414 Nicollet Mall
Minneapolis, Minnesota 55401-1993

March 11, 2011

**--Via Electronic Filing--**

Burl W. Haar
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101

RE: APPLICATION TO THE PUBLIC UTILITIES COMMISSION FOR A ROUTE PERMIT
ST. CLOUD LOOP PROJECT
DOCKET NO. E002/TL-10-1026

Dear Dr. Haar:

Northern States Power Company, a Minnesota corporation ("Xcel Energy") is electronically filing its application for a route permit for the St. Cloud Loop Project ("Project") pursuant to the alternative permitting procedures in Minnesota Rules 7850.2800 to 7850.3900.

The proposed Project includes construction of approximately 4.7 miles of new 115 kilovolt ("kV") transmission facilities from the Mayhew Lake Substation to the Granite City Substation and transmission Structure 39 on the north side of the City of Sauk Rapids in Benton County. The Project will also include modifying existing transmission lines and associated substations. The Project is needed to provide a second source of power to the Mayhew Lake Substation and associated loads, and to ensure reliable and stable electric service in the Sauk Rapids and St. Cloud areas.

This filing consists of the body of the Application and associated appendices, 9 files in total, as follows:

Cover Letter and Application – 1 file
Appendix A-1 file
Appendix B-4 files
Appendix C-1 file
Appendix D-1 file
Appendix E-1 file

The initial application fee payment and copies of the application are being sent to the Department of Commerce under separate cover. Please call me at (612) 330-6435 if you have any questions.

Sincerely,

Joseph G. Sedarski
Senior Permitting Analyst

Enclosure

cc: Scott Ek, Department of Commerce, Office of Energy Security
Project Service List

# NORTHERN STATES POWER COMPANY
# APPLICATION TO THE
# MINNESOTA PUBLIC UTILITIES
# COMMISSION
# FOR A ROUTE PERMIT

# ST. CLOUD LOOP PROJECT
# NEW 115 KV TRANSMISSION LINE

**Alternative Permitting Process**
**MPUC Docket No. E002/TL-10-1026**

**March 11, 2011**

# TABLE OF CONTENTS


**1.0 Executive Summary ..... 1**
1.1 Proposal Summary ..... 1
1.2 Completeness Checklist ..... 1
**2.0 Introduction ..... 5**
2.1 Statement of Ownership ..... 5
2.2 Requested Action ..... 5
2.3 Permittee ..... 5
2.4 Certificate of Need ..... 7
2.5 Route Permit, Alternative Permitting Process ..... 7
2.6 Notice to Commission ..... 7
**3.0 Project Information ..... 8**
3.1 Project Location ..... 8
3.2 Project Proposal ..... 8
3.3 Need for Project ..... 10
3.4 Project Schedule ..... 11
3.5 Project Cost ..... 11
**4.0 Facility Description and Route Selection Rationale ..... 13**
4.1 Transmission Line Description ..... 13
4.2 Route Width and Alignment Selection Process ..... 14
4.2.1 Route Width ..... 14
4.2.2 Route Selection Process ..... 15
4.3 Alternative Routes Considered and Rejected ..... 16
4.3.1 Alternative Route ..... 19
4.3.2 Route Segment A ..... 19
4.3.3 Route Segment B ..... 20
4.4 Associated Facilities and Substation Modifications ..... 21
4.4.1 Mayhew Lake and Granite City Substations (Existing) ..... 21
4.4.2 Benton County and St. Cloud Substations (Existing) ..... 21
4.4.3 Structure 39 (Existing) ..... 21
4.5 Design Options to Accommodate Future Transmission Lines ..... 22
**5.0 Engineering Design, Construction and Right-of-way Acquisition ..... 23**
5.1 Structures, Right-of-Way, Construction and Maintenance ..... 23
5.1.1 Transmission Structures ..... 23
5.1.2 Right-of-Way Width ..... 25
5.1.3 Right-of-Way Evaluation and Acquisition ..... 29
5.1.4 Transmission Construction Procedures ..... 31
5.1.5 Restoration Procedures ..... 32
5.1.6 Maintenance Procedures ..... 33
5.2 Electric and Magnetic Fields ..... 33
5.2.1 Electric Fields ..... 33
5.2.2 Magnetic Fields ..... 34
5.2.3 Stray Voltage ..... 39
5.3 Farming Operations, Vehicle Use, and Metal Buildings Near Power Lines ..... 39
**6.0 Land Use, Recreation, and Historic and Natural Resources ..... 41**
6.1 Description of Environmental Setting ..... 41

6.1.1 Topography ... 41
6.1.2 Geology and Soils ... 42
6.2 Human Settlement ... 42
6.2.1 Public Health and Safety ... 42
6.2.2 Commercial, Industrial, and Residential Land Use ... 43
6.2.3 Displacement ... 44
6.2.4 Noise ... 45
6.2.5 Television and Radio Interference ... 47
6.2.6 Aesthetics ... 48
6.2.7 Socioeconomic Impacts ... 49
6.2.8 Cultural Values ... 51
6.2.9 Recreation ... 51
6.2.10 Public Services ... 52
6.3 Land-Based Economics ... 52
6.3.1 Agriculture ... 52
6.3.2 Forestry ... 53
6.3.3 Tourism ... 54
6.3.4 Mining ... 54
6.4 Archaeological and Historic Resources ... 54
6.5 Natural Environment ... 56
6.5.1 Air Quality ... 56
6.5.2 Water Quality ... 57
6.5.3 Minnesota Public Waters Inventory ... 57
6.5.4 Wetlands ... 57
6.5.5 Floodplain ... 61
6.5.6 Flora ... 61
6.5.7 Fauna ... 62
6.6 Rare and Unique Natural Resources ... 64
**7.0 Comparison of the Proposed and Alternative Routes, and Route Segments A and B ... 67**
**8.0 Agency Involvement, Public Participation, and Required Permits and Approvals ... 70**
8.1 Agency Contacts ... 70
8.1.1 Notice to Local Government Units ... 70
8.1.2 Notice to Agencies and Interested Parties ... 71
8.1.3 Minnesota Department of Natural Resources ... 71
8.1.4 Minnesota State Historic Preservation Office ... 72
8.2 Identification of Landowners ... 72
8.3 Public Participation ... 72
8.4 Required Permits and Approvals ... 74
**9.0 References ... 76**
**10.0 Definitions ... 79**
**11.0 Acronyms ... 82**

## List of Tables


Table 1 Completeness Checklist ..... 3
Table 2 Project Location ..... 8
Table 3 Estimated Project Schedule ..... 11
Table 4 Estimated Project Cost ..... 11
Table 5 Detailed Description of Proposed Route ..... 13
Table 6 Detailed Description of Alternative Routes ..... 18
Table 7 Structure Design Summary ..... 24
Table 8 Calculated Electric Fields (kV/m) for Proposed 115 kV Transmission Line Designs ..... 34
Table 9 Calculated Magnetic Flux Density (milligauss) for Proposed 115 kV Transmission Line Designs ..... 36
Table 10 Distance to Occupied Structures ..... 44
Table 11 Common Noise Sources and Levels ..... 45
Table 12 Noise Standards by Noise Area Classification ..... 46
Table 13 Calculated Audible Noise (dBA) for Proposed Single/ Double Transmission Line Designs ..... 47
Table 14 Population and Economic Characteristics of the Project Location ..... 50
Table 15 Farmland within the Proposed Route ..... 53
Table 16 Wetlands within the Proposed Route ..... 58
Table 17 Rare and Unique Resources within the Proposed Project ..... 64
Table 18 Summary of Proposed and Alternative Routes ..... 68
Table 19 Potential Required Permits ..... 74


## List of Figures


Figure 1 Project Location ..... 2
Figure 2 Proposed Route ..... 6
Figure 3 Alternative Route and Route Segments A and B ..... 17
Figure 4 Photo of Typical 115 kV Single Circuit Wood Braced Post Insulator Structure ..... 23
Figure 5 Photo of Typical 115 kV Single Circuit Steel Davit Arm with Distribution Underbuild Structure ..... 23
Figure 6 Photo of Typical 115 kV Single Circuit Steel Davit Arm Structure (No Distribution Underbuild) ..... 23
Figure 7 Photo of Typical 115/115 kV Double Circuit Davit Arm Structure ..... 24
Figure 8 Typical Dimensions and Right-of-Way Requirements for Single Circuit 115 kV Structure ..... 26
Figure 9 Typical Dimensions and Right-of-Way Requirements for Single Circuit 115 kV Structure with Distribution Underbuild ..... 27
Figure 10 Typical Dimensions and Right-of-Way Requirements for Double Circuit 115/115 kV Davit Arm Structure ..... 28

**List of Appendices**

Appendix A Applicant's Notice Letter to Commission of Intent to Use Alternative Permitting Process

Appendix B Maps
- Figure B-1 General Vicinity Map
- Figures B-2 to B-11 Project Location Maps
- Figure B-12 Land Use Land Cover
- Figure B-13 Zoning
- Figure B-14 Property Parcels
- Figure B-15 Wetlands and Waterbodies
- Figure B-16 Parks and Recreational Areas
- Figure B-17 Locations of Known Rare Species
- Figure B-18 Archaeological and Historical Resources
- Figure B-19 Modifications to Mayhew Lake Substation

Appendix C Public Correspondence
- C.1 MnDNR NHIS Response
- C.2 List of LGUs Sent a 90-Day Project Notice Letter
- C.3 City of St. Cloud Response
- C.4 Benton County Response
- C.5 Benton County Board of Commissioners Resolution
- C.6 City of Sauk Rapids Resolution
- C.7 List of Agencies Concerning Requests for Comments on Project
- C.8 MnDOT Response
- C.9 MnDNR Response

Appendix D Landowner List and Public Comments
- D.1 Landowner List
- D.2 Published Notices of Aug. 3, 2010 Xcel Energy Public Information Meeting and Handouts
- D.3 Sign In Form for Aug. 3, 2010 Xcel Energy Public Information Meeting
- D.4 Public Comments
- D.5 Comments of Ron and Doreen Hodel

Appendix E Literature Review Report and State Historic Preservation Office Response

# 1.0 Executive Summary

## 1.1 Proposal Summary

Northern States Power Company, a Minnesota corporation ("Xcel Energy" or the "Company"), submits this application ("Application") for a Route Permit to the Minnesota Public Utilities Commission ("MPUC" or "Commission") pursuant to Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7850. A route permit is requested to construct approximately 4.7 miles of new 115 kilovolt ("kV") transmission facilities on the north side of Sauk Rapids in Benton County.

The project, referred to as the St. Cloud Loop Project ("Project"), is comprised of the following:

- a new 115 kV transmission line between the Mayhew Lake Substation and the Granite City Substation ("Line 5520");
- remove the existing transmission Line 5509 between the Granite City Substation and the intersection of Line 5509 with Line 0887;
- extend Line 5509 from its intersection with Line 0887 to transmission structure 39 ("Structure 39") in Benton County; and
- associated modifications along Xcel Energy's existing transmission lines 5509, 0887, 0899, and 0877 between the Mayhew Lake, Benton County, St. Cloud, and Granite City Substations.

The proposed route for the new 115 kV transmission line (Line 5520) and the extension of Line 5509 measures approximately 4.7 miles in length and primarily follows existing transportation and utility corridors. The general Project location shown on **Figure 1**.

The Project is needed to provide a second power source to the Mayhew Lake Substation. A second power source to the Mayhew Lake Substation will enable redundant, stable, and more reliable electric service for all customers served from Mayhew Lake Substation and transmission Line 5509 which includes customers located in and near the cities of St. Cloud, Sartell, and Sauk Rapids, and the surrounding townships.

The Project qualifies for the Alternative Permitting Process under Minn. Stat. § 216E.04, subd. 2(3), and Minn. Rules Chapter 7850.2800 to 7850.3900 (*see* Minn. R. 7850.2800, Subp. 1(C)). The Company respectfully requests that the Commission approve the proposed route and authorize a 400-foot route width along the proposed route.

## 1.2 Completeness Checklist

The content requirements for an application with the Commission under the Alternative Permitting Process are identified under Minn. Stat. § 216E.04, subd. 2(3) and Minn. R. 7850.2900 and 7850.1700. **Table 1** lists the rule requirements and the section where the information can be found in this Application.

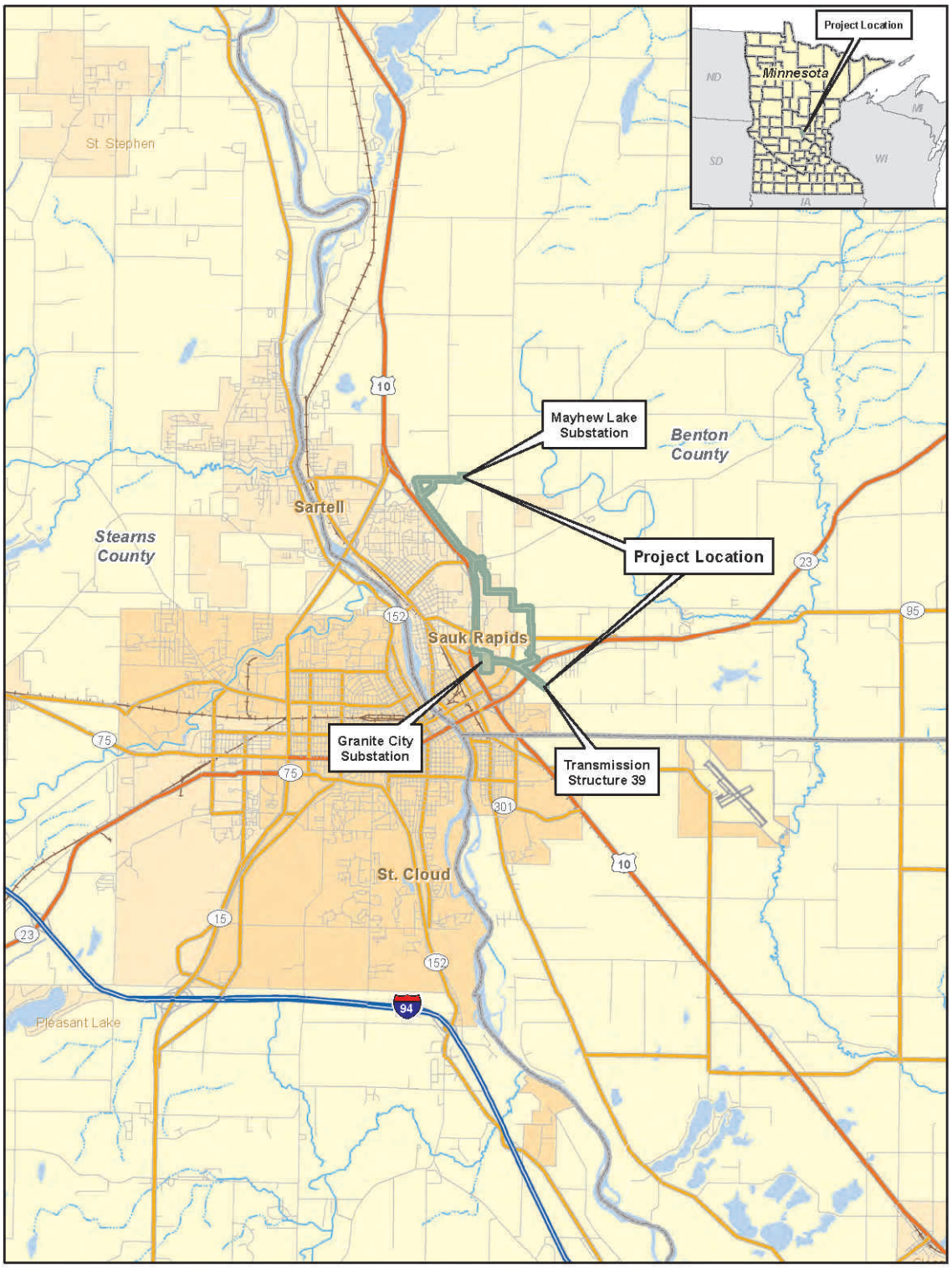


**Figure 1**
**Project Location**

**Table 1**

**Completeness Checklist**

| Authority | Required Information | Section |
|---|---|---|
| Minn. R. 7850.2800 Subp. 1(C) – Eligible Projects | | |
| | An applicant for a site permit or a route permit for one of the following projects may elect to follow the procedures of parts 7850.2800 to 7850.3900 instead of the full permitting procedures in part 7850.1700 to 7850.2700 for high voltage transmission lines of between 100 and 200 kilovolts. | 2.5 |
| Minn. R. 7850.2800, Subp. 2 – Notice to Commission | | |
| | An applicant for a permit for one of the qualifying projects in subpart 1, who intends to follow the procedures of parts 7850.2800 to 7850.3700, shall notify the MPUC of such intent, in writing, at least 10 days before submitting an application for the project. | 2.6 and **Appendix A** |
| Minn. R. 7850.3100 Contents of Application (alternative permitting process) | | |
| | The applicant shall include in the application the same information required in part 7850.1900, except the applicant need not propose any alternative sites or routes to the preferred site or route. If the applicant has rejected alternative sites or routes, the applicant shall include in the application the identity of the rejected sites or routes and an explanation of the reasons for rejecting them. | 4.3 |
| Minn. R. 7850.1900, Subp. 2 (applicable per Minn. R. 7850.3100) – Route Permit for a High Voltage Transmission Line ("HVTL") | | |
| A. | A statement of proposed ownership of the facility at the time of filing the Application and after commercial operation. | 2.1 |
| B. | The precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the Route Permit may be transferred if transfer of the Route Permit is contemplated. | 2.3 |
| C. | At least two proposed routes for the proposed HVTL and identification of the preferred route and the reasons for the preference. | Not applicable per Minn. R. 7850.3100. However, *see* 4.3. |
| D. | A description of the proposed HVTL and all associated facilities, including the size and type of the HVTL. | 3.2, 4.1, 4.4, 5.1.1 |
| E. | The environmental information required under Minn. R. 7850.1900, Subp. 3. | Chapter 6.0 |
| F. | Identification of land uses and environmental conditions along the proposed routes. | Chapter 6.0 |
| G. | The names of each owner whose property is within any of the proposed routes for the HVTL. | 8.2 and **Appendix D.1** |
| H. | U.S. Geological Survey ("USGS") topographical maps or other maps acceptable to the Commission showing the entire length of the HVTL on all proposed routes. | **Appendix B** |

| Authority | Required Information | Section |
|---|---|---|
| I. | Identification of existing utility and public rights-of-way along or parallel to the proposed routes that have the potential to share right-of-way with the proposed HVTL. | 4.1, 4.2, 4.3, 5.1.2 |
| J. | The engineering and operational design concepts for the proposed HVTL, including information on the electric and magnetic fields of the HVTL. | 5.0, 5.2 |
| K. | Cost analysis of each route, including the costs of constructing, operating and maintaining the HVTL that are dependent on design and route. | 3.5 |
| L. | A description of possible design options to accommodate expansion of the HVTL in the future. | 4.5 |
| M. | The procedures and practices proposed for the acquisition and restoration of the right-of-way and for construction and maintenance of the HVTL. | 5.1.3 – 5.1.6 |
| N. | A listing and brief description of federal, state and local permits that may be required for the proposed HVTL. | 8.4 |
| O. | A copy of the Certificate of Need or the certified HVTL list containing the proposed HVTL or documentation that an application for a Certificate of Need has been submitted or is not required. | 2.4 |
| Minn. R. 7850.1900, Subp. 3 – Environmental Information | | |
| A. | A description of the environmental setting for each site or route. | 6.1 |
| B. | A description of the effects of construction and operation of the facility on human settlement, including, but not limited to, public health and safety, displacement, noise, aesthetics, socioeconomic impacts, cultural values, recreation and public services. | 6.2 |
| C. | A description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism and mining. | 6.3 |
| D. | A description of the effects of the facility on archaeological and historic resources. | 6.4 |
| E. | A description of the effects of the facility on the natural environment, including effects on air and water quality resources and flora and fauna. | 6.5 |
| F. | A description of the effects of the facility on rare and unique natural resources. | 6.6 |
| G. | Identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route. | Chapter 6.0 |
| H. | A description of measures that might be implemented to mitigate the potential human and environmental impacts identified in items A to G and the estimated costs of such mitigation measures. | Chapter 6.0 |

# 2.0 Introduction

## 2.1 Statement of Ownership

Xcel Energy will construct, own, and operate the proposed new 115 kV transmission line (Line 5520) between the Mayhew Lake Substation and the Granite City Substation and the extended Line 5509 between the intersection of this line with Line 0887 located in Benton County, Minnesota. *See* **Figure 2**.

Xcel Energy is a Minnesota corporation with its headquarters in Minneapolis, Minnesota. Xcel Energy is a wholly owned subsidiary of Xcel Energy Inc., a utility holding company with its headquarters in Minneapolis. Xcel Energy provides electricity services to approximately 1.2 million customers and natural gas services to 435,000 residential, commercial, and industrial customers in Minnesota. Xcel Energy also provides electricity service to more than 83,000 customers in South Dakota and 88,000 customers in North Dakota.

Xcel Energy Services Inc. is the service company for Xcel Energy Inc. holding company system and its personnel prepare, submit, and administer regulatory applications to the Commission on behalf of Xcel Energy, including Route Permit applications.

## 2.2 Requested Action

This Application is submitted under the Alternative Permitting Process under Minn. Stat. § 216E.04, subd. 2(3) and Minn. R. 7850.2800 to 7850.3900 (*see* Minn. R. 7850.2800, Subp. 1(C)). While the rules do not require consideration of alternative routes in the Application (*see* Minn. Rules Chapter 7850.3100), Xcel Energy's evaluation of one alternative route and two alternative route segments, in addition to the "Proposed Route" for the Project is contained in this Application. For the reasons presented herein, Xcel Energy prefers the Proposed Route for the new transmission line and respectfully requests that the Commission approve the Proposed Route and authorize a 400-foot route width along the Proposed Route.

This Application demonstrates that construction of the Project along the Proposed Route will comply with the applicable standards and criteria set out in Minn. Stat. § 216E.03, subd. 7, and Minn. R. 7850.4100. The Project will support the State's goals to conserve resources, minimize environmental and human settlement impacts and land use conflicts, and ensure the State's electric energy security through the construction of efficient, cost-effective transmission infrastructure.

