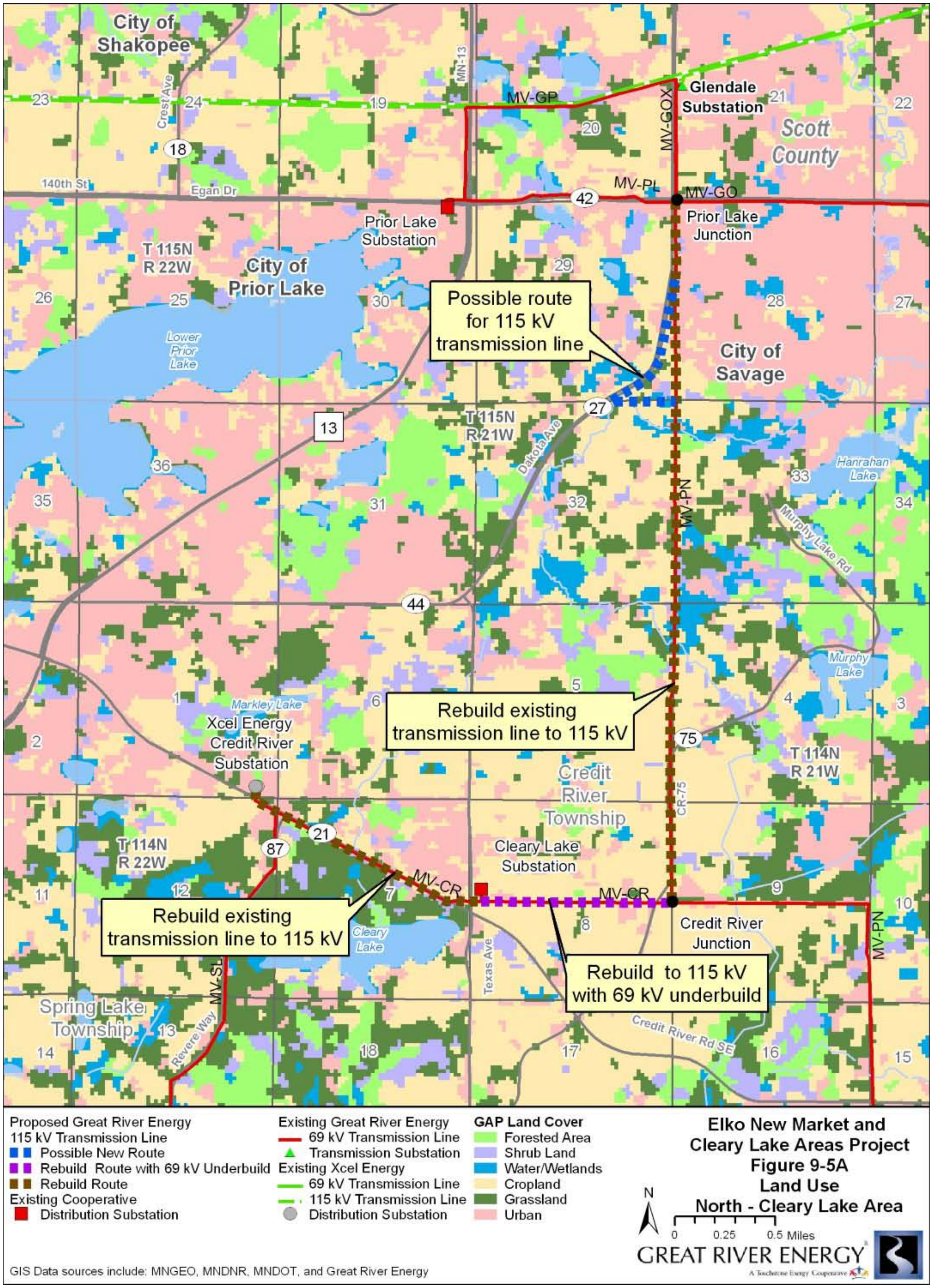