## 2.3 Permittee

The permittee for the proposed Project is:

| | |
|---|---|
| **Permittee:** | Northern States Power Company, a Minnesota Corporation |
| **Contact:** | Joseph G. Sedarski<br>Senior Permitting Analyst, Siting and Land Rights |
| **Address:** | Xcel Energy Services Inc.<br>414 Nicollet Mall, MP-8<br>Minneapolis, MN 55401 |
| **Phone:** | 612-330-6435 |
| **Email:** | joseph.g.sedarski@xcelenergy.com |

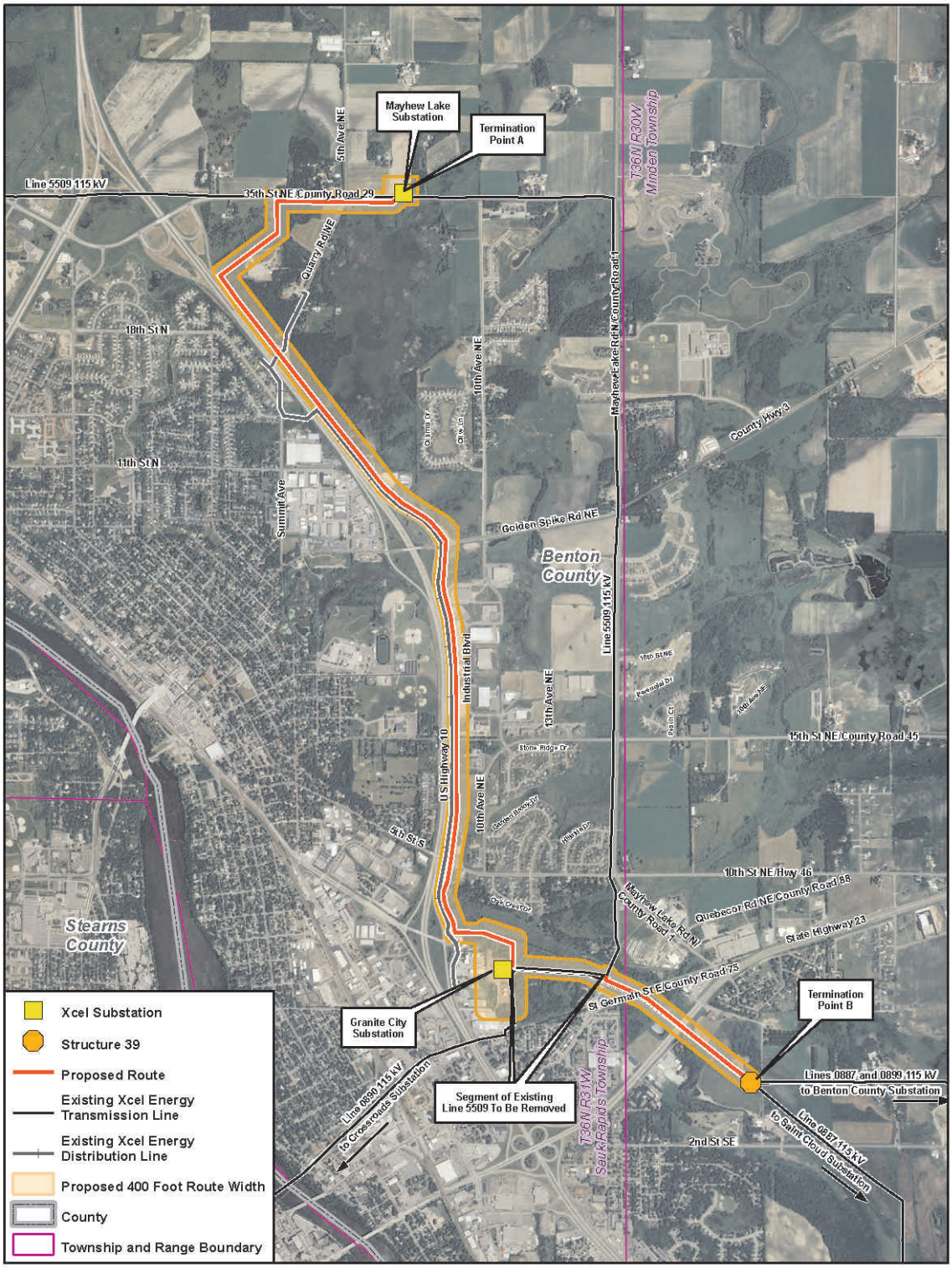


**Figure 2**
**Proposed Route**

## 2.4 Certificate of Need

A Certificate of Need is not required for the Project because it is not classified as a large energy facility ("LEF") under Minn. Stat. §§ 216B.243 and 216B.2421, subd. 2(3). While the Project is a High Voltage Transmission Line ("HVTL") with a capacity of 100 kV or more, it is not more than 10 miles long in Minnesota and it does not cross a state line. Therefore, a Certificate of Need is not required. *See* Minn. Stat. §§ 216B.2421, subd. 2(3) and 216B.243.

## 2.5 Route Permit, Alternative Permitting Process

The Minnesota Power Plant Siting Act ("PPSA") provides that no person may construct a HVTL without a Route Permit from the Commission. Minn. Stat. § 216E.03, subd. 2. Under the PPSA, an HVTL includes a transmission line that is 100 kV or more and is greater than 1,500 feet in length. Minn. Stat. § 216E.01, subd. 4. The proposed new 115 kV transmission line is an HVTL greater than 1,500 feet in length and, therefore, a Route Permit is required from the Commission prior to construction. The Project qualifies for review under the Alternative Permitting Process authorized by Minn. Stat. § 216E.04, subd. 2(3), and Minn. R. 7850.2800, Subp. 1(C) (establishing alternative process for HVTLs between 100 and 200 kilovolts). Accordingly, Xcel Energy is following the provisions of the Alternative Permitting Process outlined in Minn. R. 7850.2800 to 7850.3900 for this Project.

## 2.6 Notice to Commission

Xcel Energy notified the Commission on September 28, 2010, by letter (mailed and electronically filed) that Xcel Energy intended to use the Alternative Permitting Process for the Project. This letter complies with the requirement of Minn. R. 7850.2800, Subp. 2, to notify the Commission of this election at least 10 days prior to submitting an application for a Route Permit. A copy of the letter is attached in **Appendix A**.

## 3.0 Project Information

### 3.1 Project Location

The proposed Project is located within Benton County, Minnesota. **Figure 1** shows an overview of the Project location and the Proposed Route is shown in **Figure 2**. **Appendix B** (see **Figures B-2 through B-11**) includes detailed maps of the townships crossed by the proposed Project and the substations described in this Application. **Table 2** identifies the cities/townships and location of the Project.

**Table 2**

**Project Location**

| City/Township Name | Township (N) | Range (W) | Section(s) |
|---|---|---|---|
| City of Sauk Rapids | 36N | 31W | 24, 25 |
| Sauk Rapids Township | 36N | 31W | 11, 12, 13, 14, 23, 24, 25, 36 |
| Minden Township | 36N | 30W | 19, 30, 31 |

### 3.2 Project Proposal

Xcel Energy proposes construction of a new 115 kV line between the Mayhew Lake Substation and the Granite City Substation, removing the existing transmission Line 5509 between the Granite City Substation and the intersection with Line 0887, adding a new 115 kV line to extend Line 5509 from its intersection with Lines 0887 and 0899 to transmission Structure 39, installing a new pole near Structure 39 and connecting the Line 5509 extension, and redesignating Xcel Energy's existing transmission Lines 5509, 0887, 0899, and 0877 between the Mayhew Lake, Benton County, St. Cloud, and Granite City Substations. Extending Line 5509 to transmission Structure 39 results in connecting the Mayhew Lake and Benton Substations, which will provide a second 115 kV source to the Mayhew Lake Substation.

The Project includes an approximately 4.7-mile-long, new 115 kV transmission line that primarily runs north-south from the Mayhew Lake Substation in Sauk Rapids Township to the Granite City Substation and northwest-southeast from the intersection of Line 5509 with Lines 0887 and 0899 to transmission Structure 39 in Minden Township near the City of Sauk Rapids, Minnesota. **Figure 2** shows the overall proposed Project and **Appendix B** includes detailed maps of the proposed Project.

More specifically, Xcel Energy proposes the following for the Project:

- removing Line 0887 jumper at Structure 39 so that Line 0887 is no longer connected to Benton County Substation from Structure 39, and keeping Line 0887 connection between the St. Cloud and Granite City Substations;

- disconnecting the existing Line 0899 at Structure 39 to the Benton County Substation and connecting to removed Line 0887 segment from Structure 39 to Benton County

Substation, and designating this revised line from Granite City to Benton County Substations as Line 0899;

- installing approximately 0.7 miles of new 115 kV transmission line to extend existing Line 5509 from its intersection with Lines 0887 and 0899 to Structure 39, which may be double circuited with other existing lines in this corridor;

- installing either a new single-circuit pole or a new double circuit structure near Structure 39 and installing a jumper to connect the above-described new extended Line 5509 segment to the existing Line 0899 segment from Structure 39 to the Benton County Substation, thus creating the new Line 5509 which connects the Mayhew Lake and Benton County Substations;

- constructing approximately 4 miles of new 115 kV transmission line (Line 5520), structures, and related facilities between the Mayhew Lake Substation and the Granite City Substation, which will connect the Mayhew Lake and Granite City Substations via the new Line 5520;

- removing approximately 1,700 feet of existing single circuit 115 kV transmission Line 5509 segment between the Granite City Substation and the intersection of Line 5509 with Lines 0887 and 0899;

- installing fiber optic ground wire with the new 115 kV line and the remaining segment of Line 0899;

- modifying the existing Mayhew Lake Substation and Granite City Substation to accommodate a new line termination and related equipment;

- modifying associated Benton County, Saint Cloud and Crossroads Substations to accommodate the above changes, which include changing and/or adding new line termination equipment and/or a ring bus, adding transfer trip and pilot relaying, installing fiber optic lines for relaying and transfer trip, installing breakers, reconfiguring line protection, replacing shield wire with fiber optic shield wire, and related modifications; and,

- changing line designations, terminals, breakers, relays, and line protection as a result of the above changes.

Specific modifications to existing substations and associated facilities are further described in Section 4.4.

The proposed transmission structures are single-pole, wood, galvanized steel or weathering-steel type structures. Approximately 2.4 miles of the new 115 kV transmission line (Line 5520) will be underbuilt with an existing distribution line located along the east side of U.S. Highway 10 (*see* **Figure 2**). The height of the new single circuit poles will range from 70 to 90 feet and the new double circuit poles will range from 75 to 105 feet, with the spans between poles ranging from 300 to 500 feet.

For the entire Proposed Route, Xcel Energy requests a total route width of 400 feet as indicated on **Figures B-2 to B-11** in **Appendix B**. The requested route width is further described in Section 4.2.1. Following construction, the typical right-of-way width for the new transmission line is 75 feet, depending on several factors, such as the use of existing electrical corridors and the location of existing roads and other facilities. *See* **Figures B-2 to B-11** in **Appendix B**. Right-of-way width is further discussed in Section 5.1.2.

### 3.3 Need for Project

The proposed Project will improve the reliability of service to customers served from Mayhew Lake Substation. These customers are located in and near the cities of St. Cloud, Sartell, and Sauk Rapids, and the surrounding townships. The proposed Project provides a second power source to the Mayhew Lake Substation, providing a redundant, stable, and more reliable electric service for all customers served from Mayhew Lake Substation and transmission Line 5509.

There are two critical contingencies under which customers in this area are at risk of service interruption. These contingencies are described below:

- **Outage of Granite City–Mayhew Lake 115 kV Line 5509**
  Currently, Line 5509 serves the entire load at the Mayhew Lake Substation (including a large industrial customer). The current total load of the Mayhew Lake Substation is more than 100 MW, and an outage on this line will result in dropping this entire load. Although the Granite City Substation is currently capable of back-feeding the load at the Mayhew Lake Substation, current projections indicate that after 2015 not all the load at the Mayhew Lake Substation will not be able to be back-fed from the Granite City Substation.

- **Outage of Benton County–Granite City 115 kV Double Circuit Lines 0887 and 0899**
  The loss of 115 kV double circuit Lines 0887 and 0899 will result in disconnecting the Mayhew Lake – Granite City 115 kV Line 5509, which in turn results in dropping the entire load at the Mayhew Lake Substation. After such an outage with the current transmission system, getting the load at the large industrial customer facility and Mayhew Lake Substation back online is difficult due to low voltage and thermal overload concerns. After the addition of the planned new Quarry Substation (a 345 kV substation), as part of CapX2020 Monticello–St. Cloud 345 kV project expected to be built in 2011 (MPUC edocket No. E002/TL-09-246), and the underlying system upgrades included in this Project, it will be possible to bring the load back online without any thermal or voltage concerns.

The proposed Project will provide a second power source to the Mayhew Lake Substation, thereby eliminating the critical contingency where the load cannot be served during an outage of Line 5509 between the Granite City and Mayhew Lake Substations. With the reconfiguration of 115 kV lines around transmission Structure 39 in this Project, the loss of any double circuit transmission lines between the Granite City, Benton County, Mayhew Lake, and St. Cloud Substations will not result in dropping the load at Mayhew Lake Substation or the large industrial customer facility.

### 3.4 Project Schedule

Construction for the Project is expected to begin in the fourth quarter 2011, and Xcel Energy anticipates a fourth quarter 2012 in-service date for the proposed facilities. **Table 3** provides an estimated permitting and construction schedule summary.

**Table 3**

**Estimated Project Schedule**

| Project Task | Date |
|---|---|
| File Route Permit Application with the Commission | 1st Quarter 2011 |
| Route Permit Review Process Complete | 3rd Quarter 2011 |
| Begin Transmission Line and Substation Construction | 4th Quarter 2011 |
| In-Service Date | 4th Quarter 2012 |

This Project schedule is based on information known as of the date of this filing and upon planning assumptions that balance the timing of implementation with the availability of crews and materials and with other practical considerations. This schedule may be subject to revision as further information is developed.

### 3.5 Project Cost

Xcel Energy estimates that the transmission line and substation modifications will cost approximately $10 million, depending upon the selected route, and broken down as follows in **Table 4**.

**Table 4**

**Estimated Project Cost**

| Project Item | Cost |
|---|---|
| Transmission Line Facilities along Proposed Route | $5 million |
| Modifications to Existing Substations and Structure 39 | $5 million |
| Total Project Cost | $10 million |

Operating and maintenance costs for the transmission line will be nominal for several years, since the line will be new and minimal vegetation maintenance will be required. Typical annual operating and maintenance costs for 115 kV transmission voltages across Xcel Energy's Upper Midwest system area are on the order of $300 to $500 per mile of transmission right-of-way. The principal operating and maintenance cost include inspections, which are usually done by fixed-wing aircraft and by helicopter on a regular basis.

The Company performs periodic inspections of substations and equipment. The type and frequency of inspection varies depending on the type of equipment. Typical inspection intervals are semi-

annual or annual. Maintenance and repairs are performed on an as-needed basis, and therefore the cost varies from substation to substation.

# 4.0 Facility Description and Route Selection Rationale

## 4.1 Transmission Line Description

The Project involves constructing a new 115 kV transmission line (Line 5520) between the Mayhew Lake Substation and Granite City Substation, removing the existing transmission Line 5509 between the Granite City Substation and the intersection of Line 0887, adding a new 115 kV line to extend Line 5509 from the intersection of Lines 0887 and 0899 to transmission Structure 39, and redesignating Xcel Energy's existing transmission Lines 5509, 0887, 0899, and 0877 between the Mayhew Lake, Benton County, St. Cloud, and Granite City Substations. *See* **Figure 2** and the detailed Project maps in **Appendix B**, further described below. The proposed Project follows existing rights-of-way and property lines to the extent feasible.

Due to the presence of sufficient transportation and utility corridors, as well as existing Xcel Energy owned land, a majority of the Proposed Route for the new transmission line and transmission line extension primarily follows these existing corridors. The Proposed Route for the new 115 kV transmission line is 4 miles long between the Mayhew Lake Substation and the Granite City Substation. The Proposed Route for the extension of Line 5509 is 0.7 mile long between the intersection of Line 5509 with Lines 0887 and 0899 to transmission Structure 39. **Figure 2** provides an overview of the Proposed Route and **Appendix B** provides more detail on the Proposed Route.

**Table 5** provides a detailed description of the Proposed Route, including road and waterbody crossings.

**Table 5**

**Detailed Description of Proposed Route**

| Route Direction | Approximate Length | Road and Public Water Crossings |
|---|---|---|
| Segment 1 (new Line 5520) – Mayhew Lake Substation to Granite City Substation | | |
| WEST along 35th Street NE/County Road ("CR") 29 | 0.5 mile | Quarry Road NE |
| SOUTH at/across the edge of open field and scattered forest land | 0.1 mile | -- |
| SOUTHWEST at/across edge of forest land | 0.2 mile | -- |
| SOUTHEAST along U.S. Highway 10 | 2.9 miles | Golden Spike Road NE, 5th Street South, Unnamed Stream |
| EAST-SOUTHEAST along County Ditch 3 | 0.2 mile | County Ditch 3 |
| SOUTH into Granite City Substation | <0.1 mile | -- |
| Segment 2 (extension of Line 5509) – Intersection of Line 5509 with Lines 0887 and 0899 to Transmission Structure 39 | | |
| SOUTH-SOUTHEAST across scattered forest and open fields along County Ditch 3 and existing Lines 0887 and 0899 to Transmission Structure 39 | 0.7 mile | St. Germain Street E/County Road 75, State Highway 23, Unnamed Stream |
| Total Proposed Route Length | 4.7 miles | |

The entire new 115 kV transmission line will be constructed with single-pole, wood, galvanized steel or weathering-steel structures. The Project's proposed transmission line will create a loop connecting the Mayhew Lake Substation and Granite City Substation and a loop connecting the Mayhew Lake Substation and Benton County Substation, via the extension of Line 5509 and modifications to transmission Structure 39.

The Mayhew Lake Substation is located in Benton County, approximately 1.0 mile east of the intersection of U.S. Highway 10 and 35th Street NE/County Road ("CR") 29, which is approximately 0.5 mile north of the City of Sauk Rapids municipal boundaries (*see* **Figure 2**). The Granite City Substation is located in Benton County, approximately 1,000 feet east of the intersection of U.S. Highway 10 and Benton Drive South, within the City of St. Cloud municipal boundaries (*see* **Figure 2**). Transmission Structure 39 is located in Benton County, approximately 0.25 mile east of the intersection of State Highway 23 and County Ditch 3, which is approximately 0.25 mile northwest of the City of St. Cloud municipal boundaries (*see* **Figure 2**).

Xcel Energy's Proposed Route is approximately 4.7 miles long and consists of two segments. The first segment (new Line 5520) is approximately 4.0 miles long and is located between the Mayhew Lake Substation and the Granite City Substation. The second segment (extension of existing Line 5509) is approximately 0.7 mile long and is located between the intersection of Line 5509 with Lines 0887 and 0899 and transmission Structure 39. *See* **Figure 2**.

The Proposed Route is within or adjacent to the existing rights-of-way of utilities, roads, and highways for approximately 83 percent of the length of the route, with the remainder of the route paralleling section lines and crossing commercial/industrial, residential, and wooded areas. More than 94 percent of the route crosses developed, open, or agricultural land, and approximately 6 percent of the route crosses forest land (*see* Section 6.3). The route crosses land zoned primarily for highway, agricultural, commercial, or development purposes (*see* Section 6.2.2). Approximately 32 percent of the route crosses within the City of Sauk Rapids municipal boundaries.

There are five residences located within 200 feet of the Proposed Route centerline. Twelve cultural resource sites are located within 0.5 mile of the Proposed Route, including four archaeological sites, one unverified archaeological site lead, five standing structures, and two properties listed or eligible for listing on the National Register of Historic Places ("NRHP") (*see* Section 6.4). The historic character of the two NRHP properties will not be affected by the proposed Project. The Proposed Route will not cross any Public Waters Inventory ("PWI") watercourses. The Proposed Route will, however, include three waterbody crossings and will span approximately 0.9 mile of wetland (*see* Section 6.5.4). The Blanding's turtle, a threatened species, has been identified by the Minnesota Department of Natural Resources ("MnDNR") within 1.0 mile of the Proposed Route (*see* Section 6.6).

## 4.2 Route Width and Alignment Selection Process

### 4.2.1 Route Width

The PPSA, Minn. Stat. Chapter 216E, directs the Commission to locate transmission lines in a manner that "minimize[s] adverse human and environmental impact while ensuring continuing electric power system reliability and integrity and ensuring their electric needs are met and fulfilled in an orderly and timely fashion." Minn. Stat. § 216E.02, subd. 1. The PPSA also authorizes the

Commission to meet its routing responsibility by designating a "route" for a new transmission line when it issues a Route Permit. The route may have "a variable width of up to 1.25 miles" within which the right-of-way for the facilities can be located. Minn. Stat. § 216E.01, subd. 8.

Based upon the following analysis, Xcel Energy respectfully requests that the Commission authorize a total route width of 200 feet from the boundaries of Xcel Energy-owned property at the Mayhew Lake and Granite City Substations and a total route width of 400 feet along the entire length of the Proposed Route, and as follows: i) from the Mayhew Lake Substation to the intersection with U.S. Highway 10, 200 feet on either side of the centerline of the Proposed Route (400 feet total width); ii) from this point going south, 400 feet from the east edge of the northbound lanes and along the entire length of U.S. Highway 10 to where the Proposed Route bears east along County Ditch 3; iii) from this point crossing land east to the Xcel Energy Granite City Substation property, 200 feet on either side of the centerline of the Proposed Route (400 feet total width); and iv) for the segment for extending Line 5509 to Structure 39, 200 feet on either side of the centerline of the Proposed Route (400 feet total width). Detailed maps showing currently planned route widths and proposed alignments are provided on **Figures B-2 to B-11** in **Appendix B**.

### 4.2.2 Route Selection Process

In developing the routes proposed in this Application, Xcel Energy first analyzed the statutory and rule criteria set forth in the PPSA, Minn. Stat. Chapter 216E, and Minn. R. 7850.4100. Xcel Energy also gave due consideration to the State's policy of non-proliferation of new infrastructure corridors and met with interested stakeholders and landowners, including applicable municipalities and government agencies. Throughout the process, Xcel Energy evaluated several route alternatives, considering feedback provided at a public open house meeting and through written comments. Xcel Energy also consulted with federal, state, and local agencies associated within the vicinity of the Project.

In late June 2010, Xcel Energy provided Project information and requested comments from local units of government ("LGUs"), other governmental agencies, and interested parties located within the vicinity of the Project. *See* Section 8.0 and **Appendix C.2**.

A public open house meeting was held by Xcel Energy at the Sauk Rapids Municipal Park Pavilion in Sauk Rapids, Minnesota on August 3, 2010. Xcel Energy mailed invitations to landowners within the Project location in July 2010 and published notice of the open house meeting in local newspapers on July 18, 20 and 21, 2010. *See* **Appendix D.2**. Approximately 15 people attended this open house meeting. Public interest focused primarily on the proposed location of the new 115 kV line at the southwest corner of the intersection of U.S. Highway 10 and CR 29 on the north end of the Project and the proposed location of the new 115 kV line along County Ditch 3 at the south end of the Project and transmission structure design details of the proposed Project.

The Proposed Route was subsequently developed by Xcel Energy's permitting and engineering personnel based on their investigation of the overall Project location and on input from the public and government agencies. The general vicinity of the Project was initially studied during the planning process by a team of siting, right-of-way, planning, environmental, ecological, and engineering personnel. The team also reviewed the general area surrounding the Project to help identify anticipated and significant routing issues that might arise.

The Company then performed an analysis of environmental resources in the vicinity of the Project by using computer mapping of data, including aerial photographs and topographic maps. Environmental resources identified within the vicinity of the Project are discussed in Section 6.0 of the Application. The Proposed Route is designed to best minimize overall impacts of the Project.

The proposed transmission line locations were developed with the following primary objectives:

- minimize land use impacts by routing along roads and existing distribution and transmission lines to reduce the amount of new right-of-way required;
- minimize land use impacts by routing along natural corridors, field lines, and property lines, where an existing corridor (e.g., fence line, drainage ditch, access road) is present;
- minimize impacts on residences;
- minimize use of new right-of-way; and
- minimize impacts on environmental and sensitive resources.

The Company believes the Proposed Route best meets the objectives stated above. In particular, the Proposed Route maximizes the use of existing distribution and transmission line corridors and roads – approximately 3.9 miles of the 4.7-mile-long Proposed Route are within or adjacent to existing rights-of-way. The use of existing distribution and transmission line corridors, roads, and Xcel Energy's own property was an important factor for this Project because using existing corridors reduces transmission line proliferation and minimizes impacts to residences and environmental and sensitive resources.

### 4.3 Alternative Routes Considered and Rejected

Xcel Energy identified and analyzed one alternative route and two alternative route segments for the Project, which are identified as the "Alternative Route," "Route Segment A," and "Route Segment B" (collectively, "Alternative Routes") on **Figure 3** and on the detailed Project maps in **Appendix B**, further described below. In evaluating the Alternative Routes, Xcel Energy focused predominantly on the location of existing transportation corridors and alignment of the existing distribution and transmission lines because they best satisfy the routing criteria. The Alternative Routes follow existing rights-of-way and property lines to the extent feasible.

In performing the Alternative Routes analysis, Xcel Energy considered social, environmental, and engineering-related factors, such as location of existing transportation and utility corridors, land use, site conditions, proximity to residential or commercial structures, environmental impacts, effects on trees, proximity to areas of archaeological or historical significance, proximity to wetlands or PWI watercourses, and several engineering design-related factors. **Figures B-2 to B-11** in **Appendix B** identify the locations of these alternatives.

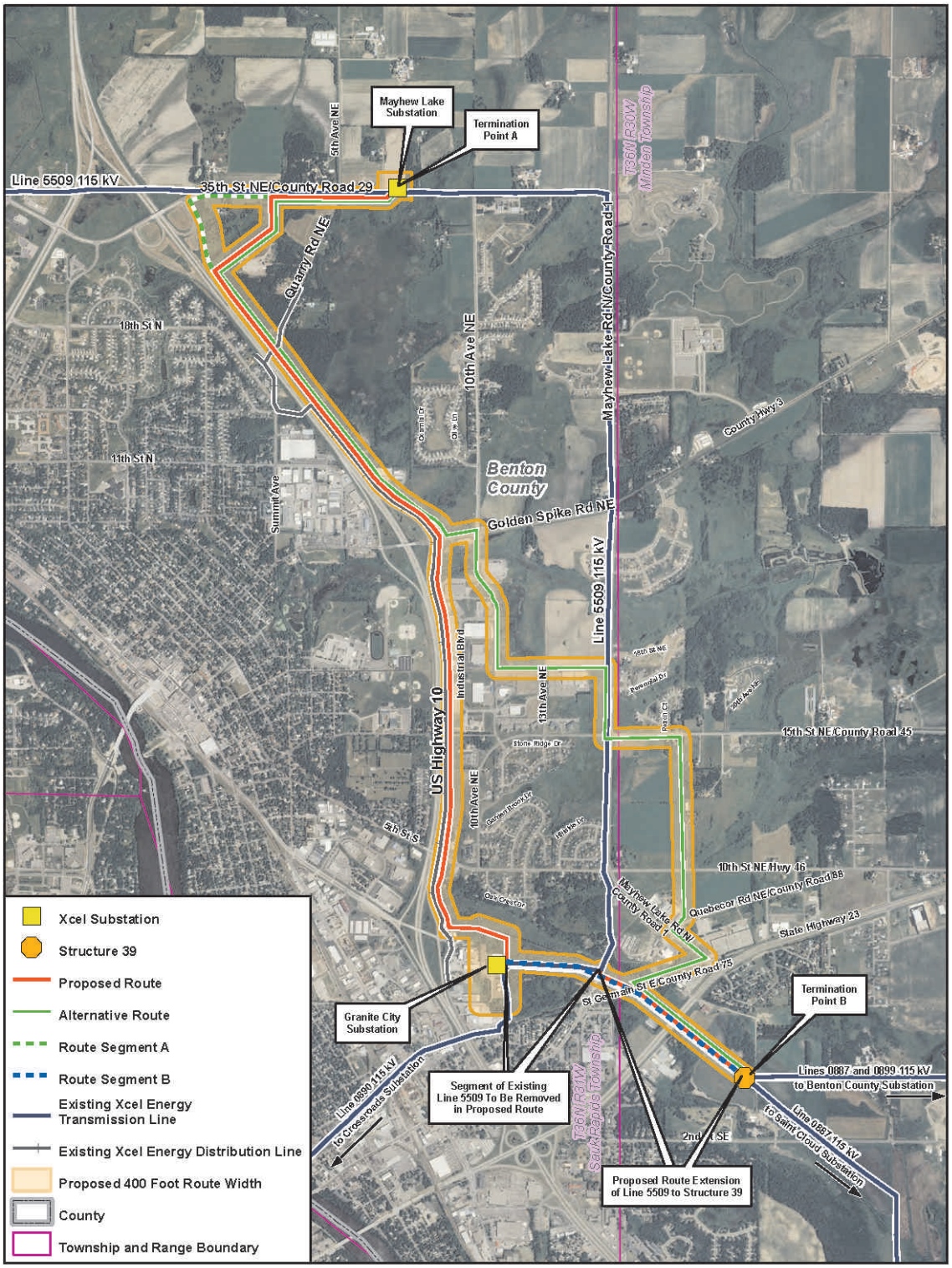


**Figure 3**
**Alternative Route and Route Segments A and B**

**Table 6** provides a detailed description of the Alternative Routes, including road and waterbody crossings.

**Table 6**

**Detailed Description of Alternative Routes**

| Route Direction | Approximate Length | Road and Public Water Crossings |
|---|---|---|
| Alternative Route | | |
| WEST along 35th Street NE/CR 29 | 0.5 mile | Quarry Road NE |
| SOUTH at/across the edge of open field and scattered forest land | 0.1 mile | -- |
| SOUTHWEST at/across edge of forest land | 0.2 mile | -- |
| SOUTHEAST along U.S. Highway 10 | 1.2 miles | Quarry Road NE |
| EAST along Golden Spike Road NE/County Highway 3 | <0.1 mile | 10th Avenue NE |
| SOUTH along 10th Avenue NE and through commercial area | 0.5 mile | Golden Spike Road N, Unnamed Stream |
| EAST across open fields and intersection with Line 5509 | 0.4 mile | -- |
| SOUTH along Line 5509 | 0.3 mile | 15th Street NE/CR 45 |
| EAST along 15th Street NE/CR 45 | 0.3 mile | Mayhew Lake Road N/CR 1 |
| SOUTH across open fields | 0.9 mile | 10th Street NE/Highway 46, Unnamed Stream |
| SOUTHWEST along Quebecor Road NE/CR 88 | <0.1 mile | Quebecor Road NE/CR 88, Unnamed Stream |
| SOUTHEAST along Mayhew Lake Road N/CR 1 | 0.2 mile | Unnamed Stream |
| SOUTHWEST along St. Germain Street E/CR 75 | 0.3 mile | Mayhew Lake Road N/CR 1 |
| SOUTHEAST across open fields and along Line 0887 to Transmission Structure 39 | 0.6 mile | St. Germain Street E/CR 75, State Highway 23 |
| Total Alternative Route Length | 5.5 miles | |
| Route Segment A | | |
| Beginning about 0.5 mile west of Mayhew Lake Substation, WEST along 35th Street/CR 29 | 0.2 mile | -- |
| SOUTHEAST along U.S. Highway 10 frontage road | 0.3 mile | -- |
| Total Route Segment A Length | 0.5 mile | |

| Route Direction | Approximate Length | Road and Public Water Crossings |
|---|---|---|
| Route Segment B | | |
| From Granite City Substation SOUTH-SOUTHEAST across scattered forest and open fields along Lines 5509, 0887, and 0899 and County Ditch 3 to Transmission Structure 39 | 1.0 mile | St. Germain Street E/County Road 75, State Highway 23, Unnamed Stream |
| Total Route Segment B Length | 1.0 mile | |

### 4.3.1 Alternative Route

The Alternative Route is approximately 5.5 miles long. *See* **Figure 3**. The Alternative Route is similar to the first 2.3 miles of the north end of the Proposed Route (*see* **Figure 2** and **Figures B-2 to B-11** in **Appendix B**). Just north of the intersection with Golden Spike Road NE, the Alternative Route deviates from the Proposed Route alignment and proceeds south and east through primarily commercial developments and open fields until realigning with the Proposed Route at the intersection with St. Germain Street E/CR 75.

The Alternative Route is within or adjacent to the existing rights-of-way of utilities, roads, and highways for approximately 71 percent of the length of the route, with the remainder of the route paralleling section lines and crossing residential, agricultural, and commercial/industrial areas. More than 99 percent of the route crosses developed, open, or agricultural land; less than 1 percent of the route crosses forest land (*see* Section 6.3). The route crosses land zoned primarily for highway, agricultural, commercial, or development purposes (*see* Section 6.2.2). Approximately 25 percent of the route crosses within the City of Sauk Rapids municipal boundaries. There are 11 residences located within 200 feet of the Alternative Route centerline. Cultural resource site information is the same as that for the Proposed Route (i.e., 12 sites within 0.5 mile as described above) (*see* Section 6.4). The Alternative Route will not cross any PWI watercourses. However, the Alternative Route will include five waterbody crossings and will span approximately 1.1 miles of wetland (*see* Section 6.5.4). The Blanding's turtle, a threatened species, has been identified by the MnDNR within 1.0 mile of the Alternative Route (*see* Section 6.6).

The Alternative Route follows utility, road, and railroad corridors for 71 percent of the route, compared to a greater percentage (83 percent) associated with the Proposed Route. The Alternative Route is not preferable to the Proposed Route because it will not fulfill two main objectives of the Project, those being: i) maximizing the use of existing distribution and transmission line alignments; and ii) minimizing the use of new right-of-way, when compared to the Proposed Route.

### 4.3.2 Route Segment A

Route Segment A is approximately 0.5 mile long and is an alternative segment for both the Proposed Route and Alternative Route. *See* **Figure 2**. Route Segment A was developed based on comments from City of Sauk Rapids and Benton County government officials during a June 28, 2010 meeting (*see* Section 8.3), resolutions passed by the City of Sauk Rapids and Benton County (discussed herein), and on routing criteria preferring the use of natural corridors, field lines, and property lines.

Route Segment A begins approximately 0.5 mile west of the Mayhew Lake Substation along 35th Street NE/CR 29 where it continues west along 35th Street NE/CR 29 (vs. deviating south as the Proposed Route alignment does) before turning southeast at the intersection with the U.S. Highway 10 interchange. It then proceeds southeast, traversing primarily open and scattered forest land, along the interchange road before reconnecting with the Proposed and Alternative Route alignments. Due to its proximity to the Proposed and Alternative Routes and relatively short length, incorporation of Route Segment A into either the Proposed or Alternative Routes will result in similar impacts on resources as those summarized above.

Route Segment A is not as preferable as the Proposed Route because it does not offer any significantly greater advantage with respect to the Project's objectives of maximizing the use of existing distribution and transmission line alignments and minimizing the use of new right-of-way compared to the Proposed Route. In addition Route Segment A will cross approximately the same length of wetland compared to the Proposed Route, and, unlike the Proposed Route, it will cross or be near medium to high intensity commercial development areas near the intersection of US Highway 10 and 35th Street NE/CR 29. Also, unlike the Proposed Route, Route Segment A does not accommodate preferences expressed by City of Sauk Rapids and Benton County government officials to route the transmission line away from the intersection of 35th Street NE/CR 29 and U.S. Highway 10.

### 4.3.3 Route Segment B

Route Segment B is approximately 1.0 mile long and is an alternative segment for the Proposed Route. *See* **Figure 2**. Route Segment B was developed to evaluate another option to create a second source of power to the Mayhew Lake Substation by connecting the new Line 5520 to the Benton County Substation at transmission Structure 39, which avoids removal and reconfiguration of a portion of Line 5509. Route Segment B begins approximately 0.4 miles east of the Granite City Substation at the intersection of existing transmission Lines 5509 and 0887 and 0899. Route Segment B proceeds southeast for approximately 1.0 mile across wetlands, scattered forest, and open field along Lines 0887 and 0899 and County Ditch 3 before meeting with transmission Structure 39.

If Route Segment B is selected, the Mayhew Lake Substation will remain connected to the Granite City Substation with existing Line 5509, and the second source to Mayhew Lake Substation will be provided by the new Line 5520 being connected to the Benton County Substation with modifications to transmission Structure 39. Due to its proximity to the Proposed Route, incorporation of Route Segment B into the Proposed Route will result in similar impacts on resources as those summarized above, with the exception of additional wetland impacts and forest crossings.

Route Segment B is not preferable to the Proposed Route because it does not offer any greater advantage with respect to the Project's objectives of maximizing the use of existing distribution and transmission line alignments and minimizing the use of new right-of-way compared to the Proposed Route. In addition, Route Segment B will cross, and potentially impact, approximately 140 feet more deciduous forest land and approximately 1,100 feet more wetland compared to the Proposed and Alternative Routes. Also, approximately 1,700 feet of existing Line 5509 would be removed if the Proposed Route is selected, which would not occur if Route Segment B is selected.

## 4.4 Associated Facilities and Substation Modifications

The associated facilities for the Project include changes to the Mayhew Lake and Granite City Substations, where the new 115 kV Line 5520 will terminate on the north and south ends of the Project, reconfiguring Line 5509, jumper modifications to transmission lines at Structure 39, new pole and jumper near Structure 39 to connect Line 5509 to Benton County Substation, and redesignation and line termination equipment additions at the existing Mayhew Lake, Benton County, St. Cloud, and Granite City Substations. No additional fee land purchase is anticipated for these modifications.

### 4.4.1 Mayhew Lake and Granite City Substations (Existing)

Equipment additions at the existing Mayhew Lake and Granite City Substations will include the addition of oil circuit breakers, a 115 kV main bus, and a 115 kV line termination structure. The new structures and equipment will be similar to those currently installed and located northeast of the exiting electrical equipment enclosure at the Mayhew Lake Substation. In conjunction with the new structures and equipment at the Mayhew Lake Substation, there will be site grading, foundation installation, steel installation, equipment installation, control room modifications, and extending of the fence. *See* **Figure B-19** in **Appendix B**.

For the Mayhew Lake Substation changes will be the addition of three new transmission structures to route the new line termination to the north side of the substation. Xcel Energy will also likely require modifications to the existing structures outside this substation, which may involve removal and replacement with one of the three new structures.

New dead-end transmission structures will also be required at the Granite City Substation where the new Line 5520 enters into this substation site. Xcel Energy is still evaluating the location for this new line termination, but the preliminary location is at the northeast corner of the existing Granite City Substation site.

### 4.4.2 Benton County and St. Cloud Substations (Existing)

Work at the Benton County and St. Cloud Substations will be internal to the substations and consist almost entirely of replacement or upgrades of relays and communication equipment internal to the control house. Additionally, minor item tone equipment removal from the substation structures and installation of fiber optic terminations in place of these items may also be required. Redesignation of affected transmission line numbers will also occur.

### 4.4.3 Structure 39 (Existing)

Modifications to transmission Structure 39 will be minor. The jumpers on the existing Structure 39 will be modified to disconnect the existing Line 0887 from the Benton County Substation to Structure 39. The new Line 5509 segment will be added by constructing either a new double circuit structure or single pole adjacent to Structure 39 and installing new jumpers to connect new Line 5509 with Line 0899 segment from this structure to the Benton County Substation. Line 0887 segment will become the new Line 0899 from Structure 39 to Benton County Substation. New structures will be installed to connect the new transmission Line 5509 segment with the existing transmission Line 5509. Xcel Energy is evaluating whether the new line segment of Line 5509 can

be double circuited with existing transmission Lines 0899 and 0887 in this corridor to where it will connect to existing Line 5509.

### 4.5 Design Options to Accommodate Future Transmission Lines

The proposed 115 kV transmission line is designed to meet current and projected needs. In addition, the Mayhew Lake Substation, Granite City Substation, and transmission Structure 39 were designed and constructed to accommodate future transmission line interconnections.

# 5.0 Engineering Design, Construction and Right-of-way Acquisition

## 5.1 Structures, Right-of-Way, Construction and Maintenance

### 5.1.1 Transmission Structures

For a portion of the Proposed Route, the 115 kV transmission line is proposed to be constructed as a single-circuit line using single-pole, steel or wood poles with braced post insulators. In locations where the Proposed Route can be constructed with the existing distribution line, the structures will be single circuit 115 kV poles with davit arms and distribution underbuild. Double circuit structures may be used for the approximately 0.7 miles of new 115 kV transmission line to extend existing Line 5509 from its intersection with Lines 0887 and 0899 to Structure 39, to double circuit this new line with other existing lines in this corridor. A new double circuit structure may also be used near Structure 39 to connect the new extended Line 5509 segment to the existing Line 0899 segment from Structure 39 to the Benton County Substation. Pictures and schematics of the proposed structure types are shown below on **Figures 4 to 7**.

**FIGURE 4**

**PHOTO OF TYPICAL 115 KV SINGLE CIRCUIT WOOD BRACED POST INSULATOR STRUCTURE**

**FIGURE 5**

**PHOTO OF TYPICAL 115 KV SINGLE CIRCUIT STEEL DAVIT ARM WITH DISTRIBUTION UNDERBUILD STRUCTURE**

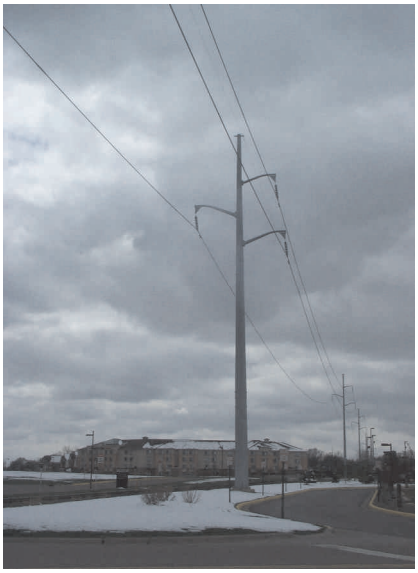

**FIGURE 6**

**PHOTO OF TYPICAL 115 KV SINGLE CIRCUIT STEEL DAVIT ARM STRUCTURE (NO DISTRIBUTION UNDERBUILD)**

**FIGURE 7**
**PHOTO OF TYPICAL 115/115 KV**
**DOUBLE CIRCUIT DAVIT ARM STRUCTURE**

Direct embedded wood, galvanized steel, or weathering steel poles with davit arms or braced post are proposed to be used for the tangent structures if soil conditions warrant. Rock-filled culvert foundations may be required in areas with poor soils. Self-supporting galvanized steel or weathering steel poles with davit arms or braced post on concrete foundations are proposed to be used for long-span, angle, and dead-end structures.

The height of the single circuit structures will average between 70 and 90 feet and the double circuit structures will average between 75 and 105 feet. The average span for all structures will be approximately 300 to 400 feet, with a maximum span of approximately 500 feet to keep the conductor within existing right-of-way, where applicable. **Table 7** summarizes the structure designs and foundations for the line.

**Table 7**

**Structure Design Summary**

| Line Type | Structure Type | Structure Material | Right-of-Way Width (feet) | Structure Height (feet) | Structure Base Diameter (inches) | Foundation Diameter (feet) | Span Between Structures (feet) |
|---|---|---|---|---|---|---|---|
| Single Circuit 115 kV | Single Circuit Braced Post or Davit Arm | Galvanized Steel, Weathering Steel or Wood | 75 | 70 to 90 | 24 to 42: tangent structures 36 to 72: angle structures | 5 to 8 | 300 to 500 |
| Single Circuit 115 kV, with Distribution Underbuild | Davit Arm with Distribution Crossarm | Galvanized Steel, Weathering Steel or Wood | 75 | 70 to 90 | 24 to 42: tangent structures 36 to 72: angle structures | 5 to 8 | 300 to 500 |

| Line Type | Structure Type | Structure Material | Right-of-Way Width (feet) | Structure Height (feet) | Structure Base Diameter (inches) | Foundation Diameter (feet) | Span Between Structures (feet) |
|---|---|---|---|---|---|---|---|
| Double Circuit 115/115 kV | Single Pole, Davit Arm | Galvanized Steel or Weathering Steel | 75 | 75-105 | Direct embedded or 4 foot diameter culvert or 6 to 8 foot concrete | Direct embedded for tangents and self-supporting for angle/ dead-end and switch structures 6 to 8 | 300 to 500 |

The proposed transmission line will be designed to meet or surpass relevant local and state codes, the National Electric Safety Code ("NESC"), North American Electric Reliability Corporation ("NERC") requirements and Company standards. Appropriate standards will be met for construction and installation, and applicable safety procedures will be followed during and after installation. The 115 kV conductor proposed for the Project will be 795 thousand circular mil ("kcmil") 26/7 Aluminum Core Steel Supported ("ACSS") conductor per phase.

### 5.1.2 Right-of-Way Width

Xcel Energy typically requires a right-of-way of 75 feet wide (37'6" from centerline of structure) for new 115 kV transmission line construction such as that proposed in this Project. *See* **Figures 8 – 10** and detailed **Figures B-2 to B-11** in **Appendix B**. In locations with existing rights-of-way or other considerations, the Project may be designed to fit within existing right-of-way (centered on the centerline of the structure).

When the transmission line parallels other existing infrastructure right-of-way (e.g., roads, railroads, other utilities), an easement of lesser width may be required as part of the right-of-way of the existing infrastructure, which can often be combined with the right-of-way needed for the transmission line. With this pole placement, the transmission line shares the existing right-of-way, thereby reducing the size of the easement required from the private landowner.

When the transmission line is parallel to a roadway, poles will generally be placed 5 feet within the private right-of-way adjacent to the roadway. Therefore, a little less than half of the line right-of-way will share the existing road right-of-way, resulting in an easement of lesser width being required from the landowner. In general, the structures will be placed as close to the property line as practical. Xcel Energy will work with industry standard practices and the Minnesota Department of Transportation's ("MnDOT") accommodation policy to position and manage the right of way.