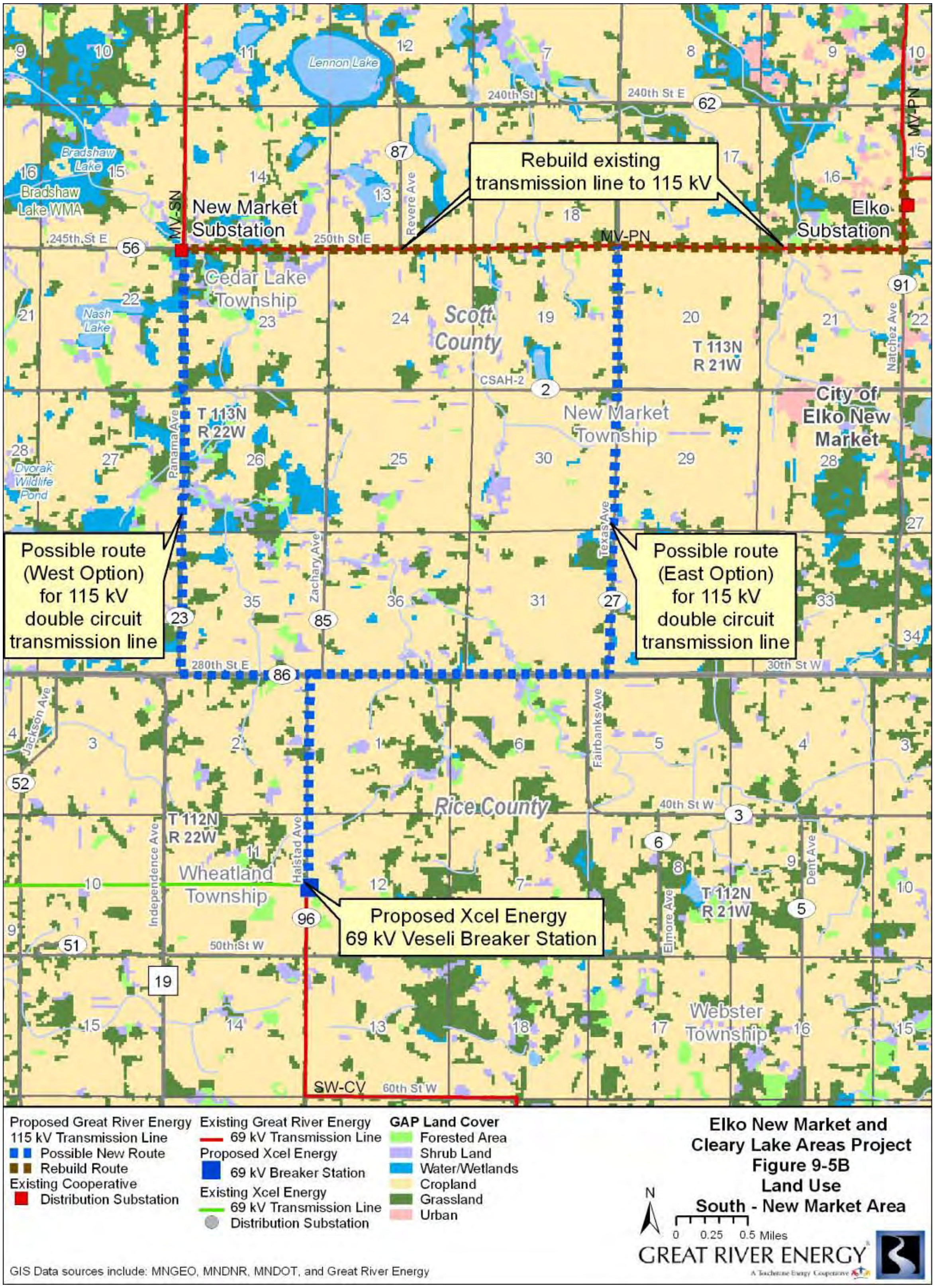
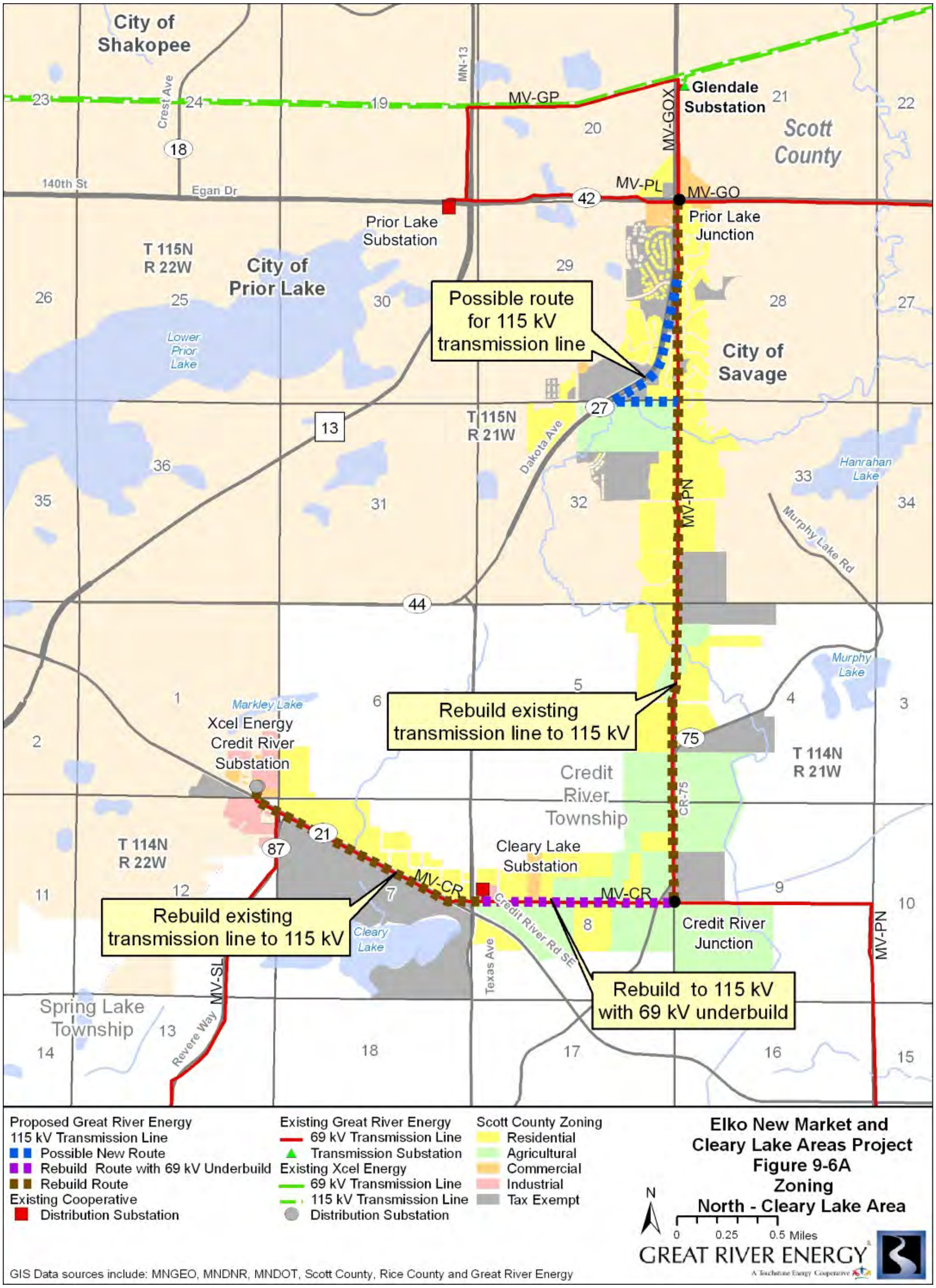