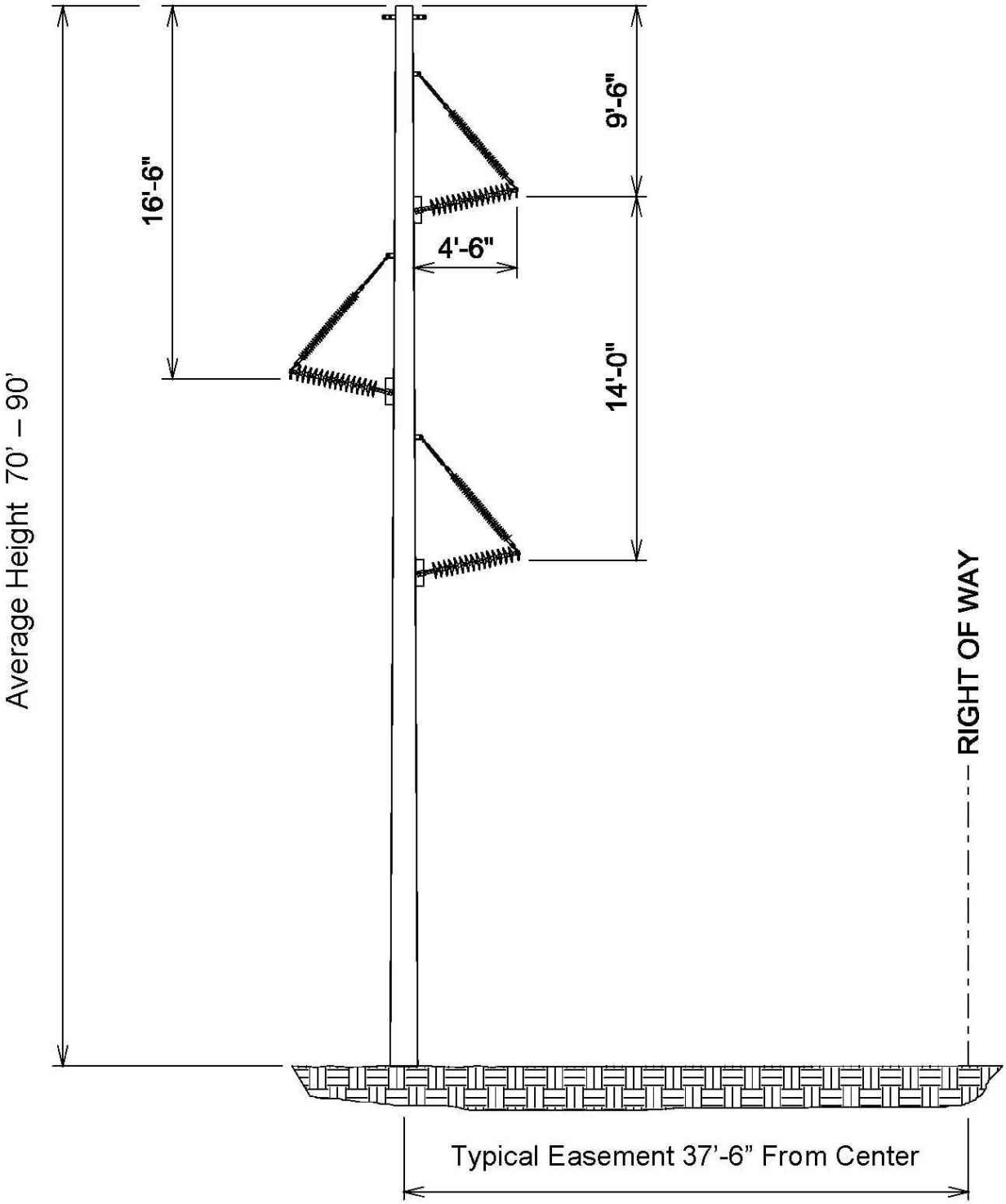


**FIGURE 8**
**TYPICAL DIMENSIONS AND RIGHT OF WAY REQUIREMENTS FOR SINGLE CIRCUIT 115 KV STRUCTURE**

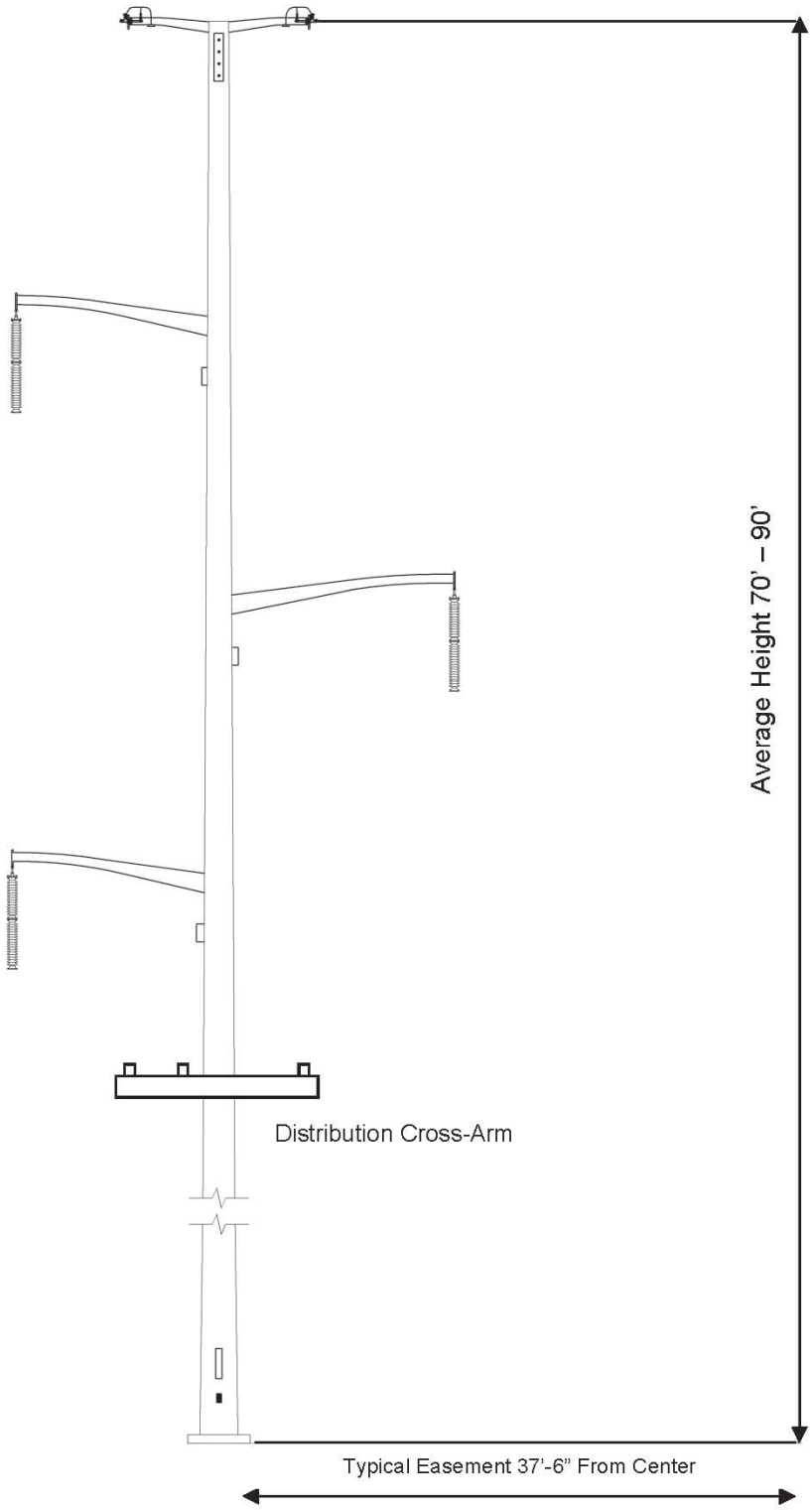


**FIGURE 9**
**TYPICAL DIMENSIONS AND RIGHT OF WAY REQUIREMENTS FOR SINGLE CIRCUIT 115 KV STRUCTURE WITH DISTRIBUTION UNDERBUILD**

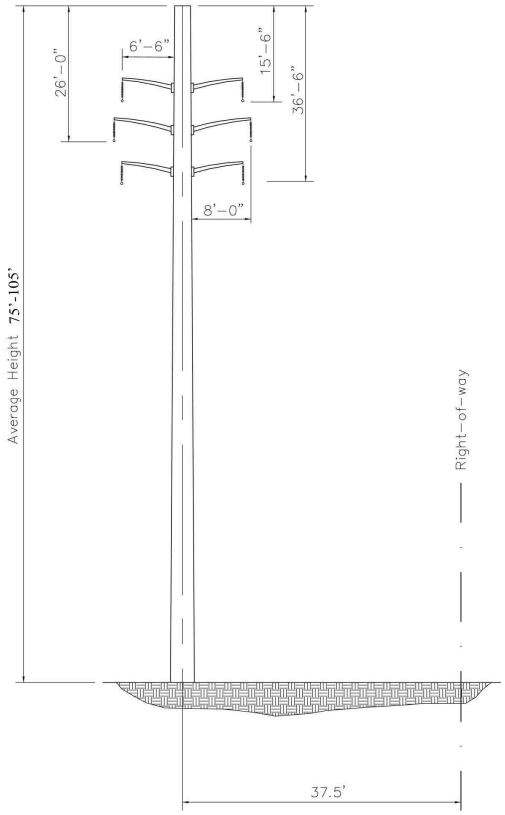


**FIGURE 10**
**TYPICAL DIMENSIONS AND RIGHT-OF-WAY REQUIREMENTS FOR DOUBLE CIRCUIT 115/115 KV DAVIT ARM STRUCTURE**

When the transmission line is placed cross-country across private land, an easement for the entire right-of-way (up to 75 feet wide) will be acquired from the affected landowner(s). Xcel Energy plans to locate the poles as close to property division lines as reasonably possible. **Figures 8 - 10** show the right-of-way requirements for the proposed structures.

Xcel Energy will work within existing right-of-way for the Project whenever reasonably possible. Approximately 2.7 miles of the Project will be located at or very near existing electrical distribution or transmission corridors and easements. These easements may be able to satisfy the needs of the Project. In locations where existing easements are insufficient for this Project, new or modified easements will be obtained.

Approximately 0.5 mile of new right-of-way will need to be acquired along CR 29 to construct the Proposed or Alternative Routes. The route of this segment is anticipated to be located on the south side of CR 29. Approximately 0.5 mile of new right-of-way will also need to be acquired between CR 29 and U.S. Highway 10 (Route Segment A).

Approximately 0.6 mile of new right-of-way will also need to be acquired between where the proposed routes meet U.S. Highway 10 and meets up with existing electric distribution facilities (Proposed and Alternative Routes). *See* **Figure B-1** in **Appendix B**.

### 5.1.3 Right-of-Way Evaluation and Acquisition

Where the Project is expected to use existing rights-of-way, the right-of-way agent will evaluate all existing easements. If the terms of the existing easement are sufficient and no new right-of-way is needed, the right-of-way agent will continue to work with the landowner to address any construction needs, impacts, damages, or restoration issues. To the extent new right-of-way acquisition is necessary, the right-of-way agent will work with landowners to determine how to expand existing easements.

For those segments of the Project where new right-of-way will be necessary, the acquisition process begins early in the detailed design phase. For transmission lines, utilities acquire easement rights across certain parcels to accommodate the facilities. The evaluation and acquisition process includes title examination, initial owner contacts, survey work, document preparation, and purchase. Each of these activities, particularly as it applies to easements for transmission line facilities, is described in more detail below.

The first step in the right-of-way process is to identify all persons and entities that may have a legal interest in the real estate upon which the facilities will be built. To compile this list, a right-of-way agent or other persons engaged by the utility will complete a public records search of all land involved in the Project. A title report is then developed for each parcel to determine the legal description of the property and the owner(s) of record of the property, and to gather information regarding easements, liens, restriction, encumbrances, and other conditions of record.

After owners are identified, a right-of-way representative contacts each property owner or the property owner's representative. The right-of-way agent describes the need for the transmission facilities and how the Project may affect each parcel. The right-of-way agent also seeks information from the landowner about any specific construction concerns.

The next step in the acquisition process is evaluation of the specific parcel. For this work, the right-of-way agent may request permission from the owner for survey crews to enter the property to conduct preliminary survey work. Permission may also be requested to take soil borings to assess the soil conditions and determine appropriate foundation design. Surveys are conducted to locate the right-of-way corridors, natural features, man-made features, and associated elevations for use during the detailed engineering of the line. The soil analysis is performed by an experienced geotechnical testing laboratory.

During the evaluation process, the location of the proposed transmission line or substation facility may be staked with permission of the property owner. This means that the survey crew locates each structure or pole on the ground and places a surveyor's stake to mark the structures or substation facility's anticipated location. By doing this, the right-of-way agent can show the landowner where the structure(s) will be located on the property. The right-of-way agent may also delineate the boundaries of the easement area required for safe operation of the line.

Prior to the acquisition of easements or fee purchase of property, land value data will be collected. Based on the impact of the easement or purchase to the market value of each parcel, a fair market value offer will be developed. The right-of-way agent then contacts the property owner(s) to present the offer for the easement and discuss the amount of just compensation for the rights to build, operate, and maintain the transmission facilities within the easement area and reasonable access to the easement area. The agent will also provide maps of the line route or site and maps showing the landowner's parcel. The landowner is allowed a reasonable amount of time to consider the offer and to present any material that the owner believes is relevant to determining the property's value. This step is often performed prior to full evaluation in the form of an "option to purchase" contract and can be very helpful in obtaining permission for completion of all necessary evaluations.

In nearly all cases, utility companies are able to work with the landowners to address their concerns and an agreement is reached for the utility's purchase of land rights. The right-of-way agent prepares all of the documents required to complete each transaction. Some of the documents that may be required include easement, purchase agreement, contract, and deed.

In rare instances, a negotiated settlement cannot be reached and the landowner chooses to have an independent third party determine the value of the rights taken. Such valuation is made through the utility's exercise of the right of eminent domain pursuant to Minnesota Statutes, Chapter 117. The process of exercising the right of eminent domain is called condemnation.

Before commencing a condemnation proceeding, the right-of-way agent must obtain at least one appraisal for the property proposed to be acquired and a copy of that appraisal must be provided to the property owner. Minn. Stat. § 117.036, subd. 2(a). The property owner may also obtain another property appraisal and the company must reimburse the property owner for the cost of the appraisal according to the limits set forth in Minnesota Stat. § 117.036, subd. 2(b). The property owner may be reimbursed for reasonable appraisal costs up to $1,500 for single-family and two-family residential properties, $1,500 for property with a value of $10,000 or less, and $5,000 for other types of properties.

To start the formal condemnation process, a utility files a Petition in the district court where the property is located and serves that Petition on all owners of the property. If the court grants the Petition, the court then appoints a three-person condemnation commission that will determine the compensation for the easement. The three people must be knowledgeable of applicable real estate issues. Once appointed, the commissioners schedule a viewing of the property over and across which the transmission line easement is to be located. Next, the commission schedules a valuation hearing where the utility and landowners can testify as to the fair market value of the easement or fee. The commission then makes an award as to the value of the property acquired and files it with the court. Each party has 40 days from the filing of the award to appeal to the district court for a jury trial. In the event of an appeal, the jury hears land value evidence and renders a verdict. At any point in this process, the case can be dismissed if the parties reach a settlement.

As part of the right-of-way acquisition process, the right-of-way agent will discuss the construction schedule and construction requirements with the owner of each parcel. To ensure safe construction of the line, special consideration may be needed for fences, crops, or livestock. For instance, fences may need to be moved, temporary or permanent gates may need to be installed; crops may need to

be harvested early; and livestock may need to be moved. In each case the right-of-way agent and construction personnel coordinate these processes with the landowner.

### 5.1.4 Transmission Construction Procedures

Construction will begin after federal, state, and local approvals are obtained, property and rights-of-way are acquired, soil conditions are established and final design is completed. The precise timing of construction will take into account various requirements that may be in place due to permit conditions, system loading issues, and available workforce.

Construction will follow standard construction and mitigation practices, including best management practices ("BMPs") that were developed from experience with past projects. These practices address right-of-way clearance, staging, erecting transmission line structures, and stringing transmission lines. Construction and mitigation practices to minimize impacts will be developed based on the proposed schedule for activities, permit requirements, prohibitions, maintenance guidelines, inspection procedures, terrain, and other factors. In some cases, activities or schedules are modified to minimize impacts on sensitive environments.

Transmission line structures are generally designed for installation at existing grades. Typically, structure sites with 10 percent or less slope will not be graded or leveled. Sites with more than 10 percent slope will have working areas graded level or fill brought in for working pads. If the landowner permits, it is preferred to leave the leveled areas and working pads in place for use in future maintenance activities, if any. If permission is not obtained, the site is graded back to its original condition to the extent possible and imported fill is removed.

Typical construction equipment used on a Project consists of tree removal equipment, mowers, cranes, backhoes, digger-derrick line trucks, track-mounted drill rigs, dump trucks, front end loaders, bucket trucks, bulldozers, flatbed tractor-trailers, flatbed trucks, pickup trucks, concrete trucks, and various trailers. Many types of excavation equipment are set on wheel or track-driven vehicles. Poles are transported on tractor-trailers. Staging areas are often established for the Project. Staging involves delivering the equipment and materials necessary to construct the new transmission line facilities. The materials are stored at staging areas until they are needed for the Project.

Staging areas may also be required for additional space for storage during construction. These areas will be selected for their location, access, security, and ability to efficiently and safely warehouse supplies. The temporary staging areas outside of the transmission line right-of-way will be obtained through rental agreements.

Access to the transmission line right-of-way corridor is made directly from existing roads or trails that run parallel or perpendicular to the transmission line right-of-way. In some situations, private field roads or trails are used. Where necessary to accommodate the heavy equipment used in construction, including cranes, cement trucks and hole drilling equipment, existing access roads may be upgraded or new roads may be constructed. New access roads may also be constructed when no current access is available or the existing access is inadequate to cross roadway ditches. To the extent possible, these activities are coordinated with the owner of the property affected.

When it is time to install the poles (structures), they are generally moved from the staging areas and delivered to the staked location. The poles are typically placed within the right-of-way until the pole

is set. Insulators and other hardware are attached while the pole is on the ground. The pole is then lifted, placed and secured using a crane.

Poles that are considered medium angle, heavy angle or deadened structures will have concrete foundations. In those cases, holes are drilled in preparation for the foundation. Drilled pier foundations may vary from approximately 5 to 7 feet in diameter and 12 or more feet in depth, depending on soil conditions. After the concrete foundation is set, the pole is bolted to the foundation. Tangent and light angle structures may be placed on poured concrete foundations or direct embedded. Direct embedding involves digging a hole for each pole, filling it partially with crushed rock and then setting the pole on top of the rock base. The area around the pole is then backfilled with crushed rock and/or soil.

Environmentally sensitive and wetland areas may require special construction techniques, which may vary according to conditions at the time of construction. During construction, impacts on wetland areas will be minimized to the extent possible. Additionally, construction practices that help prevent soil erosion will be utilized and measures will be taken to ensure that equipment fueling and lubricating will occur at a distance from waterways. Additional mitigative measures relating to wetlands are contained in Section 6.5.4.

### 5.1.5 Restoration Procedures

During construction, crews will attempt to limit ground disturbance wherever possible. However, areas are disturbed during the normal course of work, which can take several weeks in any one location. As construction is completed, disturbed areas are restored to their original condition to the maximum extent practicable. The right-of-way agent attempts to contact each property owner after construction is completed to see if any remaining damage has occurred as a result of the Project. If damage has occurred to crops, fences or the property, Xcel Energy will fairly reimburse the landowner for the damages sustained that are not repaired or restored by Xcel Energy or its representatives. In some cases, Xcel Energy may engage an outside contractor to restore the damaged property as nearly as possible to its original condition. Portions of vegetation that are disturbed or removed during construction of transmission lines will naturally reestablish to pre-disturbance conditions. Resilient species of common grasses and shrubs typically reestablish with few problems after disturbance. Areas with significant soil compaction and disturbance from construction activities along the proposed transmission line corridor may require assistance in reestablishing the vegetation stratum and controlling soil erosion. Commonly used methods to control soil erosion and assist in reestablishing vegetation include, but are not limited to:

- re-seeding and mulching;
- erosion control blankets;
- silt fence installation; and
- minimizing soil disturbance during construction.

These erosion control and vegetation establishment practices are regularly used in construction projects and are referenced in the construction permit plans. Long-term impacts are minimized by using these construction techniques.

### 5.1.6 Maintenance Procedures

Transmission lines and substations are designed to operate for decades and require only moderate maintenance, particularly in the first few years of operation.

The estimated service life of a transmission line for accounting purposes is approximately 40 years. However, practically speaking, transmission lines are seldom completely retired. Transmission infrastructure has very few mechanical elements and is built to withstand weather extremes that are normally encountered. With the exception of severe weather such as tornadoes and heavy ice storms, transmission lines rarely fail. Transmission lines are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system. Such interruptions are usually only momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure exceeds 90 percent.

The principal operating and maintenance cost for transmission facilities is the cost of inspections, usually done monthly by air. Annual operating and maintenance costs for transmission lines in Minnesota and the surrounding states vary. For transmission lines with voltages ranging from 69 kV through 345 kV, experience shows that the maintenance cost is approximately $300 to $500 per mile. Actual line-specific maintenance costs depend on the setting, the amount of vegetation management necessary, storm damage occurrences, structure types, materials used, and the age of the line.

Substations require a certain amount of maintenance to keep them functioning in accordance with accepted operating parameters and the NESC and NERC requirements. Transformers, circuit breakers, batteries, protective relays, and other equipment need to be serviced periodically in accordance with the manufacturer's recommendation. The site itself must be kept free of vegetation and drainage maintained.

## 5.2 Electric and Magnetic Fields

The term electromagnetic fields ("EMF") refer to electric and magnetic fields that are coupled together, such as in high frequency radiating fields. For the lower frequencies associated with power lines (referred to as "extremely low frequencies" ("ELF")), EMF should be separated into electric fields ("EFs") and magnetic fields ("MFs"), measured in kilovolts per meter ("kV/m") and milliGauss ("mG"), respectively. These fields are dependent on the voltage of a transmission line (EFs) and current carried by a transmission line (MFs). The intensity of the electric field is proportional to the voltage of the line, and the intensity of the magnetic field is proportional to the current flow through the conductors. Transmission lines operate at a power frequency of 60 hertz (cycles per second).

### 5.2.1 Electric Fields

There is no federal standard for transmission line electric fields. The Commission, however, has imposed a maximum electric field limit of 8 kV/m measured at one meter above the ground. *In the Matter of the Route Permit Application 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 (*adopting* ALJ Findings of Fact, Conclusions and Recommendation at Finding 194 (April 22, 2010 and amended April 30, 2010)) (September 14, 2010). The standard was designed to prevent serious hazards from

shocks when touching large objects parked under AC transmission lines of 500 kV or greater. The maximum electric field, measured at one meter above ground, associated with the Project is calculated to be 1.013 kV/m (*see* **Table 8** below).

**Table 8**

**Calculated Electric Fields (kV/m) for Proposed 115 kV Transmission Line Designs (3.28 feet above ground)**

| Structure Type | Maximum Operating Voltage (kV) | Distance to Proposed Centerline (feet) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | -300 | -200 | -100 | -75 | -50 | -25 | 0 | 25 | 50 | 75 | 100 | 200 | 300 |
| Single Pole Davit Arm 115 kV Single Circuit Delta Configuration | 121 | 0.012 | 0.029 | 0.131 | 0.220 | 0.358 | 0.443 | 0.596 | 0.714 | 0.368 | 0.182 | 0.110 | 0.030 | 0.013 |
| Single Pole Davit Arm 115 kV Single Circuit Delta Configuration with 34.5 kV Distribution Underbuild | 121 | 0.013 | 0.031 | 0.139 | 0.231 | 0.372 | 0.424 | 0.290 | 0.611 | 0.346 | 0.182 | 0.114 | 0.032 | 0.014 |
| Single Pole Davit Arm 115 kV Single Circuit Vertical Configuration | 121 | 0.009 | 0.017 | 0.028 | 0.020 | 0.039 | 0.222 | 0.614 | 0.602 | 0.200 | 0.020 | 0.031 | 0.023 | 0.011 |
| Single Pole Davit Arm 115 kV Single Circuit Vertical Configuration with 34.5 kV Distribution Underbuild | 121 | 0.011 | 0.021 | 0.047 | 0.054 | 0.048 | 0.038 | 0.294 | 0.466 | 0.152 | 0.012 | 0.043 | 0.026 | 0.013 |
| Single Pole Davit Arm 115 kV/115kV Double Circuit | 121 | 0.003 | 0.008 | 0.024 | 0.016 | 0.146 | 0.998 | 0.558 | 0.998 | 0.146 | 0.016 | 0.024 | 0.008 | 0.003 |
| Single Pole Davit Arm 115 kV/115kV Double Circuit with 34.5 kV Distribution Underbuild | 121 | 0.003 | 0.007 | 0.024 | 0.031 | 0.149 | 0.964 | 0.413 | 1.013 | 0.150 | 0.016 | 0.023 | 0.007 | 0.003 |
| H-Frame Structure 115 kV Horizontal Configuration | 121 | 0.007 | 0.021 | 0.119 | 0.215 | 0.385 | 0.478 | 0.091 | 0.478 | 0.385 | 0.215 | 0.119 | 0.021 | 0.007 |
| H-Frame Structure 115 kV Horizontal Configuration with 34.5 kV Distribution Underbuild | 121 | 0.007 | 0.021 | 0.121 | 0.218 | 0.389 | 0.486 | 0.111 | 0.516 | 0.405 | 0.225 | 0.125 | 0.022 | 0.008 |

### 5.2.2 Magnetic Fields

There are presently no Minnesota regulations pertaining to MF exposure. Xcel Energy provides information to the public, interested customers and employees so they can make informed decisions about MFs. Such information includes the availability for measurements to be conducted for customers and employees upon request.

The magnetic field profiles around the proposed transmission lines for each structure and conductor configuration being considered for the Project is shown in **Table 9**. Magnetic fields were calculated under normal system conditions (systems intact) for the expected peak and average current flows as

projected for the year 2016-2018, which is contingent upon the completion and operation of the CapX2020 Monticello to St. Cloud 345 kV transmission line (MPUC edocket No. E002/TL-09-246). The peak magnetic field values are calculated at a point directly under the transmission line and where the conductor is closest to the ground. The same method is used to calculate the magnetic field at the edge of the right-of-way. The magnetic field profile data show that magnetic field levels decrease rapidly as the distance from the centerline increases (proportional to the inverse square of the distance from source).

The magnetic field produced by the transmission line is dependent on the current flowing on its conductors. Therefore, the actual magnetic field when the Project is placed in service is typically less than shown in the charts. This is because the charts represent the magnetic field with current flow at expected normal peak based on projected regional load growth through 2016-2018, the maximum load projection timeline available. Actual current flow on the line will vary, so magnetic fields will be less than peak levels during most hours of the year.