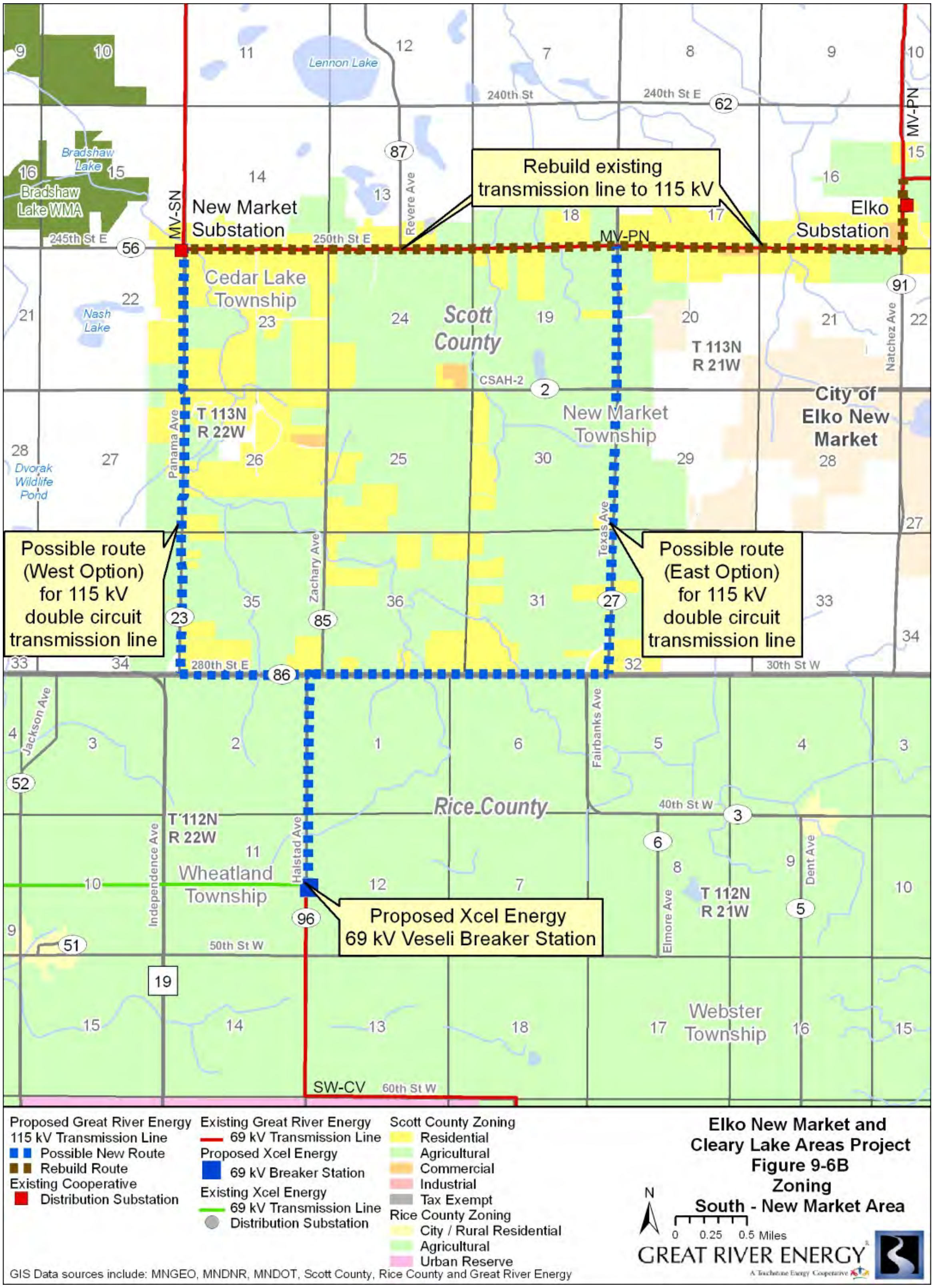
**Figure 9-5B. Land Use South – New Market Area**