## Table 9

## Calculated Magnetic Flux Density (milligauss) for Proposed 115 kV Transmission Line Designs (3.28 feet above ground)

| Segment | System Condition | Current (Amps) | Distance to Proposed Centerline (feet) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | -300 | -200 | -100 | -75 | -50 | -25 | 0 | 25 | 50 | 75 | 100 | 200 | 300 |
| Single Pole Davit Arm 115kV Single Circuit Delta Configuration | Peak | 450 | 1.13 | 2.39 | 7.76 | 11.75 | 18.73 | 29.45 | 38.49 | 33.62 | 21.23 | 12.86 | 8.21 | 2.29 | 1.01 |
| | Average | 270 | 0.68 | 1.43 | 4.66 | 7.05 | 11.24 | 17.67 | 23.09 | 20.17 | 12.74 | 7.71 | 4.93 | 1.37 | 0.60 |
| Single Pole Davit Arm 115kV Single Circuit Delta Configuration with 34.5 kV Distribution Underbuild | Peak | 450 | 1.07 | 2.21 | 7.24 | 11.03 | 17.72 | 28.00 | 36.44 | 31.58 | 19.85 | 12.10 | 7.83 | 2.33 | 1.11 |
| | Average | 270 | 0.65 | 1.34 | 4.36 | 6.65 | 10.69 | 16.93 | 22.21 | 19.16 | 11.99 | 7.30 | 4.71 | 1.40 | 0.67 |
| Single Pole Davit Arm 115kV Single Circuit Vertical Configuration | Peak | 450 | 0.63 | 1.34 | 4.19 | 6.23 | 9.86 | 16.30 | 24.72 | 24.76 | 16.36 | 9.90 | 6.26 | 1.70 | 0.75 |
| | Average | 270 | 0.38 | 0.80 | 2.51 | 3.74 | 5.91 | 9.78 | 14.83 | 14.86 | 9.82 | 5.94 | 3.76 | 1.02 | 0.45 |
| Single Pole Davit Arm 115kV Single Circuit Vertical Configuration with 34.5 kV Distribution Underbuild | Peak | 450 | 0.69 | 1.27 | 3.56 | 5.17 | 7.98 | 12.88 | 20.37 | 21.52 | 14.07 | 8.46 | 5.35 | 1.54 | 0.76 |
| | Average | 270 | 0.41 | 0.76 | 2.14 | 3.10 | 4.79 | 7.74 | 12.43 | 13.08 | 8.50 | 5.10 | 3.22 | 0.93 | 0.45 |
| Single Pole Davit Arm 115kV/115kV Double Circuit | Peak | 450 | 0.14 | 0.43 | 2.92 | 6.12 | 15.42 | 45.06 | 75.21 | 44.56 | 15.12 | 5.96 | 2.82 | 0.42 | 0.14 |
| | Average | 270 | 0.09 | 0.26 | 1.75 | 3.67 | 9.25 | 27.04 | 45.13 | 26.73 | 9.07 | 3.58 | 1.69 | 0.25 | 0.09 |
| Single Pole Davit Arm 115kV/115kV Double Circuit with 34.5 kV Distribution Underbuild | Peak | 450 | 0.25 | 0.57 | 3.24 | 6.59 | 16.13 | 45.97 | 78.34 | 44.47 | 14.74 | 5.74 | 2.71 | 0.46 | 0.22 |
| | Average | 270 | 0.16 | 0.36 | 1.98 | 4.01 | 9.77 | 27.77 | 48.51 | 26.99 | 8.90 | 3.46 | 1.63 | 0.28 | 0.14 |
| H-Frame Structure 115kV Horizontal Configuration | Peak | 450 | 0.74 | 1.68 | 6.11 | 9.74 | 16.61 | 27.71 | 34.87 | 28.05 | 17.04 | 10.13 | 6.44 | 1.87 | 0.87 |
| | Average | 270 | 0.44 | 1.01 | 3.67 | 5.84 | 9.97 | 16.62 | 20.92 | 16.83 | 10.22 | 6.08 | 3.87 | 1.12 | 0.52 |
| H-Frame Structure 115kV Horizontal Configuration with 34.5 kV Distribution Underbuild | Peak | 450 | 0.84 | 1.79 | 6.28 | 9.94 | 16.81 | 27.77 | 34.85 | 28.23 | 17.31 | 10.36 | 6.63 | 1.97 | 0.95 |
| | Average | 270 | 0.50 | 1.08 | 3.79 | 5.99 | 10.14 | 16.77 | 21.11 | 17.07 | 10.44 | 6.24 | 3.99 | 1.18 | 0.57 |
| Note: The assumed peak and average line loading assumed for these calculations is the estimated flow in 2016-2018 and is contingent upon the completion and operation of the CapX2020 Monticello to St. Cloud 345 kV Transmission Project. | | | | | | | | | | | | | | | |

Considerable research has been conducted throughout the past three decades to determine whether exposure to power-frequency (60 hertz) magnetic fields causes biological responses and health effects. Epidemiological and toxicological studies have shown no statistically significant association or weak associations between MF exposure and health risks. Public health professionals have also investigated the possible impact of exposure to EMF upon human health for the past several decades. While the general consensus is that electric fields pose no risk to humans, the question of whether exposure to magnetic fields can cause biological responses or health effects continues to be debated.

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. The NIEHS concluded that the scientific evidence linking MF exposures with health risks is weak and that this finding does not warrant aggressive regulatory concern. However, because of the weak scientific evidence that supports some

association between MFs and health effects and the common exposure to electricity in the United States, passive regulatory action, such as providing public education on reducing exposures, is warranted.

In 2007, the World Health Organization ("WHO") concluded a review of the health implications of electromagnetic fields. In this report, the WHO stated:

> Uncertainties in the hazard assessment [of epidemiological studies] include the role that control selection bias and exposure misclassification might have on the observed relationship between magnetic fields and childhood leukemia. In addition, 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. Thus, on balance, the evidence is not strong enough to be considered causal, but sufficiently strong to remain a concern. (*Environmental Health Criteria Volume N°238 on Extremely Low Frequency Fields* at p. 12, WHO (2007)).

Also, regarding disease outcomes, aside from childhood leukemia, the WHO stated that:

> A number of other diseases have been investigated for possible association with ELF magnetic field exposure. These include cancers in children and adults, depression, suicide, reproductive dysfunction, developmental disorders, immunological modifications and neurological disease. The scientific evidence supporting a linkage between ELF magnetic fields and any of these diseases is much weaker than for childhood leukemia and in some cases (for example, for cardiovascular disease or breast cancer) the evidence is sufficient to give confidence that magnetic fields do not cause the disease. (*Id.* at p.12.)

Furthermore, in their "Summary and Recommendations for Further Study" WHO emphasized that:

> The limit values in [ELF-MF] exposure guidelines [should not] be reduced to some arbitrary level in the name of precaution. Such practice undermines the scientific foundation on which the limits are based and is likely to be an expensive and not necessarily effective way of providing protection. (*Id.* at p. 12).

Although WHO recognized epidemiological studies indicate an association on the range of three to four mG, WHO did not recommend these levels as an exposure limit but instead provided: "The best source of guidance for both exposure levels and the principles of scientific review are international guidelines." *Id.* at pp. 12-13. The international guidelines referred to by WHO are the International Commission on Non-Ionizing Radiation Protection ("ICNIRP") and the Institute of Electrical and Electronic Engineers ("IEEE") exposure limit guidelines to protect against acute effects. *Id.* at p. 12. The ICNIRP-1998 continuous general public exposure guideline is 833 mG and the IEEE continuous general public exposure guideline in 9,040 mG. In addition, WHO determined that "the evidence for a casual relationship [between ELF-MF and childhood leukemia] is limited, therefore exposure limits based on epidemiological evidence is not recommended, but some precautionary measures are warranted." *Id.* at 355-56.

WHO concluded that:

> given both the weakness of the evidence for a link between exposure to ELF magnetic fields and childhood leukemia, and the limited impact on public health if there is a link, the benefits of exposure reduction on health are unclear. Thus, the costs of precautionary measures should be very low... Provided that the health, social and economic benefits of electric power are not compromised, implementing very low-cost precautionary procedures to reduce exposure is reasonable and warranted. (*Id.* at p. 13).

Wisconsin, Minnesota and California have all conducted literature reviews or research to examine this issue. In 2002, Minnesota formed an Interagency Working Group ("Working Group") to evaluate the body of research and develop policy recommendations to protect the public health from any potential problems resulting from HVTL (High Voltage Transmission Lines) EMF effects. The Working Group consisted of staff from various state agencies and published its findings in a White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options in September 2002, (Minnesota Department of Health, 2002). The report summarized the findings of the Working Group 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. (*Id.* at p. 1.)

The Public Service Commission of Wisconsin ("PSCW") has periodically reviewed the science on MFs since 1989 and has held hearings to consider the topic of MF and human health effects. The most recent hearings on MF were held in July 1998. Recently, January 2008, the PSC published a fact sheet regarding MFs. In this fact sheet the PSC noted that:

> Many scientists believe the potential for health risks for exposure to EMF is very small. This is supported, in part, by weak epidemiological evidence and the lack of a plausible biological mechanism that explains how exposure to EMF could cause disease. The magnetic fields produced by electricity are weak and do not have enough energy to break chemical bonds or to cause mutations in DNA. Without a mechanism, scientists have no idea what kind of exposure, if any, might be harmful. In addition, whole animal studies investigating long-term exposure to power frequency EMF have shown no connection between exposure and cancer of any kind. (*EMF-Electric & Magnetic Fields*, PSC (January 2008)).

The Minnesota Public Utilities Commission, based on the Working Group and World Health Organization findings, has repeatedly found that "there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects." *In the Matter of the Application of Xcel Energy for a Route Permit for the Lake Yankton to Marshall Transmission Line Project in*

*Lyon County*, Docket No. E-002/TL-07-1407, Findings of Fact, Conclusions of Law and Order Issuing a Route Permit to Xcel Energy for the Lake Yankton to Marshall Transmission Project at p. 7-8 (Aug. 29, 2008); *See also*, *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 at p. 23 (Aug. 1, 2007)("Currently, there is insufficient evidence to demonstrate a causal relationship between EMF exposure and any adverse human health effects.").

The Commission again confirmed its conclusion regarding health effects and MFs in the Brookings County – Hampton 345 kV Route Permit proceeding ("Brookings Project"). In the Brookings Project Route Permit proceeding, Applicants Great River Energy and Xcel Energy and one of the intervening parties provided expert evidence on the potential impacts of electric and magnetic fields on human health. The ALJ in that proceeding evaluated written submissions and a day-and-half of testimony from these 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 or MF] exposure." *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). The Commission adopted this finding on July 15, 2010. *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).

### 5.2.3 Stray Voltage

Stray voltage (also known as Neutral to Earth Voltage ("NEV")) is a condition that can occur on the electric service entrances to structures from distribution lines, not transmission lines. More precisely, stray voltage is a voltage that exists between the neutral wire of the service entrance and grounded objects in buildings, such as barns and milking parlors. Transmission lines do not, by themselves, create stray voltage because they do not connect to businesses or residences. Transmission lines, however, can induce stray voltage on a distribution circuit that is parallel to and immediately under the transmission line.

## 5.3 Farming Operations, Vehicle Use, and Metal Buildings Near Power Lines

Insulated electric fences used in livestock operations can pick up an induced charge from transmission lines. Usually, the induced charge will drain off when the charger unit is connected to the fence. When the charger is disconnected either for maintenance or when the fence is being built, shocks may result. Potential shocks can be prevented by using a couple of methods including:

i) one or more of the fence insulators can be shorted out to ground with a wire when the charger is disconnected; or

ii) an electric filter can be instilled that grounds out charges induced from a power line while still allowing the charger to be effective.

Farm equipment, passenger vehicles, and trucks may be safely used under and near power lines. The power lines will be designed to meet or exceed minimum clearance requirements over roads, driveways, cultivated fields, and grazing lands specified by the NESC. Recommended clearances within the NESC are designed to accommodate a relative vehicle height of 14 feet.

There is a potential for vehicles under HVTLs to build up an electric charge. If this occurs, the vehicle can be grounded by attaching a grounding strap to the vehicle long enough to touch the earth. Such buildup is a rare event because generally vehicles are effectively grounded through tires. Modern tires provide an electrical path to ground because carbon black, a good conductor of electricity, is added when they are produced. Metal parts of farming equipment are frequently in contact with the ground when plowing or engaging in various other activities. Therefore, vehicles will not normally build up a charge unless they have unusually old tires or are parked on dry rock, plastic or other surfaces that insulate them from the ground.

Buildings are permitted near transmission lines but are generally prohibited within the right-of-way itself because a structure under a line may interfere with safe operation of the transmission facilities. For example, a fire in a building on the right-of-way could damage a transmission line. As a result, NESC guidelines establish clear zones for transmission facilities. Metal buildings may have unique issues. For example, metal buildings near power lines of 200 kV or greater must be properly grounded. Any person with questions about a new or existing metal structure can contact Xcel Energy for further information about proper grounding requirements.

If a customer suspects that stray voltage/NEV is a concern on their property, they can call the Company stray voltage hotline. The customer can contact an Xcel Energy technician or engineer and discuss the situation. If an on-farm investigation is warranted it will be scheduled. On the day of the investigation, the Xcel Energy team will arrive and conduct an investigation of the utility system serving the farm and the farm wiring. The team will discuss the preliminary results with the customer before leaving the farm. In most instances, recording volt meters will be set to measure activity over several days. A few days later these will be retrieved and taken to the Company for analysis. Upon completing the analysis, an Xcel Energy engineer or technician will call the farmer to discuss the results.

# 6.0 Land Use, Recreation, and Historic and Natural Resources

## 6.1 Description of Environmental Setting

The Project generally lies along a natural boundary between two areas characterized by the MnDNR Ecological Classification system as the Anoka Sand Plain and the Mille Lacs Uplands subsections to the south and north, respectively (MnDNR, 2010a, 2010b).

The Anoka Sand Plain subsection generally consists of a flat, sandy lake plain and terraces along the Mississippi River. Approximately three percent of the land surface in this subsection is covered by water. The area was previously occupied by oak barrens and openings, with characteristic trees being bur oak and northern pin oak. Today, the subsection is predominately characterized by sod and vegetable crops, as well as urban development in the immediate vicinity of the Project.

The Mille Lacs Uplands subsection generally consists of rolling till plains and drumlin fields. Several major rivers cross this subsection, including the St. Croix, Kettle, Snake, Rum, and Ripple Rivers. Historically, the southern portion of this subsection, where the Project is located, was characterized by upland hardwood forests consisting of various species of oak, maple, basswood, and aspen-birch trees. Today, the southern portion of the subsection is dominated by agriculture, although the majority of the routes cross primarily open space consisting of existing transportation and utility corridors, as well as areas of herbaceous lands, hay/pasture fields, undeveloped commercial space, and emergent wetlands. Other land uses crossed include developed commercial/industrial land, forested land, and cultivated crop fields. *See* **Figure B-12** in **Appendix B**.

The existing Mayhew Lake Substation and transmission Structure 39 are located in open and commercial areas. *See* **Figure B-12** in **Appendix B**. The overall Project surroundings are undergoing ongoing development as evidenced by the natural growth and expansion of the City of Sauk Rapids. Also, the majority of the Project is located in an area zoned as an Orderly Annexation Area, which is focused on residential, commercial, and industrial uses, thus altering the former agricultural practices within the vicinity of the Project. The proposed transmission line, which will be collocated for a portion of its route with existing facilities, will not conflict with the current characterization of the Project location or with what the area is zoned for future uses. Associated with the ongoing residential, commercial, and industrial developments is a need for electric power to serve these facilities.

### 6.1.1 Topography

Unlike much of Minnesota, the Project location was not covered by the most recent glaciations (i.e., 10,500 years before present) (Minnesota River Basin Data Center, 2010). However, melt waters and glacial lakes associated with the last glacial advance contributed large volumes of meltwater to rivers that cut deep valleys along the present course of the Minnesota, St. Croix, and lower Mississippi Rivers located east and south of the Project. *See* **Figure B-1** in **Appendix B**. The Project is located within a broad sandy lake plain, which contains small dunes, kettle lakes, and tunnel valleys. The topography of the area is level to gently rolling. The drainage network is young and undeveloped, and extensive areas of wetlands are present. Prior to settlement, the area consisted of forest land, which included various species of oak and maple, as well as jack pine. Along the Mississippi River, upland prairie was present. Steep slopes in the vicinity are generally limited to portions of the Mississippi River bank, which is outside the Project location.

### 6.1.2 Geology and Soils

The geology is composed of a gently rolling landscape and open fields. Bedrock is locally exposed in the St. Cloud area and surface glacial deposits are usually less than 200 feet thick. The Project is underlain by Cambrian and Ordovician dolomite, sandstone, and Cretaceous marine and variegated shale.

The underlying geology and topography of the City of Sauk Rapids and its growth areas have remained consistent over time. However, the surface topography and natural drainage ways have been impacted by the built environment. Some areas east of U.S. Highway 10 contain wetlands, woodlands, and soils incompatible with urban development.

Soils throughout the area are derived primarily from fine sands of the sandy plain, and are primarily droughty, upland soils. However, poorly drained prairie soils (Aquolls) occur along the Mississippi River. Based on the Soil Survey of Benton County (U.S. Department of Agriculture ("USDA"), 1977), the most predominant soils within the vicinity of the Project include the following two soil associations:

- Mora-Ronneby-Parent Association: Deep, moderately well drained to very poorly drained, nearly level to gently sloping fine sandy loams and loams formed in reddish brown glacial till on uplands.

- Hubbard-Duelm Association: Deep, excessively drained and somewhat poorly drained, nearly level and gently sloping loamy sands; on outwash plains and terraces. Erosion tends to be a problem that occurs uniformly over the entire city (Sauk Rapids) and the connecting region, particularly where agricultural crop production is taking place. Both wind and water erosion threaten the topsoil, which is many times lost or transferred to undesirable locations.

## 6.2 Human Settlement

### 6.2.1 Public Health and Safety

Proper safeguards will be implemented for construction and operation of the facility. The Project will be designed in compliance with local, state, NESC, and Xcel Energy standards for clearance to ground, crossing utilities and buildings, strength of materials, and right-of-way widths. Construction and contract crews will comply with local, state, NESC, and Xcel Energy standards for installation of facilities and standard construction practices. Established Xcel Energy and industry safety procedures will also be followed after the transmission line is installed. This will include clear signage during all construction activities.

The proposed transmission lines will be equipped with protective devices (circuit breakers and relays located in the substation where the transmission lines terminate) to safeguard the public if an accident occurs, such as a structure or conductor falling to the ground. The protective equipment will de-energize the transmission line should such an event occur. In addition, the substation facilities involved with the Project will be fenced and access limited to authorized personnel. Proper signage is posted to warn the public about the risk of coming into contact with the energized equipment.

**Mitigative Measures**

Xcel Energy does not anticipate any adverse public health and safety impacts from the Project. Therefore, no mitigative measures are proposed.

### 6.2.2 Commercial, Industrial, and Residential Land Use

As shown in **Table 2**, the Project is located in an area with multiple jurisdictions, which include Benton County, Minden and Sauk Rapids Townships, and the Cities of Sauk Rapids and St. Cloud Municipal boundaries. *See* **Figure B-13** in **Appendix B**.

While the PPSA specifically supersedes and preempts local land use control under Minn. Stat. § 216E.10, subd. 1, local zoning plans will be accommodated as much as possible during detailed routing. Applicable zoning ordinances in the Project location may include zoning ordinances implemented by Benton County and the City of Sauk Rapids.

Based on Benton County's zoning information, approximately 61 percent of the Proposed Route crosses land zoned as Sauk Rapids Township/City of Sauk Rapids Orderly Annexation Area (*see* **Figure B-13** in **Appendix B**) (Benton County, 2009). The remaining portions of the Proposed Route cross Incorporated (29 percent), St. Cloud Joint Powers (5 percent), and B-2: Business Enterprise District (4 percent).

Based on more detailed City of Sauk Rapids and township zoning, the Project location covers areas zoned as Agricultural District, Single and Multiple Family Residence, Supportive Care, Commercial, Highway Commercial (including road right-of-way), Industrial, Light Industrial, Park, Church, Business Enterprise District, Incorporated, Saint Cloud Joint Powers, and Sauk Rapids Annexation Area (City of Sauk Rapids, 2010) (*see* **Figure B-13** in **Appendix B**). Of these, the Proposed Route crosses land zoned as Highway Commercial and associated with road right-of-way (50 percent), Agricultural District (31 percent), Saint Cloud Joint Powers (7 percent), Light Industrial (4 percent), Industrial (3 percent), Business Enterprise District (3 percent), and Sauk Rapids Annexation Area (2 percent) based on City of Sauk Rapids Zoning information (2010) (*see* **Figure B-13** in **Appendix B**).

The Proposed Route includes existing aboveground transmission facilities located at the north and south ends of the proposed transmission line. *See* **Figure 2**. The Mayhew Lake Substation site (owned by Xcel Energy) is located in Sauk Rapids Township, Benton County, and the land is zoned as an Agricultural District (City of Sauk Rapids, 2010). The Granite City Substation is located in Sauk Rapids Township, Benton County, and the land is zoned as Light Industrial (City of Sauk Rapids, 2010). Structure 39 is located in Minden Township, Benton County, and the land is zoned as St. Cloud Joint Powers (Benton County, 2009).

There are five residences and 11 non-residential or commercial businesses within 200 feet of the Proposed Route centerline. *See* **Table 10** and **Figures B-2 to B-11** and **B-14** in **Appendix B**. Relative to the substations and Structure 39, the closest residence is located approximately 325 feet northwest of the Mayhew Lake Substation, residences located approximately 550 feet northeast of the Granite City Substation, and a commercial business located approximately 350 feet to the southeast of Structure 39. Classifications of entities noted above were determined by referencing the land use description found in the Benton County GIS mapping and parcel database.

**Table 10**

**Distance to Occupied Structures**

| Segment | Number of Farmsteads or Residences within 0-50' of Proposed Line [a] | Number of Commercial Operations within 0-50' of Proposed Line | Number of Farmsteads or Residences within 51-100' of Proposed Line [a] | Number of Commercial Operations within 51-100' of Proposed Line | Number of Farmsteads or Residences within 101-200' of Proposed Line [a] | Number of Commercial Operations within 101-200' of Proposed Line |
|---|---|---|---|---|---|---|
| Proposed Route | 4 | 0 | 0 | 4 | 1 | 7 |
| Alternative Route | 4 | 2 | 0 | 6 | 7 | 6 |
| Route Segment A | 0 | 0 | 1 | 0 | 1 | 0 |
| Route Segment B | 0 | 0 | 0 | 0 | 0 | 1 |

[a] Some residences consist of associated structures (e.g., garages, sheds), which are shown as non-residential structures on Figures B-2 through B-11 in Appendix B, but are not counted as additional residences or commercial buildings in this table.

**Mitigative Measures**

Land uses near the Project are not expected to change as a result of the construction and operation of the proposed transmission lines. Permanent impacts will be limited to the area where structures (e.g., poles) are placed and to the construction areas as described in Section 5.1.1.

For both the Proposed and Alternative Routes and both Route Segments A and B, the structures and overhead transmission lines will be placed in primarily commercially/industrially developed areas and open fields along existing roadways and utility corridors. Impacts on commercial/industrial operations and agricultural practices will be minimized by following within or adjacent to existing roadway and utility rights-of-way as much as possible.

### 6.2.3 Displacement

NESC and Xcel Energy standards require certain clearances between transmission line facilities and buildings for safe operation of the transmission line. Xcel Energy acquires a right-of-way for transmission lines that is sufficient to maintain these clearances. Displacement can occur when an existing structure is located within the right-of-way for a new transmission facility. The transmission line will be designed so that all existing residences are located outside of the right-of-way. The proposed Project will not require displacement of occupied residences.

**Mitigative Measures**

It is not anticipated that any buildings or residences will be displaced by the Project. Therefore, no mitigative measures are proposed. Xcel Energy will work with landowners where buildings or residences are near the proposed structures to ensure appropriate placement of such structures.

### 6.2.4 Noise

Transmission conductors produce noise under certain conditions. The level of noise depends on conductor conditions, voltage level and weather conditions. Generally, activity-related noise levels during the operation and maintenance of substations and transmission lines are minimal.

Noise emissions from a transmission line occur during certain weather conditions. In foggy, damp, or rainy weather, power lines can create a crackling sound when a small amount of electricity ionizes 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. During light rain, dense fog, snow, and other times when there is moisture in the air, transmission lines can produce noise. Noise levels produced by a 115 kV transmission line are generally less than outdoor background levels and are therefore not usually audible. At substations, the source of noise is primarily the transformers, which can create a humming noise.

Since 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 decibels ("dBA"). 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 11** shows noise levels associated with common, everyday activities.

**Table 11**

**Common Noise Sources and Levels**

| Noise Source [a] | Sound Pressure Level (dBA) |
|---|---|
| Jet Engine (at 25 meters) | 140 |
| Jet Aircraft (at 100 meters) | 130 |
| Rock Concert | 120 |
| Pneumatic Chipper | 110 |
| Jackhammer (at 1 meter) | 100 |
| Chainsaw. Lawn Mower (at 1 meter) | 90 |
| Heavy Truck Traffic | 80 |
| Business Office, Vacuum Cleaner | 70 |
| Conversational Speech, Typical TV Volume | 60 |
| Library | 50 |
| Bedroom | 40 |
| Secluded Woods | 30 |
| Whisper | 10 |

[a] *A Guide to Noise Control in Minnesota Acoustical Properties, Measurement, Analysis and Regulation*, Minnesota Pollution Control Agency, 2008.

In Minnesota, statistical sound levels ("L" or Level Descriptors) are used to evaluate noise levels and identify noise impacts. 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 within an hour, while $L_{10}$ may be exceeded 10 percent of the time within an hour.

Land areas, such as picnic areas, churches, or commercial spaces, are assigned to an activity category based on the type of activities or use occurring in the area. Activity categories are then categorized based on their sensitivity to traffic noise. The Noise Area Classification ("NAC" list 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.

**Table 12** identifies the established daytime and nighttime noise standards by NAC.

**Table 12**

**Noise Standards by Noise Area Classification**

| | Daytime Noise Standard | | Nighttime Noise Standard | |
|---|---|---|---|---|
| Noise Area Classification | $L_{50}$ (dBA) | $L_{10}$ (dBA) | $L_{50}$ (dBA) | $L_{10}$ (dBA) |
| 1 | 60 | 65 | 50 | 55 |
| 2 | 65 | 70 | 65 | 70 |
| 3 | 75 | 80 | 75 | 80 |

The noise levels from the proposed 115 kV transmission line with distribution underbuild are expected to be only slightly higher than the existing distribution lines in the Project location. Therefore, noise levels from the new 115 kV transmission line and distribution underbuild should not be noticeably greater than existing levels.

At substations, the source of noise is primarily the transformers, which can create a humming noise. The nearest occupied structures to the substations and Structure 39 include a residence located approximately 325 feet to the northwest of the Mayhew Lake Substation, residences located approximately 350 feet northeast of the Granite City Substation, and a business located approximately 350 feet to the southeast of Structure 39. It is very unlikely that substation noise will be audible at these homes or businesses.

The proposed transmission lines were modeled using the Bonneville Power Administration CFI8X model to evaluate audible noise from transmission lines. Where possible, the model was executed as a worst-case scenario benchmark, to ensure that noise was not under-predicted. **Table 13** presents the $L_5$ and $L_{50}$ noise levels predicted for proposed transmission line structures and voltages for the Project.

**Table 13**

**Calculated Audible Noise (dBA) for Proposed Single/Double Transmission Line Designs (3.28 feet above ground)**

| Structure Type | Noise $L_5$ (Edge of Right-of-Way) (Decibels a weighted) | Noise $L_{50}$ (Edge of Right-of-Way) (Decibels a weighted) |
|---|---|---|
| Single Pole Davit Arm 115 kV Single Circuit Delta Configuration | 12.6 | 9.1 |
| Single Pole Davit Arm 115 kV Single Circuit Vertical Configuration | 18.0 | 14.5 |
| Single Pole Davit Arm 115 kV/115 kV Double Circuit | 23.0 | 19.5 |
| H-Frame Structure 115 kV Horizontal Configuration | 16.7 | 13.2 |

The noise generated from the transmission lines is not expected to exceed background noise levels and will, therefore, not be audible at any receptor location. Transmission conductors and transformers at substations can produce noise when it is foggy, damp, or rainy, including a subtle cracking or humming noise. Any audible noise will be well below the MPCA noise standards established for NAC 1, as shown in **Tables 12** and **13** above.

The transmission lines and substations are designed and constructed to comply with state noise standards established by the Minnesota Pollution Control Agency ("MPCA").

**Mitigative Measures**

Transmission line noise levels are not expected to exceed the MPCA noise standards outside the right-of-way for all NACs. Likewise, substation noise will not exceed applicable limits, including the MPCA noise limits. Therefore, no mitigation is required for the audible noise generated by the proposed transmission lines or modifications to existing substations and transmission Structure 39.

### 6.2.5 Television and Radio Interference

Corona from transmission line conductors can generate electromagnetic "noise" at the same frequencies that radio and television signals are transmitted. This noise can cause interference with the reception of these signals depending on the frequency and strength of the radio and television signal. Tightening loose hardware on the transmission line usually resolves the problem.

If radio interference from transmission line corona does occur, satisfactory reception from AM radio stations presently providing good reception can be obtained by appropriately modifying (or adding to) the receiving antenna system. Moreover, AM radio frequency interference typically occurs immediately under a transmission line and dissipates rapidly within the right-of-way to either side.

FM radio receivers do not usually pick up interference from transmission lines because:

- corona-generated radio frequency noise currents decrease in magnitude as the frequency increases and are quite small in the FM broadcast band (88-108 Megahertz); and

- the excellent interference rejection properties inherent in FM radio systems make them virtually immune to amplitude-type disturbances.

A two-way mobile radio located immediately adjacent to and behind a large metallic structure (such as a steel tower) may experience interference. Moving either mobile radio so that the metallic structure is not immediately between the two units should restore communications. This will generally require a movement of less than 50 feet by the mobile radio adjacent to the metallic tower.

Television interference is rare but may occur when a large transmission structure is aligned between the receiver and a weak distant signal, creating a shadow effect. Loose or damaged hardware may also cause television interference.

Digital reception is, in most cases, considerably more tolerant of electric interference and somewhat less resistant to multipath reflections. In the digital realm, the picture does not gradually degrade; rather, at what is called the "avalanche point," the picture suddenly pixelates (turns into squares) and usually "freezes."

If the interference is due to the power line, the electric utility will remedy problems so that reception is restored to its original quality. Generally, the problem is resolved by moving or raising or adjusting the customer's antenna. In some instances, a more effective antenna or a signal amplifier is required.

**Mitigative Measures**

No impacts are anticipated from the proposed Project. However, if radio or television interference occurs because of the transmission line, Xcel Energy will work with the affected parties to restore reception to pre-Project quality.

### 6.2.6 Aesthetics

The 115 kV single circuit braced post and 115 kV single circuit davit arm with distribution underbuild poles will either be wood, galvanized steel or weathering-steel structures. These structure types will be 70 to 90 feet in height. The 115/115 kV double circuit davit arm structures will be 75 to 105 feet in height.

Because the Proposed Route mainly follows an existing distribution line along the east side of U.S. Highway 10, the Project will have a moderate effect on the visual and aesthetic character of the area. The proposed structures for the 115 kV transmission line with distribution underbuild will be similar in design to existing Line 5509 located east of the Proposed Route. *See* **Figure 5**. In comparison to the existing distribution line, the proposed transmission line structures will be taller but they will be spaced comparable to the current distribution pole layout, where it exists. For the Proposed Route, approximately 1,700 feet of existing Line 5509 conductors and poles will be removed from its termination at the Granite City Substation to the intersection with East St. Germain Street to the east.

For a small portion of the Alternative Route, a wood or weathering steel double-circuit pole will be used and be 75 to 105 feet in height.

The span range for the poles will be 300 to 500 feet. Where the lines need to span longer distances, H-frame pole structures may be used in place of single pole structures. Larger spans will still keep the conductor within the right-of-way under blowout conditions. The usual right-of-way required for these types of structures is 75 feet wide. *See* Section 5.1.1 for diagrams of the transmission line structures.

There are existing Xcel Energy transmission lines within the viewshed in the Project location, including 115 kV Lines 5509, 0887, and 0899. *See* **Figure 2**. Similar to the existing transmission lines, the new single circuit and double circuit transmission lines will be visible to area residents. Land use within the Project location is primarily open; however, developed (e.g., commercial/industrial), agricultural (e.g., cultivated), and forested land uses are also present. The visual effect will depend largely on the perceptions of the observers. 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 within the Project location will limit the extent to which the new line and substation are viewed as a disruption it the area's scenic integrity.

**Mitigative Measures**

The transmission lines will be visible by some residents near the proposed Project. However, all routes maximize the use of existing transportation and utility corridors and avoid residences to the greatest extent practicable. Also, a large portion of the Project location is populated by existing, visible transmission and distribution lines that result in a visual impact and, therefore, the installation of new transmission facilities associated with the Project will incrementally increase visual impacts. For the Proposed Route, approximately 1,700 feet of existing Line 5509 conductors and poles will be removed, thus minimizing visual impacts at this location. Xcel Energy will work with landowners to identify concerns related to the transmission line aesthetics.

### 6.2.7 Socioeconomic Impacts

The per capita income of the Project location ranges between $21,130 in Minden Township (2000) and $50,587 in Benton County (2008). Compared to the state or county average, the Project location does not contain disproportionately high minority or low-income populations. No disproportionate impacts on minority or low-income populations are anticipated. Persons living in Benton County have a slightly lower median family income when compared with the rest of the state. The percentage of homes with income levels below the federal poverty line is approximately 30 percent less than the national average, but slightly higher than the state average. Population and economic data is provided in **Table 14**.

**Table 14**

**Population and Economic Characteristics of the Project Location**

| Location | Population | Minority Population (percent) | Caucasian Population (percent) | Per Capita Income (U.S. dollars) | Percentage of Population Below Poverty Level (families) |
|---|---|---|---|---|---|
| State of Minnesota [a] | 5,266,214 | 10.9 | 89.0 | 57,318 | 9.6 |
| Benton County [a] | 40,193 | 5.1 | 94.9 | 50,587 | 10.2 |
| Sauk Rapids Township [c] | 723 | 1.7 | 98.3 | 24,421 | 3.4 |
| Minden Township [d] | 1,790 | 1.2 | 98.8 | 21,130 | 2.7 |
| City of Sauk Rapids [b] | 10,213 | 2.5 | 97.1 | 45,857 | 2.8 |

[a] U.S. Census Bureau, 2010.
[b] U.S. Census Bureau, 2000a.
[c] U.S. Census Bureau, 2000b.
[d] U.S. Census Bureau, 2000c.

Approximately 15 to 25 workers will be needed over 26 weeks to construct the proposed transmission line. During construction, construction crews will spend money locally, thereby providing a small economic benefit to the community.

There will be short-term impacts on community services as a result of construction activity and an influx of contractor employees during construction of the various segments of the Project. Both utility personnel and contractors will be used for construction activities. The communities near the Project should experience short-term positive economic impacts through the use of the hotels, restaurants, and other services by the various workers.

It is not expected that additional permanent jobs will be created the Project. The construction activities will provide a seasonal influx of additional dollars into the communities during the construction phase, and materials such as concrete may be purchased from local vendors.

Once the Project is operational, its socioeconomic effects are generally positive because it will provide a more stable and reliable supply of electricity, encourage economic development, provide for future growth, and increase the local tax base resulting from the incremental increase in revenues from utility property taxes.

Socioeconomic impacts resulting from the Project will be primarily positive with an influx of wages and expenditures made at local businesses during the Project, increased tax revenue and increased opportunities for business development.

**Mitigative Measures**

Xcel Energy does not anticipate any adverse socioeconomic impacts from the Project. Therefore, no mitigative measures are proposed.

### 6.2.8 Cultural Values

Cultural values are the history and beliefs of the area that provide a framework for community unity. The region surrounding the Project primarily depends on agricultural practices (typically corn, soybeans, and grazing), with some manufacturing and tourism, as well as education and residential uses. Local community ties relate to work, worship, celebration, and recreation. Based on the City of Sauk Rapids' Comprehensive Plan (2005), examples of area culture and industry include the Rapids Food Fest, a farmer's market, Miss Sauk Rapids Pageant, Festival of Bands Parade, Benton County Fair, Sauk Rapids-Rice Alumni Association Event, and stock car racing events at the Golden Spike Speedway. Construction of the proposed Project is not expected to conflict with the cultural values along the route. No impacts on cultural values are anticipated.

**Mitigative Measures**

Because the proposed Project avoids or minimizes land uses associated with cultural values, no impacts are anticipated and, therefore, no mitigative measures are proposed.

### 6.2.9 Recreation

Within the Project location, there are community parks and playgrounds associated with residential developments (*see* **Figures B-13 and B-16** in **Appendix B**). However, the proposed Project avoids crossing these areas. Adjacent to the Project, and separated by and west of U.S. Highway 10, is the Bob Cross Park and Nature Preserve and the Sauk Rapids Rice Middle School. Located approximately ½ mile east of the Project is the Mayhew Creek Park and the Sauk Rapids Senior High School.

According to the City of Sauk Rapids website, several park, hiking and biking trail facilities are planned near or within the Project location (City of Sauk Rapids, 2004) (*see* **Figure B-16** in **Appendix B**). The small unnamed streams within the Project location are not known to be used for designated recreational activities such as boating or fishing.

Direct impacts on existing recreational opportunities within the Project location will be avoided because the proposed routes will not cross these areas and they are collocated with existing transmission facilities and major public road rights-of-way for the majority of the routes. However, indirect and temporary impacts such as visual and noise impacts will occur during the time of construction, which is expected to only extend for approximately two months.

The timing of creating the future park and hiking and biking trails is unknown. However, Xcel Energy has been, and will continue to be, in contact with Benton County Community Development staff to identify if the proposed Project may impact these areas.

**Mitigative Measures**

Xcel Energy has proposed routes to avoid or minimize any impacts on the recreational facilities in the vicinity of the Project. Because the proposed routes will not directly affect recreational areas, no mitigative measures are proposed.

### 6.2.10 Public Services

Public services in the Project location include sewer and water services and existing and future transportation corridors and projects. In the City of Sauk Rapids, water and sewer services are provided by city-owned wells and wastewater treatment facilities. Outside the city boundaries, water is obtained from wells, and wastewater is treated with individual septic treatment systems.

During meetings with MnDOT and Benton County representatives (*see* Section 8.3), several proposed highway projects were identified within the vicinity of the Project. These include an interchange at County Highway 3/Golden Spike Road NE and U.S. Highway 10, modifications at the Benton Avenue/5$^{th}$ Street crossing over U.S. Highway 10, and the possible expansion of CR 29.

The proposed transmission line will be constructed before the interchange and modification projects, whose schedules are unknown (possibly sometime in the next 10 to 20 years). The use of the proposed future corridor for these interchanges and modifications were considered during the selection of the proposed Project routes.

**Mitigative Measures**

Because the proposed routes will not directly affect public services, no mitigative measures are proposed.

## 6.3 Land-Based Economics

### 6.3.1 Agriculture

Over 70 percent of the land in Benton County is in agricultural production, according to the USDA 2007 Census of Agriculture (USDA, 2007). The primary crops in Benton County are corn for grain (41 percent), soybeans for beans (23 percent), forage (hay fields, grass silage, greenchop) (19 percent), corn for silage (15 percent), and oats for grain (2 percent). The primary livestock are broiler chickens (95 percent), with some cattle (3 percent), hogs and pigs (2 percent), and layers (less than 1 percent). The market value of crop sales increased 29 percent between 2002 and 2007, although the number of farms and land dedicated to farming has decreased 5 percent during that same period.

While Benton County is primarily agricultural, the majority of the Project location is located outside of actively cultivated tracts, particularly the southern portion of the Project location, which is dominated by commercial, industrial, and residential areas, and the undeveloped area along County Ditch 3, which is comprised of forest land and wetlands (*see* Section 6.5.4).

Federal regulations define prime farmland as "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops and is available for these uses" (7 C.F.R. 657.5(a)(1)). Soils are classified as prime farmland, prime farmland if drained, prime farmland if protected from flooding, and farmland of statewide importance.

Under current drainage conditions, approximately 30 percent of the acreage affected by the Project is considered prime farmland or farmland of statewide importance. An additional 13 percent of the land affected by the Project is considered prime farmland if drained (USDA, Natural Resources Conservation Service, 2008).

**Table 15** identifies the farmland types associated with the Proposed Route.

**Table 15**

**Farmland within the Proposed Route**

| Farmland Type | Area (acres) [a] | Percent of Total Route Area (%) |
|---|---|---|
| Prime Farmland | 10.9 | 26 |
| Prime Farmland if Drained | 5.6 | 13 |
| Statewide Importance | 1.9 | 4 |
| Total | 18.4 | 43 |

[a] Assumes an approximately 75-foot-wide right-of-way easement.
Source: U.S. Department of Agriculture, Natural Resources Conservation Service, 2008

Permanent effects on agricultural land can include loss of land due to structure placement. Temporary impacts during construction may include soil compaction, disruption of agricultural practices (e.g., drain tile), and crop damage within the right-of-way. Construction of the new transmission structures and removal of existing structures will require repeated access to structure locations to install foundations, structures, and conductors. Equipment used in this 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.

**Mitigative Measures**

Landowners will be compensated for the use of their land through easement payments. To minimize loss of farmland and to ensure reasonable access to the land near transmission structures, when possible Xcel Energy intends to place the structures on private property approximately 5 feet away from, and overhang, the road right-of-way.

When possible, an attempt will be made to construct the transmission line before crops are planted or following harvest to avoid crop damage. Landowners will be compensated for crop damage and soil compaction that occurs as a result of the Project. Soil compaction will be addressed by compensating the farmer to repair the ground or by using contractors to chisel-plow the impacted site.

To further minimize agricultural impacts, springtime construction will be avoided to the extent possible. However, if construction during springtime is necessary, disturbance to farm soil from access to each structure location will be minimized by using the shortest reasonable access route. This may require construction of temporary driveways between the roadway and the structure but will limit traffic on fields between structures. Construction mats may also be used to minimize impacts on the access paths and in construction areas.

### 6.3.2 Forestry

There are no federal, state, or locally designated forests or commercial logging operations located within the Project location. *See* **Figure B-12** in **Appendix B**. While Benton County as a whole is

mostly agricultural land, the majority of the land adjacent to the proposed Project routes is developed land (*see* **Figures B-12 and B-13** in **Appendix B**). There is no forest production in the Project location.

Historically, the areas along the proposed Project have experienced a large decrease in natural forest, particularly a reduction in bur and northern pin oak trees. The majority of trees present within the vicinity of the routes are associated with the Mississippi River, unnamed streams, and residential and commercial landscaping, with occasional small wooded uplands.

**Mitigative Measures**

No substantial forest or commercial logging impacts are expected; therefore, no mitigative measures have been proposed. No impacts are anticipated and therefore no mitigative measures are proposed.

### 6.3.3 Tourism

The Benton County Fair, other miscellaneous fairground events, various parks located along the Mississippi River, and the Golden Spike Raceway represent the major tourism resources in the general vicinity of the Project. All of these resources are located outside of the Project location. The Benton County fairgrounds are located over ½ mile west of the Project, the nearest park along the Mississippi River (Wilson Park) is located approximately one mile west of the Project, and the Golden Spike Raceway is located over one mile east of the Project. Due to the respective distances away from the proposed Project, effects to these tourism resources can easily be avoided during construction and operation or the proposed transmission line.

**Mitigative Measures**

No effects on tourism are anticipated from the Project; therefore, no mitigative measures are proposed.

### 6.3.4 Mining

According to USGS topographic maps, Gazetteers, and site visits, there are gravel pits, rock quarries, and commercial aggregate sources located within the Project location. These sources can easily be avoided during detailed design and construction of the proposed transmission line. Because no existing gravel, rock, and aggregate resources are being utilized within the Project location, no impacts are anticipated. Unknown resources that may exist in the Project location will be situated in close proximity to existing utility and roadway right-of-way, making development unlikely.

**Mitigative Measures**

No effects on mining are expected from the Project; therefore, no mitigative measures are proposed.

## 6.4 Archaeological and Historic Resources

On behalf of Xcel Energy, Merjent, Inc. conducted Phase Ia background research/literature review for the Project in May of 2010 (*see* **Appendix E**). Merjent visited the Minnesota State Historic

Preservation Office ("SHPO"), and examined the Minnesota Archaeological Site Files, the Minnesota Architectural History Site Files, and cultural resources investigation reports on file. Merjent also requested a database file search from the SHPO, which was delivered by email. Online resources were used to view primary sources such as original land survey maps, patent records, and historic aerial photographs.

Twelve cultural resource sites are located within 0.5 mile of the Project, including four archaeological sites, one unverified archaeological site lead, five standing structures, and two properties listed or eligible for listing on the NRHP. The NRHP sites include the Leonard Robinson House, which is listed on the NRHP, and the Great Northern Railroad line, which has been determined eligible for listing on the NRHP. The historic character of these two properties will not be affected by the proposed Project. The Phase Ia background research revealed that no archaeological site or inventoried standing structure is recorded within the immediate Project location.

The potential to impact any undiscovered archaeological site is low to very low because the Project is proposed to be located along existing transportation and utility corridors, or it is in areas already disturbed by residential and commercial development. Also there are no lakes, or perennial rivers or streams in the proposed Project location, all high potential locations for discovery of prehistoric archaeological sites.

Consultation letters were also sent to the Benton County Historical Society and the City of St. Cloud Historic Preservation Commission (*see* **Appendix C.6**). The letters introduced the Project and invited comments regarding any effects the Project might have to historic properties.

In a letter dated August 2, 2010, the Minnesota SHPO commented on the proposed Project and Phase Ia literature review report (*see* **Appendix E**). The Minnesota SHPO stated that it is premature to conclude that no survey work will be required, and indicated that Xcel Energy should consult with the Minnesota SHPO once a Project route has been finalized. Xcel Energy is currently working with the Minnesota SHPO to determine the appropriate next steps for the Project.

**Mitigative Measures**

No mitigative measures are indicated for cultural resources within the Project location. No property listed or eligible for listing on the NRHP or the Minnesota Register of Historic Sites is within the Project location. As stated above, the Phase Ia report and its recommendations have been reviewed by the Minnesota SHPO. After a definitive route is determined, Xcel Energy will consult as necessary with the Minnesota SHPO to determine if avoidance or mitigative measures will be necessary to prevent impacts to historic properties.

If there is an unanticipated discovery of cultural resources during Project construction, Xcel Energy will stop construction activities and consult with a professional archaeologist and Minnesota SHPO to determine the proper course of action. If a cultural item or feature is determined to be potentially eligible for listing on the NRHP, it will be avoided or mitigated before construction resumes.

## 6.5 Natural Environment

### 6.5.1 Air Quality

Potential air quality effects related to transmission facilities include fugitive dust emissions during construction, exhaust emissions from construction equipment, and ozone generation during transmission line operation (Jackson et al., 1994). All of these potential effects are considered to be relatively minor, and all but the ozone effects are short-term.

State and federal governments currently regulate permissible concentrations of ozone and nitrogen oxides. Ozone forms in the atmosphere when nitrogen oxides and volatile organic compounds react in the presence of heat and sunlight. Air pollution from cars, trucks, power plants, and solvents contribute to the concentration of ground-level ozone through these reactions. Currently, both state and federal governments regulate permissible concentrations of ozone and nitrogen oxides. The national standard is 0.075 parts per million ("ppm") during an 8-hour averaging period. The state standard is 0.08 ppm based upon the fourth-highest 8-hour daily maximum average in one year.

The only potential air emissions from a transmission line result from corona, and such emissions are limited. Corona consists of the breakdown or ionization of air within a few centimeters immediately surrounding conductors and can produce ozone and oxides of nitrogen in the air surrounding the conductor. This process is limited because the conductor electrical gradient of a 115 kV transmission line is usually less than that necessary for the air to break down. Typically, some imperfection such as a scratch on the conductor or a water droplet is necessary to cause corona.

Ozone is not only produced by corona, but also 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, humidity (or moisture), the same factor that increases corona discharges from transmission lines, inhibits the production of ozone. Ozone is a reactive form of oxygen and combines readily with other elements and compounds in the atmosphere. Because of its reactivity, it is relatively short-lived. There are currently no non-attainment areas designated in Minnesota (U.S. Environmental Protection Agency, 2010).

During construction of the proposed transmission line, minor emissions from vehicles and other construction equipment and fugitive dust from right-of-way clearing will occur, but will be limited. Air-quality impacts during the construction phase will also be temporary.

The magnitude of construction emissions is heavily influenced by weather conditions and the specific construction activity. Exhaust emissions, primarily from diesel equipment, will vary according to the phase of construction, but will be minimal and temporary. Adverse impacts on the surrounding environment will be minimal because of the short and intermittent nature of the emission and dust-producing construction phases.

**Mitigative Measures**

Xcel Energy will employ BMPs to minimize the amount of fugitive dust created by the construction process. Tracking control at access roads and wetting surfaces are examples of BMPs that will be

used to minimize fugitive dust. Based upon this, Xcel Energy anticipates no significant effects to air quality from the Project; therefore, no mitigative measures are proposed.