## Figure 9-6A. Zoning North – Cleary Lake Area



## Figure 9-6B. Zoning South – New Market Area



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# 10 APPLICATION OF RULE CRITERIA

## 10.1 Certificate of Need

The Commission has established in its rules (Minn. R. 7849.0120) the criteria that it will apply to determine whether an applicant has established that a new proposed large energy facility is needed. Great River Energy has described in this Application the reasons why a CON should be granted to build the Elko New Market and Cleary Lake Areas Project. Those reasons are summarized below.

### 10.1.1 Denial Would Adversely Affect the Energy Supply

The load area served from the Scott-Faribault and Cleary-Elko 69 kV systems has shown a relatively rapid growth rate in the past five years. As discussed in **Section 5.6**, the load area is growing at a weighted annual average rate of about 2.2 percent. The existing transmission system that serves the affected load area has also reached it capacity to handle the peak demand in the area during critical contingencies. Therefore, during critical contingencies, curtailment of the affected area loads would be the only option available to bring the system voltage and loading in to the normal operating conditions. Additional demand in the affected load area, including the proposed mining, residential or commercial loads, will not be served from the transmission system as they exacerbate the system low voltage and line overload concerns during contingencies.

The upgrades of the area transmission system proposed in the Elko New Market and Cleary Lake Areas Project are designed to address the low voltage and line overload concerns that impact reliable electric service to the affected load area. If voltage is not maintained within acceptable limits, electric appliances and lighting will not perform as expected and could potentially be damaged. The proposed Project, in addition to addressing the low voltage and line overload concerns in the transmission system, provides loss savings on the transmission system as most 4/0A conductors in the Elko – New Market area will be a rebuilt with 795 ACSS conductor, which has high current carrying capability. The Project will also connect the Scott-Faribault and Cleary-Elko systems, strengthening the Scott-Faribault System.

Load growth is occurring in the affected load area. The Applicant’s forecasts are reasonable and they are supported by both the historic data and load forecasts. This growth is not the result of promotional activities by the Applicant. There is a demonstrated need for improved service in the area. Denial of the proposed Project would adversely affect the reliable electric service to the affected load area.

The upgrades to the area transmission system proposed in the Elko New Market and Cleary Lake Areas Project are designed to address the low voltage and transmission system overload concerns that threaten to jeopardize reliable electrical service to the area consumers. If voltage is not maintained within acceptable limits, electric appliances and lighting will not perform as expected and could potentially be damaged. Additionally, the 69 kV lines proposed to be rebuilt were constructed during the late 1960s and 1970s and are nearing the end of their useful life.

#### 10.1.2 There is No Reasonable and Prudent Alternative

Over two-thirds of the proposed Project involves the rebuild of existing lines. There is no less expensive way to increase the capacity of the system. The impact to the environment and to human settlement due to the rebuilt lines will be very minimal because there already are transmission lines in the same location. Rebuilding the existing lines (approximately 11.3 miles) and constructing the one new transmission line segment (approximately 5.4 miles) will be a reliable solution because the lines will operate nearly continuously for decades.

#### 10.1.3 The Project will Protect the Environment and Provide Benefits

Existing transmission line ROWs will be utilized for over two-thirds of the Project. Minimal, if any, new ROW will be required in these areas. The new portion of the Project is located in a rural setting and is located along county and state roads and highways. Rivers and waterbodies will be crossed in the places the lines presently cross them. The Applicant is working with the DNR, USFWS, Corps and other agencies to ensure that natural resources are protected.

There can be no doubt that the Project will benefit customers in the service area by ensuring an adequate power supply for years to come.

#### 10.1.4 The Project will Comply with All Applicable Requirements

The Applicant has identified other permits and approvals that may be required for the Project in **Section 2.5**. The Applicant has demonstrated that it will comply with all applicable requirements and obtain all necessary permits.

### 10.2 Route Permit

According to Minnesota Statutes Section 216E.02, subd. 1, it is the policy of the state of Minnesota to locate high voltage transmission lines in an orderly manner that minimizes adverse human and environmental impacts and ensures continuing electric power system reliability and integrity. The Commission has promulgated standards and criteria for issuing route permits (Minn. R. 7850.4000). That rule provides that the Commission shall issue route permits for high voltage transmission lines that are consistent with state goals to conserve resources, minimize environmental impacts and impacts to human settlement, minimize land use conflicts, and ensure the state’s electric energy security through efficient, cost-effective transmission infrastructure.

The 115 kV transmission proposed for the Elko New Market and Cleary Lake Areas Project satisfies all the criteria that are applied in evaluating a new transmission line project. Following existing transmission line routes, as these lines do for over two-thirds of the Project, conserves resources and minimizes environmental impacts and other impacts. Constructing the lines at 115 kV capability helps ensure a reliable and secure power source in the area served by these lines. It is less expensive and less intrusive than other alternatives.

For all the reasons described in this Application, and summarized in **Section 10.1** regarding the reasons why a CON should be issued, the Commission should also issue a Route Permit.

### 10.3 Conclusion

Great River Energy respectfully requests that the Commission issue a Certificate of Need authorizing construction of approximately 17 total miles of 115 kV transmission line.

In addition, Great River Energy requests that the Commission issue a Route Permit at the same time designating the route for the 115 kV lines, including rebuilding portions of the MV-PN line, rebuilding the MV-CR line, and building one new transmission line to the Veseli Breaker Station. For the rebuild portions of the Project, the Applicant requests that the permit designate the existing routes that the present 69 kV lines follow. The Applicant requests that the Commission designate a route wider than the necessary ROW for the Project, to allow flexibility in determining the precise location of the transmission centerline and structures.

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