### 6.5.2 Water Quality

The water resources located in the Project location are identified on **Figure B-15** in **Appendix B**. Impacts on water quality resulting from ground disturbance (e.g., excavating, grading, traffic) are limited to the construction phase of the Project, when sediment could possibly reach surface waters.

**Mitigative Measures**

No significant impacts are anticipated for water quality from the Project. Xcel Energy will design the Project to avoid and minimize wetland impacts, and will apply erosion control measures and BMPs. Implementation of BMPs to prevent water quality impacts and the construction, restoration, and maintenance of the transmission line are discussed in Sections 5.1.4 and 5.1.5. During construction, the Xcel Energy will control operations to minimize and prevent material discharge to surface waters. If materials do enter streams, they will be promptly removed and properly disposed of to the extent feasible. Disturbed surface soils will be stabilized at the completion of the construction process to minimize the potential for subsequent effects on surface water quality.

### 6.5.3 Minnesota Public Waters Inventory

The MnDNR Public Waters Inventory ("PWI") identifies lakes, wetlands, and watercourses over which the MnDNR has regulatory jurisdiction. The statutory definition of public waters can be found in Minn. Stat. § 103G.005, subd. 15 and 15a. A MnDNR License to Cross Public Waters is required for designated PWI crossings; however, none of the proposed Project routes cross any PWI watercourses (MnDNR, 2010d).

**Mitigative Measures**

No work in public waters or direct impacts on surface water resources are anticipated. Therefore, no Public Waters Work Permit is required from the MnDNR under Minn. Stat. § 103G.2455, subd. 1. Xcel Energy is required to obtain a License to Cross Public Lands and Waters from the MnDNR Division of Lands and Minerals if the proposed transmission line passes over, under, or across any state land or public waters, under Minn. Stat. § 84.415. This license will include specific mitigation required for each PWI crossing. Currently, no impacts are anticipated; therefore, no MnDNR permit will be required and no other mitigative measures are proposed.

### 6.5.4 Wetlands

Wetland locations were initially identified using the U.S. Fish and Wildlife Service ("USFWS") National Wetland Inventory ("NWI") maps and then verified during the route selection process. *See* **Figure B-15** in **Appendix B**. Wetland types range from temporarily flooded basins to riverine wetlands. In addition to the wetlands described below, there are streams and other waterways that cross farms and other parts of the Project location. To the extent practicable, the Project design will incorporate spacing of structures to span wetlands and waterways to avoid or minimize effects.

The Proposed Route will cross a total of 0.9 mile of wetland. Of the wetlands crossed by the Proposed Route, the USFWS' Cowardin Classification System (1979) classifies the majority as

Palustrine Emergent Seasonally Flooded. These areas are typically within a wetland complex and are often used as pasture areas for livestock. Other wetland types include Palustrine Shrub-Scrub Broad-leaved Deciduous Seasonally Flooded, Palustrine Forested Broad-leaved Deciduous Seasonally Flooded, and Palustrine Unconsolidated Bottom Semipermanently Flooded. Palustrine Shrub-Scrub wetlands are most commonly dominated by woody vegetation less than 20 feet tall such as true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions (USFWS, 1979). Palustrine Forested wetlands are characterized by woody vegetation that is approximately 19 feet tall or taller and normally possess an overstory of trees, an understory of young trees or shrubs, and an herbaceous layer (USFWS, 1979). Palustrine Unconsolidated Bottom wetland is typically characterized by nearly permanent open water (a vegetative cover less than 30 percent) that is free of vegetation throughout the non-growing season.

**Figure B-15** in **Appendix B** shows wetland locations and **Table 16** summarizes the wetlands located within the 75-foot-wide easement and 400-foot-wide route width associated with the Proposed Route.

**Table 16**

**Wetlands within the Proposed Route**

| Township | Range | Section | Wetland Type [a] | Wetland Area (acres) |
|---|---|---|---|---|
| Wetlands Within 75-foot-wide Easement | | | | |
| 36 | 31 | 14 | PFO/SS | 0.5 |
| 36 | 31 | 14 | PEM | <0.1 |
| 36 | 31 | 24 | PEM | 0.4 |
| 36 | 31 | 25 | PEM/SS | 2.3 |
| 36 | 31 | 25 | PUB | <0.1 |
| 36 | 31 | 25 | PEM | 0.5 |
| 36 | 30 | 30 | PEM | 0.3 |
| 36 | 30 | 30 | PEM/SS | 0.8 |
| 36 | 30 | 31 | PEM | 1.7 |
| 36 | 30 | 31 | PEM/SS | 0.6 |
| 36 | 30 | 31 | PEM | 1.2 |
| | | | Subtotal | 8.3 |
| Wetlands Within 400-foot-wide Route Width | | | | |
| 36 | 31 | 11 | PUB/F | 0.4 |
| 36 | 31 | 14 | PFO/SS | 4.5 |
| 36 | 31 | 14 | PEM | 0.3 |
| 36 | 31 | 14 | PEM | 0.8 |
| 36 | 31 | 13 | PUB | 0.6 |
| 36 | 31 | 24 | PEM | 0.9 |
| 36 | 31 | 24 | PEM | 1.5 |
| 36 | 31 | 25 | PEM/SS | 8.7 |

| Township | Range | Section | Wetland Type [a] | Wetland Area (acres) |
|---|---|---|---|---|
| 36 | 31 | 25 | PUB | 0.1 |
| 36 | 31 | 25 | PEM/SS | 0.9 |
| 36 | 31 | 25 | PEM | 1.9 |
| 36 | 30 | 30 | PEM | 1.7 |
| 36 | 30 | 30 | PEM/SS | 3.5 |
| 36 | 30 | 31 | PEM | 8.6 |
| 36 | 30 | 31 | PSS | 0.3 |
| 36 | 30 | 31 | PEM/SS | 3.1 |
| 36 | 30 | 31 | PEM | 4.9 |
| | | | Subtotal | 42.7 |

[a] Based on the USFWS' Cowardin Classification System for wetlands. Wetland types include: PEM – Palustrine Emergent, PFO Palustrine Forested Broad-leaved Deciduous, PSS – Palustrine Shrub-Scrub Broad-leaved Deciduous, PUBF – Palustrine Unconsolidated Bottom.

Approximately 8.3 acres of wetlands are located within the 75-foot-wide easement area and 42.7 acres of wetlands are located within the 400-foot-wide route width of the Proposed Route. Because the proposed transmission line easement will be 75-foot-wide, potential impacts to wetlands will be limited to the area where the structures and line will be constructed and operated. Therefore, wetland impacts are anticipated to be much less than the wetland areas indicated in **Table 16**. The location of the transmission structures has yet to be determined.

Similar to the Proposed Route, the USFWS' Cowardin System classifies the majority of wetlands affected by the Alternative Route and Route Segments A and B as Palustrine Emergent Seasonally Flooded or wet meadows. Other wetland types affected by the Alternative Route include Palustrine Shrub-Scrub Broad-leaved Deciduous Seasonally Flooded, Palustrine Forested Broad-leaved Deciduous Seasonally Flooded, and Palustrine Unconsolidated Bottom Semipermanently Flooded. **Figure B-15** in **Appendix B** shows wetland locations. Within the 75-foot-wide easement area, approximately 8.2 acres of wetlands within the Proposed Route with Route Segment A incorporated, approximately 10.2 acres of wetlands are located within the Proposed Route with Route Segment B incorporated, and approximately 10.1 acres of wetlands are located within the Proposed Route with Route Segments A and B incorporated. Approximately 9.3 acres of wetlands are located within the 75-foot-wide easement area of the Alternative Route. For similar reasons noted above, within the Alternative Route and Route Segments A and B, wetland impacts are anticipated to be much less than the area of wetlands located within the easement area.

It appears the wetlands crossed by the Proposed and Alternative Routes are jurisdictional to the U.S. Army Corps of Engineers ("ACOE") under Section 404 of the Clean Water Act. Once the route is finalized and permitting requirements determined, Xcel Energy will submit the Minnesota Local/State/Federal Application Form for Water/Wetland Projects to the ACOE's St. Paul District, MnDNR, and Benton County Soil and Water Conservation District ("SWCD"), if needed. Xcel Energy anticipates the Project will be authorized under the ACOE's General Permit ("GP")/Letter of Permission ("LOP") permitting program. Application materials will include information necessary for the ACOE to make its jurisdictional determination for impacted wetlands. The joint

application will also be subject to MnDNR and Benton County SWCD review and regulation under the Minnesota Wetland Conservation Act.

According to the Clean Water Act, Section 401 water quality certification is required for activities that may result in a discharge to waters of the United States. On non-tribal lands in Minnesota, the MPCA administers Section 401 water quality certification. If the ACOE authorizes the Project under its GP/LOP permitting program as expected, the MPCA waives its Section 401 Water Quality Certification authority.

**Mitigative Measures**

During construction, the most effective way to minimize impacts on wetland areas will be to span wetlands to the extent possible. In addition, crossing wetlands with equipment will be avoided except where necessary. Where wetlands must be crossed to pull in the new conductors and shield wires, workers may walk or drive equipment across ice in the winter. These construction practices will help prevent soil erosion and ensure that equipment fueling and lubricating will occur at a distance from wetlands. Xcel Energy will follow standard erosion control measures identified in the MPCA Stormwater BMP Manual, such as using silt fencing to minimize impacts on adjacent water resources.

Impacts on wetlands will be minimized through appropriate construction practices. Construction crews will maintain sound water and soil conservation practices during construction and operation of the facilities to protect topsoil and adjacent water resources and minimize soil erosion. Practices may include containing excavated material, protecting exposed soil, and stabilizing restored soil. Crews will avoid major disturbance of individual wetlands and drainage systems during construction. This will be accomplished by strategically locating new access roads and spanning wetlands and drainage systems where possible.

The Project design will incorporate spacing of structures to span wetlands and streams to the extent possible. However, it is possible that a few poles could be placed within wetlands; any necessary permits will be obtained after design is completed. When it is not feasible to span the wetland, construction crews will use several methods to minimize impacts:

- When possible, construction will be scheduled for when the ground is frozen;
- Crews will attempt to take the shortest route when they access the wetland;
- The structures will be assembled on upland areas before they are brought to the site for installation; and
- When construction during winter is not possible, construction mats will be used where wetlands will be affected.

If waters of the United States, as defined by the ACOE, or wetlands, as defined under the Minnesota Wetland Conservation Act, are affected, Xcel Energy will obtain the required permits.

### 6.5.5 Floodplain

Floodplain resources were identified for the Project using maps created by Federal Emergency Management Agency ("FEMA") (U.S. Department of Homeland Security, 2006). The proposed Project is not located within floodplains or floodways mapped by FEMA.

**Mitigative Measures**

Xcel Energy does not anticipate that the propose Project will affect floodplain resources.

During construction, sediment could possibly reach surface waters as ground is disturbed by excavation, grading, or construction traffic. A National Pollutant Discharge Elimination System ("NPDES") stormwater permit will be applied for, if necessary. In addition, standard erosion control measures identified in the MPCA Stormwater BMP Manual will be followed.

The BMPs may include using silt fences to minimize the potential for erosion and sedimentation into water bodies within the Project location. Xcel Energy will maintain sound water and soil conservation practices while building and operating the transmission line, to protect topsoil and adjacent water resources and to minimize soil erosion. Practices may include containing excavated material, protecting exposed soil, and stabilizing restored soil. With implementation of BMPs, the Project is not expected to affect water quality (i.e., fecal coliform or total suspended solids levels) within the watershed. Once the Project is completed, it will have no impact on surface water quality.

### 6.5.6 Flora

While Benton County as a whole is mostly agricultural land, the majority of the land adjacent to the proposed Project is developed land (*see* **Figures B-12 and B-13** in **Appendix B**). Other land uses adjacent to the routes include undeveloped open and herbaceous land, open pasture and hay fields, cultivated land containing row crops, and forest land. Row crops in the area primarily consist of corn and soybeans. Forest lands in the area primarily consist of deciduous forest types (e.g., maple, oak).

No known areas within the Project location are currently within the Conservation Reserve Program ("CRP"). The CRP program provides an opportunity to convert highly erodible cropland or environmentally sensitive area to permanent vegetative cover, such as grasses or trees. For a discussion on agriculture impacts, s*ee* Section 6.3.1.

In its August 19, 2010 letter, the MnDNR identified a Site of Moderate Biodiversity Significance containing a Native Plant Community, Prairie Rich Fen, and Wet Prairie in the Project location (*see* **Appendix C.1**). Of particular interest to the MnDNR is the Prairie Rich Fen, which is considered vulnerable to extirpation within Minnesota. Vegetation associated with Prairie Rich Fens include predominantly wiregrass sedge (*Carex lasiocarpa*), stiff reedgrass (*Calamagrostis stricta*), and Buxbaum's sedge (*Carex buxbaumii*).

The majority of trees within the Project location are near the Prairie Rich Fen area, or are associated with streams and residential and commercial landscaping, or with occasional small wooded uplands. Impacts on trees will be minimized to the extent possible through detailed Project design.

**Mitigative Measures**

Xcel Energy has selected the proposed Project routes to avoid occupied residences and associated trees as much as reasonably possible. In addition, during detailed design, where possible the new transmission line will be placed on the opposite side of the road from residences and to avoid existing trees where possible. To minimize impacts on trees, only trees located within the transmission line right-of-way will be removed, or those trees that will affect the safe operation of the line. Trees outside the right-of-way that may need to be removed will primarily include trees that are unstable and could potentially fall into the transmission facilities. Xcel Energy will work with landowners and businesses to modify the proposed construction area such that tree removal is avoided to the extent possible.

Mitigation to avoid impacts on the Prairie Rich Fen is discussed in Section 6.6.

### 6.5.7 Fauna

Wildlife within the Project location consists primarily of deer, small mammals, waterfowl, raptors, and perching birds (MnDNR, 2010e). These species are typically observed in areas that are primarily open and agricultural, with limited opportunities for nesting and cover. The MnDNR also identified American kestrels (raptors) and trumpeter swans in the Project location, as well as a threatened species and species of concern in the Project location. Threatened species and species of concern in the Project location are discussed further in Section 6.6.

The land use crossed by and within the vicinity of the proposed Project is predominantly commercial, industrial, or residential. The primary potential impact presented to fauna by transmission lines is the potential injury and death of migratory birds such as raptors, waterfowl, and other large bird species. The electrocution of large birds, such as raptors, is more commonly associated with small distribution lines than large transmission lines. Electrocution occurs when birds with large wingspans come in contact with two conductors or with a conductor and a grounding device. Xcel Energy transmission and distribution line design standards provide adequate spacing to eliminate the risk of raptor electrocution and will minimize potential avian impacts of the proposed Project.

Wildlife could also temporarily be displaced and small amounts of habitat could be lost from the Project location during construction. Wildlife that inhabits trees that may be removed during the Project, along with wildlife that inhabits other areas, will likely be temporarily displaced. Similar tree and agricultural habitats are found adjacent to the routes; therefore, it is likely that these species will only be displaced a short distance.

Xcel Energy also consulted with the MnDNR regarding Project impacts on wildlife in the vicinity of the Project. In a letter dated July 29, 2010, the MnDNR identified several avian species in the Project location, including red-tailed hawks, American kestrels, trumpeter swans, Canada geese, and sandhill cranes. *See* Section 8.1.3 and **Appendix C.8** for more information regarding this correspondence.

**Mitigative Measures**

Displacement of fauna is anticipated to be minor and temporary in nature, and no long-term population-level effects are anticipated. Xcel Energy has been working with various state and

federal agencies over the past 20 years to address avian issues as quickly and efficiently as possible. In 2002, Xcel Energy entered into a voluntary Memorandum of Understanding ("MOU") with the USFWS to work together to address avian issues throughout its service territories. This includes the development of Avian Protection Plans ("APP") for each state Xcel Energy serves: Minnesota, South Dakota, and North Dakota.

The primary methods Xcel Energy uses to address avian issues for transmission projects include:

- working with resource agencies to identify any areas that may require marking transmission line shield wires or using alternate structures to reduce collisions (resource agencies include the MnDNR, USFWS, and the ACOE); and

- attempting to avoid areas known as major flyways or migratory resting spots.

Xcel Energy's transmission line design standards provide adequate spacing to eliminate such risks, so it is unlikely that any birds will be electrocuted as a result of the proposed Project.

In addition to the mitigation Xcel Energy proposed above, the MnDNR has recommended several measures to avoid impacts on wooded wet swales, raptors, and waterfowl within the Project location (MnDNR, 2010f) (*see* **Appendix C.8**). These recommended MnDNR measures include the following:

- Avoid vegetation clearing to extent possible at the wooded swale near U.S. Highway 10/Benton Drive where red-tailed hawks are periodically present and provide the final alignments for MnDNR review and comment. Also, conduct vegetation clearing outside of the migratory bird nesting season between April to July;

- Siting the route to avoid tree and shrub removal at the wooded wet swale north and south of Golden Spike Road at the U.S. Highway 10 interchange, where an important wetland corridor exists;

- Attaching kestrel nest boxes to power poles, one every ½ mile, along U.S. Highway 10, particularly between Benton Drive and Golden Spike Road, where American kestrels are known to occur; and

- Incorporating swan flight diverters every 25 feet along the route and staggering them between the lines (assuming there are multiple lines) for trumpeter swans, Canada geese and sandhill cranes, three species identified in this area which area of particular concern to the MnDNR.

Although wildlife is present in the area and waterfowl of concern has been identified near the Mississippi River by the MnDNR, they are not likely to nest along the routes. Avian collisions are possible in areas where agricultural fields serve as feeding areas, as well as in wetlands and on open water. However, the Project location is dominated by existing transportation and utility corridors as well as other infrastructure (e.g., businesses, residences) and, therefore, these species are already acclimatized to human development. Xcel Energy is working with the MnDNR to determine appropriate and applicable mitigation measures to address these concerns regarding the Project

Mitigation measures specific to those species identified by the MnDNR as threatened or species of concern are also discussed in Section 6.6.

## 6.6 Rare and Unique Natural Resources

A request for a MnDNR Natural Heritage Information System ("NHIS") search and comments regarding rare species and natural communities for the Project was submitted to the MnDNR on June 29, 2010. The results of the MnDNR NHIS are included in **Appendix C.1**. The following assessment is based on MnDNR response, a review of the Natural Heritage Database that is licensed to Xcel Energy by the MnDNR, and other state and federal rare species and natural community information.

The MnDNR NHIS database was queried to obtain the locations of rare and unique natural resources across the Project location. Queries to the NHIS database often display species that either do not have a status or are of special concern (referred to as "SPC" in the tables below). Species or communities that do not have a status, or are classified as special concern, have no legal protection in Minnesota. Only potential impacts on non-aquatic species with legal protection (threatened and endangered) are discussed below.

Within one mile of the proposed Project routes, the NHIS database identified four rare and unique species, one animal assemblage, and one terrestrial community (MnDNR, 2010g). *See* **Figure B-17** in **Appendix B**. Species include the Blanding's turtle, Northern myotis (bat), Easter pipistrelle (bat), and cowbane (vascular plant). The Blanding's turtle is listed as threatened at the state level, while the other three species, assemblage, and terrestrial community are listed as special concern or not listed. The Blanding's turtle is typically found in wetland and upland habitats. **Table 17** summarizes the species found, their habitats, and their state status for the proposed Project.

**Table 17**

**Rare and Unique Resources within the Proposed Project**

| Common Name | Scientific Name | Number of Occurrences | Most Recent Occurrence | MN Status [b] | State Rank [b] | Habitat |
|---|---|---|---|---|---|---|
| Species [a] | | | | | | |
| Blanding's turtle | Emydoidea blandingii | 2 | 1990 | THR | S2 | Wetlands and Uplands |
| Northern myotis | Myotis septentrionalis | 1 | 1952 | SPC | S3 | Storm sewer |
| Eastern pipestrelle | Pipistrellus subflavus | 1 | 1952 | SPC | S3 | Storm sewer |
| Cowbane | Oxypolis rigidior | 1 | 2000 | NON | SNR | Undisturbed prairie |
| Animal Assemblage | | | | | | |
| Bat Colony | -- | 1 | 1992 | N/A | SNR | Storm sewer |
| Terrestrial Community | | | | | | |
| Native Plant Community, Prairie Rich Fen and Wet Prairie | -- | 1 | 1973 and 2000 | N/A | SNR, S2, S3 | Undisturbed prairie |

| Common Name | Scientific Name | Number of Occurrences | Most Recent Occurrence | MN Status [b] | State Rank [b] | Habitat |
|---|---|---|---|---|---|---|

[a] The incorporation of the Route Segments A and B into the Proposed Route or Route Segment A into the Alternative Route will not increase or decrease the number of species or their status listed in this table.

[b] At the state level, "THR" refers to species listed as threatened, "SPC" refers to species of special concern, "NON" refers to tracked but no legal status, and "N/A" refers to native plant communities, geological features, and/or colonial waterbird nesting sites that have no legal status. In addition, Minnesota also assigns a rank to listed species. This rank reflects the known extent and condition of that species. Ranks range from S1 (in greatest need of conservation action in the state) to S5 (secure under present conditions), and SNR (rank not yet assessed).

Wetlands will be avoided to the extent possible as discussed above in Section 6.5.4 and, therefore, the Blanding's turtle is unlikely to be affected. Although the majority of the Project location is developed land and agricultural, a few small fragments of native prairie are present as indicated by the native plant community, rich prairie fen, and wet prairie identified by the MnDNR.

Within one mile of the Alternative Route and Route Segment A, the NHIS database identified the same four rare and unique species, one animal assemblage, and one terrestrial community as the Proposed Route. *See* **Figure B-17** in **Appendix B**.

**Mitigative Measures**

To mitigate potential impacts on species occupying wetland communities, structures and poles will be placed so that the conductor spans waterbodies, watercourses, and wetlands to the extent possible. Sediment will be controlled so that it does not reach aquatic and wetland habitats.

To prevent impacts on the Blanding's turtle, to the extent possible and applicable, Xcel Energy intends to adopt the mitigation measures recommended by the MnDNR (2010f), which include, but are not limited to, the following:

- a flyer with an illustration of a Blanding's turtle will be given to all contractors working in the area. Homeowners will also be informed of the presence of Blanding's turtles in the area;
- turtles which are in imminent danger will be moved, by hand, out of harm's way. Turtles which are not in imminent danger will be left undisturbed;
- if a Blanding's turtle nest is in a yard, it will not be disturbed. Silt fencing will be set up to keep turtles out of construction areas. Silt fencing will be removed after the area has been revegetated;
- small, vegetated temporary wetlands (Types 2 & 3) will not be dredged, deepened, filled, or converted to storm water retention basins (these wetlands provide important habitat during spring and summer);
- wetlands will be protected from pollution; use of fertilizers and pesticides will be avoided, and run-off from lawns and streets will be controlled. Erosion will be prevented to keep sediment from reaching wetlands and lakes; and

- vegetation management in infrequently mowed areas, such as in ditches, along utility access roads, and under power lines, will be done mechanically (chemicals will not be used). Work will occur fall through spring (after October 1st and before June 1st).

Although not classified as protected by the state, Xcel Energy is also working with the MnDNR to avoid to the extent possible impacts to the Site of Moderate Biodiversity Significance associated with the Native Plant Community, Prairie Rich Fen, and Wet Prairie identified in the Project location. Mitigation measures may include the following:

- operate within already-disturbed areas;
- minimize vehicular disturbance in the area (allow only vehicles necessary for installation);
- inspect and clean all equipment prior to bringing it to the site to prevent the introduction and spread of exotic species;
- if possible, do work in autumn or winter, to avoid damaging plants during the growing season;
- reduce runoff by completing the work as rapidly as possible and using erosion control measures such as straw bales or silt fencing;
- revegetate disturbed soil with native species suitable to the local habitat as soon after construction as possible; and
- use only invasive-free mulches, topsoils, and seed mixes.

## 7.0 Comparison of the Proposed and Alternative Routes, and Route Segments A and B

The extent of the area used to compare the Proposed and Alternative Routes, and Route Segments A and B vary depending on the applicable siting factors, including:

i. aesthetics, cultural values, recreation, public services, forestry, tourism, mining, electrical system reliability, and fauna were identified within the Project location;

ii. rare and unique natural resources and archaeological and historic resources were identified within one mile of the route centerlines;

iii. air quality, water quality, route specific design issues and existing infrastructure were identified within the requested 400-foot route width;

iv. residences, noise, and public health and safety were identified within 200 feet of the route centerline; and

v. agriculture, public water crossings, wetlands, floodplains, and flora were identified within the 75-foot-wide easement width.

For each siting factor, the potential effect of the each route is briefly summarized or it was determined there was no effect for the factor.

There are no anticipated effects for several siting factors including: noise, displacement of residents, aesthetics, cultural values, recreation, tourism, public services, public health and safety, forestry, air quality, water quality, floodplains, flora and fauna, electrical system reliability, and loss of prime farmland. For other siting factors, the effects for the Proposed and Alternative Routes are similar, including: agriculture, archaeological resources, historic resources, and public water crossings.

The primary differences between the Proposed Route, Alternative Route, and Route Segments A and B are the effects on the following siting factors: route specific infrastructure, existing rights-of-way, residences, and wetland and forest crossings. Based on this analysis, the Proposed Route has fewer impacts compared to the Alternative Route as follows:

- The Proposed and Alternative Routes generally cross the same type of landscape in a predominantly developed and open setting. To minimize impacts on these land uses, the Proposed Route shares utility, road, and railroad corridors for 83 percent of the route, while the Alternative Route follows existing infrastructure for 71 percent of the route.

- The Proposed Route will encounter about 1,500 feet less wetland than the Alternative Route, and affect about 1 acre more of wetlands compared to the Alternative Route assuming a 75-foot-wide route width.

- The Proposed Route will cross approximately 1,270 feet fewer forest area than the Alternative Route.

- The Proposed Route will be within 200 feet of 16 residences, non-residential structures, and commercial buildings compared to 25 residences, non-residential structures, and commercial buidlings within 200 feet of the Alternative Route. Of these, five are residences within 200 feet of the Proposed Route and 11 are residences within 200 feet of the Alternative Route.

**Table 18** summarizes Xcel Energy's application of the factors set forth in Minn. R. 7850.4100 for the Proposed and Alternative Routes.

**Table 18**

**Summary of Proposed and Alternative Routes**

| Issue | Proposed Route | Alternative Route | Comparison of Routes [a] |
|---|---|---|---|
| Effects on Human Settlement | | | |
| Structures within 200 feet of the route centerline | 16 (includes residences, non-residential structures, and commercial buildings) | 25 (includes residences, non-residential structures, and commercial buildings) | Similar impact – features will be avoided |
| Displacement | No impact | No impact | Similar impact – none |
| Noise | No impact | No impact | Similar impact – none |
| Aesthetics | Viewshed will include transmission lines and poles | Viewshed will include transmission lines and poles | Similar impact |
| Cultural Values | No impact | No impact | Similar impact – none |
| Recreation | No impact | No impact | Similar impact – none |
| Public Services | No impact | No impact | Similar impact – none |
| Effects on Public Health and Safety | | | |
| Public Health and Safety | No impact from noise or EMF | No impact from noise or EMF | Similar impact – none |
| Effects on Land-based Economics | | | |
| Agriculture | Minimal impact; Project operation should not affect practices | Minimal impact; Project operation should not affect practices | Similar impact – short term |
| Forestry | No impact on forestry practices in Project location | No impact on forestry practices in Project location | Similar impact – none |
| Tourism | No impact on tourism | No impact on tourism | Similar impact – none |
| Mining | Gravel pits, rock quarries, etc. in the Project location | Gravel pits, rock quarries, etc. in the Project location | Similar impact – Features will be avoided. |
| Effects on Archaeological and Historic Resources | | | |
| Archaeological Resources | 12 within 0.5 mile; two listed on or eligible for NRHP | 12 within 0.5 mile; two listed on or eligible for NRHP | Sites are located within 0.5 mile of both routes but outside Project location |
| Historic Resources | 2 | 2 | Sites are located within a 1-mile buffer around the Project location |
| Effects on the Natural Environment | | | |
| Air Quality | No impact | No impact | Similar impact – none |
| Water Quality | No impact | No impact | Similar impact – none |
| Public Water Crossings | 3 crossings (no PWI) | 5 crossings (no PWI) | Similar impact; some waterbodies crossed multiple times |

| Issue | Proposed Route | Alternative Route | Comparison of Routes [a] |
|---|---|---|---|
| Wetlands | 0.9 mile of wetland spanned; 11 wetland crossings within 75-foot-wide easement | 1.1 mile of wetland spanned; 17 wetland crossings within 75-foot-wide easement | Similar impact |
| Floodplains | Located outside of mapped floodplain | Located outside of mapped floodplain | Similar impact – none |
| Flora | Developed land with few native species; open and herbaceous, pasture and hay fields, row crops (corn, soybeans), deciduous forest (e.g., maple, oak) | Developed land with few native species; open and herbaceous, pasture and hay fields, row crops (corn, soybeans), deciduous forest (e.g., maple, oak) | Similar impact; similar flora exists throughout Project location, however, Alternative Route encounters approximately 1,270 feet more forest land |
| Fauna | No impact | No impact | Similar impact; similar fauna exists throughout Project location |
| Rare and Unique Natural Resources | 1 Threatened, 2 Special Concern, 3 Other | 1 Threatened, 2 Special Concern, 3 Other | Similar impact; similar rare and unique species identified by MnDNR |
| Use of Existing Transportation, Pipeline, and Electrical Transmission Systems or Rights-of-Way | | | |
| Existing Transportation, Pipeline, and Electrical Transmission Systems or Rights-of-Way | Approximately 3.9 miles, or 83 percent of route | Approximately 3.9 miles, or 71 percent of route | Proposed Route will use a greater percent of existing utility or road rights-of-way |
| Electrical System Reliability | | | |
| Electrical System Reliability | Provides reliability to system | Provides reliability to system | Similar benefits |
| Cost of Constructing, Operating, and Maintaining the Facility That are Dependent on Design and Route | | | |
| Costs | $10 million for construction; $300-$500 per mile per year for maintenance | $10.5 million for construction; $300-$500 per mile per year for maintenance | Alternative Route construction cost is $500,000 more than Proposed Route |
| Adverse Human and Natural Environmental Effects That Cannot Be Avoided | | | |
| General | Pole placement, potentially resulting in wetland impacts and loss of prime farmland; potential need for tree removal | Pole placement, potentially resulting in wetland impacts and loss of prime farmland; potential need for tree removal | Similar impacts |
| Irreversible and Irretrievable Commitments of Resources | | | |
| General | Pole placement, potentially resulting in wetland impacts and loss of prime farmland; potential need for tree removal | Pole placement, potentially resulting in wetland impacts and loss of prime farmland; potential need for tree removal | Similar impacts |

[a] Incorporation of the Route Segments A and B into the Proposed Route or Route Segment A into the Alternative Route will result in similar comparative impacts.

# 8.0 Agency Involvement, Public Participation, and Required Permits and Approvals

## 8.1 Agency Contacts

### 8.1.1 Notice to Local Government Units

Xcel Energy provided a notification letter to the LGUs identified in **Table 2** on June 29, 2010. This notification letter identified that Xcel Energy intended to apply for a Route Permit for the Project from the Commission. The notification letter to the LGUs complies with the notice requirements of Minn. Stat. § 216E.03, subd. 3a. *See* **Appendix C.2** for the LGU mailing list and a copy of this letter. To date, Xcel Energy has received comments from the City of St. Cloud and Benton County Department of Development.

In an email dated July 6, 2010, the City of St. Cloud Community Development/Planning Director provided a future land use map and a map showing NWI, Minnesota County Biological Survey information, and St. Cloud's environmentally sensitive areas for Xcel Energy's consideration during Project planning (*see* **Appendix C.3**).

In an email dated July 15, 2010, the Benton County Wetlands/Solid Waste Lead requested additional information regarding the Project such as if the transmission line will be new and if any substation footprint expansions will be necessary (*see* **Appendix C.4**). Also, it was noted that the Project will likely impact wetlands and small streams. Xcel Energy subsequently met with the Benton County Wetlands/Solid Waste Lead on August 3, 2010. Section 8.3 further describes the meeting.

As discussed further in Section 8.3, Benton County requested that the originally proposed route near the U.S. Highway 10 and CR 29 intersection be altered to preserve the development potential of this area. Xcel Energy has subsequently adopted the requested alteration as part of its Proposed Route, which is presented within this Route Permit application. On February 15, 2011, the Benton County Board of Commissioners approved a resolution (#2011 - #7) in support of the Proposed Route (referred to as "Alternative Route" in the resolution) (*see* **Appendix C.5**).

On October 12, 2010, the City of Sauk Rapids approved a resolution (No. 2010-103) requesting that Xcel Energy modify its originally proposed route near the U.S. Highway 10 and CR 29 intersection due to the City of Sauk Rapid's belief that its proposed route would place less burden on private property owners while maintaining the future economic potential of the U.S. Highway 10 and CR 29 corridor and reducing the overall cost of the transmission line project (*see* **Appendix C.6**). Xcel Energy has subsequently adopted the requested alteration as part of its Proposed Route, which is presented within this Route Permit application. The City of Sauk Rapids also requested in its resolution that Xcel Energy work with the Benton County Engineer regarding the placement of the proposed lines near the east ramp of U.S. Highway l0 on CR 3 in consideration of potential future development of CR 3.

Related to the route alteration near the U.S. Highway 10 and CR 29 intersection in response to Benton County and the City of Sauk Rapids, a letter from the landowners at this location, Ron and Doreen Hodel, was forwarded to Xcel Energy by the City of Sauk Rapids. This letter is discussed further in Section 8.3.

Xcel Energy has had an opportunity to meet with other LGUs during meetings conducted in June and August 2010. These meetings are discussed further in Section 8.3.

### 8.1.2 Notice to Agencies and Interested Parties

Xcel Energy also provided a request for comment letter on June 29, 2010 to several non-LGU and interested parties associated with the Project (e.g., Historical Society, St. Cloud Regional Airport). The purpose of the letter was to provide these entities notice of Xcel Energy's plan to obtain a Route Permit from the MPUC and request for comments on the proposed Project. *See* **Appendix C.7** for the non-LGU mailing list and a copy of this letter.

To date, Xcel Energy has received comments from the MnDOT and MnDNR (*see* **Appendices C.8 and C.9,** respectively). Sections 8.1.3 and 8.3 discuss further correspondence and meetings with the MnDNR and MnDOT, respectively.

### 8.1.3 Minnesota Department of Natural Resources

Xcel Energy submitted two formal consultations to the MnDNR. The first letter was sent on June 29, 2010 and requested a review of the Minnesota NHIS to determine if rare plants, animals, and natural communities or other significant natural features are known to occur within the Project location (*see* also Section 6.6 above and **Appendix C.1**). The second letter was also sent on June 29, 2010 but requested general comments on the proposed Project.

On July 29, 2010, the MnDNR responded that the Proposed Route was acceptable and recommended several mitigation measures to avoid impacts on wooded wet swales, raptors, and waterfowl in the Project location (MnDNR, 2010f) (*see* **Appendix C.9**). These measures include the following:

- Avoid vegetation clearing to extent possible at the wooded swale near U.S. Highway 10/Benton Drive where red-tailed hawks are periodically present and provide the final alignments for MnDNR review and comment. Also, conduct vegetation clearing outside of the migratory bird nesting season between April to July;

- Siting the route to avoid tree and shrub removal at the wooded wet swale north and south of Golden Spike Road at the U.S. Highway 10 interchange, where an important wetland corridor exists;

- Attaching kestrel nest boxes to power poles, one every ½ mile, along U.S. Highway 10, particularly between Benton Drive and Golden Spike Road, where American kestrels are known to occur; and

- Incorporating swan flight diverters every 25 feet along the route and staggering them between the lines (assuming there are multiple lines).

Although wildlife is present in the area and waterfowl of concern has been identified near the Mississippi River by the MnDNR (i.e., trumpeter swans, Canada geese, sandhill cranes), they are not likely to nest along the routes. Avian collisions are possible in areas where agricultural fields serve as feeding areas, as well as in wetlands and on open water. However, the Project location is dominated

by existing transportation and utility corridors as well as other infrastructure (e.g., businesses, residences) and, therefore, these species are already acclimatized to human development.

In its August 19, 2010 NHIS response, the MnDNR identified four rare and unique species, one animal assemblage, and one terrestrial community within one mile of the Project (MnDNR, 2010g). As discussed in Section 6.6, the species include the threatened Blanding's turtle, special concern Northern myotis (bat), special concern Easter pipistrelle (bat), and non-listed cowbane (vascular plant). As discussed in Section 6.5.6, the MnDNR also identified a Site of Moderate Biodiversity Significance containing a Native Plant Community, Prairie Rich Fen, and Wet Prairie in the Project location.

Xcel Energy is currently working with the MnDNR to determine appropriate and applicable mitigation measures (*see* Sections 6.5.6, 6.5.7, and 6.6) for the Project.

### 8.1.4 Minnesota State Historic Preservation Office

On July 1, 2010, Xcel Energy submitted a consultation letter to the Minnesota SHPO requesting SHPO written agreement with a Phase Ia literature review report findings for the Project, which recommended that no archaeological or historic resources will be affected by construction or operation of the transmission line Project.

As discussed in Section 6.4, the Minnesota SHPO commented on the proposed Project and Phase Ia literature review report in a letter dated August 2, 2010. The Minnesota SHPO stated that it is premature to conclude that no survey work will be required and requested that Xcel Energy consult with the Minnesota SHPO once a Project route has been finalized. Xcel Energy is currently working with the Minnesota SHPO to determine the appropriate next steps for the Project.

## 8.2 Identification of Landowners

A list of the 853 landowners within the Project vicinity is included in **Appendix D.1**. Addresses have been redacted from the landowner list and comment forms due to privacy concerns.

## 8.3 Public Participation

In developing the route alternatives, Xcel Energy consulted with local, state, and federal agencies associated with the Project location. As discussed in Section 8.1, Xcel Energy provided a notification letter to the Project's LGUs on June 29, 2010. Xcel Energy also provided a request for comment letter to various agencies in the Project location on June 29, 2010. Agencies generally responded with specific environmental or other data (e.g., special status species, land use maps) and applicable guidelines, rules, and regulations. Xcel Energy will continue to communicate with these agencies throughout the permitting process.

The following summarizes the several meetings Xcel Energy has participated in during the route development process.

- Xcel Energy met with the MnDOT on June 24, 2010. MnDOT representatives included the Utility Transmission Route Coordinator, the Project Development Engineer, and St. Cloud area MnDOT permitting staff. Issues identified during the meeting included development along U.S. Highway 10 in the vicinity of the Project. Possible locations include at the

intersections of U.S. Highway 10 with County Highway 3/Golden Spike Road NE and Benton Avenue/5th Street. Also, MnDOT noted that any expansion of U.S. Highway 10, while not currently planned, could require additional right-of-way, thus impacting the location of the transmission line structures.

- Xcel Energy met with Benton County representatives on June 28, 2010. Issues identified during the meeting included confirmation of the proposed Project location and Project need; development of new right-of-way; a roundabout interchange project at the intersection of Golden Spike Road NE and U.S. Highway 10 that could affect transmission line structure placement, although timing of project is unknown; consideration of an alternative alignment in an area zoned for commercial development; and a possible expansion of the Ridgeview Assisted Care living facility at intersection of 10th Street NE and 10th Ave. NE as well as a planned residential development near the intersection of 5th Street and U.S. Highway 10 in the proposed Project's vicinity (timing of projects unknown). Other items discussed included altering the route near the U.S. Highway 10 and CR 29 intersection to avoid a developable area, and confirmation of the use of the state PUC permitting process and the applicability of local codes and ordinances to the Project.

- Xcel Energy met with the Benton County Wetlands and Solid Waste Program representative on August 3, 2010. Issues identified during the meeting included impacts on wetlands and obtaining the required permit, if needed.

In addition to the agency meetings, on August 3, 2010, Xcel Energy held a public open house in Sauk Rapids. The purpose of the open house was to inform area landowners, LGUs, and regulatory agencies about the Project, and to gather input early in the route selection and permitting processes. The routes presented at the open house included the Proposed Route, Alternative Route, and Route Segment. Xcel Energy mailed notices or otherwise contacted potentially affected landowners in the Project location to inform them of the public open house on July 16, 2010. *See* **Appendix D.2**. Materials presented at the open house included aerial figures of the Project, a Project fact sheet, and maps of environmental resources (e.g., wetlands, waterbodies, cultural resources) in the Project location.

Of the approximately 15 people that attended the open house, three submitted written comments regarding the route for the Project during or following the meeting. *See* **Appendix D.4**. Primary issues raised by the public included:

- health concerns due to multiple HVTLs in proximity to residences;
- effects on future land uses and property values resulting from HVTL; and
- visual impacts resulting from HVTL.

Other comments received informally during the open house included:

- requests to shift the Proposed Route when adjacent to the existing transmission line so that it is located closer to and/or within the existing easement;

- requests to move Proposed Route to align with property lines rather than to follow CR 29 to the intersection of U.S. Highway 10; and

- considerations for future road, residential, and commercial/industrial development, which include:

  a. road development along CR 29;
  b. commercial development at the intersection of CR 29 and U.S. Highway 10; and
  c. development of a new theater near Golden Spike Road and 10th Avenue.

Xcel Energy has been working with the MnDOT, county officials, and landowners to establish an acceptable route that results in the least impacts practicable on current infrastructure, residences, and future development.

Xcel Energy has also considered landowner comments on its Proposed Route outside of its open houses. On September 23, 2010, Ron and Doreen Hodel, landowners near the U.S. Highway 10 and CR 29 intersection, provided a comment letter to the City of Sauk Rapids Planning Commission, which was subsequently forwarded to Xcel Energy. *See* **Appendix D.5**. In their letter, the Hodels requested that the originally proposed route be altered towards the City of Sauk Rapids property to avoid crossing the front of their property. The requested route alteration is generally the same as that approved and requested by Benton County and the City of Sauk Rapids in their resolutions (see Section 8.1.1). Xcel Energy has subsequently adopted the requested alteration as part of its Proposed Route, which is presented within this Route Permit application.

## 8.4 Required Permits and Approvals

The following **Table 19** identifies federal, state, and local permits and approvals that could potentially be required for the Project.

**Table 19**

**Potential Required Permits**

| Jurisdiction and Permit | Requirement |
|---|---|
| Federal | |
| ACOE, Clean Water Act, Section 404 Permit | Required if dredging and filling activities will occur within jurisdictional wetlands. If the proposed activities are not eligible for coverage under the General Permit or Letter of Permission, an Individual Permit will be obtained from the ACOE. |
| State | |
| MPUC, Route Permit | Required for any high voltage transmission line. |
| MnDNR, License to Cross Public Lands and Waters | Required if any work is necessary in public waters. (Currently Project does not affect any PWI features.) |
| MnDOT, Utility Permit | Required to place utilities on Minnesota trunk highway right-of-way. |
| MPCA, NPDES/SDS General Stormwater Permit for Construction Activity | Required under the NPDES/SDS General Stormwater Permit for Construction Activity where construction activities will cause more than one acre of ground disturbance. |
| MPCA, Section 401 Water Quality Certification | Required if the ACOE requires an individual permit for wetland dredging and filling activities, this certification is required. |
| Benton County – Department of Development, Public Works/Highway, and Board of Commissioners | |
| Culvert Extension/Connection | Required if extending/connecting culverts. (Sometimes also referred to as an Entrance Permit.) |

| Jurisdiction and Permit | Requirement |
|---|---|
| Driveway Permit | Required for any changes proposed to driveway access or driveway widening along county highways, including field driveways, residential driveways, commercial driveways and public street access. (Sometimes also referred to as an Access Permit.) |
| Moving Permit (Hauling) | Required whenever legal dimensions and/or axle weights are exceeded per county regulations. |
| Oversize/Overweight Vehicle Permit | Required on all county highways. May be required to move over-width loads on county, township, or city roads. |
| Utility Permit | Required for work proposed in the county highway rights-of-way. Work requiring this permit includes installation and repair of telephone cables, power lines, gas lines, storm sewers, sanitary sewers, water mains, ditch grading, culvert installation, etc. |
| Wetland Permit | Required for activities in wetlands, if needed. |
| Working in the Right-of-Way Permit | Required if constructing on, across, or under the right-of-way of a county highway. |

For the other permits listed in **Table 19** above, and any additional permit requirements identified during subsequent agency consultations, Xcel Energy will acquire the necessary authorizations and develop the appropriate plans associated with any permit or authorization (e.g., stormwater pollution prevention management plan prior to construction.

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## 10.0 Definitions

Following are a list of definitions for technical terms used in this Application:

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| Avian | Of or relating to birds. |
| Breaker | Device for opening a circuit. |
| Bus | An electrical conductor that serves as a common connection for two or more electrical circuits; may be in the form of rigid bars or stranded conductors or cables. |
| Conductor | A material or object that permits an electric current to flow easily. |
| Corona | The breakdown or ionization of air in a few centimeters or less immediately surrounding conductors. |
| Distribution underbuild | The construction of a transmission circuit (conductors) and a distribution circuit (usually at a lower voltage) on the same structures. |
| Double circuit | The construction of two separate circuits at the same or different voltage on the same structures to increase capacity of the line. |
| Electric Field ("EF") | The field of force that is produced as a result of a voltage charge on a conductor or antenna. |
| Electromagnetic | The term describing the relationship between electricity and magnetism; a quality that combines both magnetic and electric properties. |
| Electromagnetic Field ("EMF") | The combination of an electric (E) field and a magnetic (H) field, such as in high frequency radiating fields. For the lower frequencies associated with power lines, EMF should be separated into electric and magnetic fields. Electric and magnetic fields arise from the flow of electricity and the voltage of a line. The intensity of the electric field is related to the voltage of the line. The intensity of the magnetic field is related to the current flow through the conductors. |
| Electromotive Force | The force (voltage) that produces an electric current in a circuit. |
| Excavation | A cavity formed by cutting, digging, or scooping. |
| Fauna | The collective animals of any place or time that live in mutual association. |
| Flora | The collective plants of any place or time that live in mutual association. |
| Grading | To level off to a smooth horizontal or sloping surface. |
| Grounding | To connect electrically with a ground; to connect some point of an electrical circuit or some item of electrical equipment to earth or to the conducting medium used in lieu thereof. |
| Habitat | The place or environment where a plant or animal naturally or normally lives and grows. |

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| High Voltage Transmission Lines ("HVTL") | Overhead and underground conducting lines of either copper or aluminum used to transmit electric power over relatively long distances, usually from a central generating station to main substations. They are also used for electric power transmission from one central station to another for load sharing. In Minnesota, a HVTL is a conductor of electric energy and associated facilities designed for and capable of operating at a nominal voltage of 100 kilovolts or more either immediately or without significant modification (associated facilities include, but not be limited to, insulators, towers, substations, and terminals). *See* Minn. Rules 7850.1000, Subp. 9. |
| Ionization | Removal of an electron from an atom or molecule. The process of producing ions. The electrically charged particles produced by high-energy radiation, such as light or ultraviolet rays, or by the collision of particles during thermal agitation. |
| Magnetic Field ("MF") | The region in which the magnetic forces created by a permanent magnet or by a current-carrying conductor or coil can be detected. The field that is produced when current flows through a conductor or antenna. |
| Mitigate | To lessen the severity of or alleviate the effects of. |
| Neutral to Earth Voltage ("NEV") | The term NEV is used to describe a measurable level of voltage which may occur between a metal object and the adjacent floor or earth. |
| Oxide | A compound of oxygen with one other more positive element or radical. |
| Ozone | A form of oxygen in which the molecule is made of three atoms instead of the usual two. |
| Raptor | A member of the order Falconiformes, which contains the diurnal birds of prey, such as the hawks, harriers, eagles, and falcons. |
| Sediment | Material deposited by water, wind, or glaciers. |
| Stray Voltage | A condition that can occur on the electric service entrances to structures from distribution lines, not transmission lines. More precisely, stray voltage is a voltage that exists between the neutral wire of the service entrance and grounded objects in buildings such as barns and milking parlors. Transmission lines do not, by themselves, create stray voltage because they do not connect to businesses or residences. Transmission lines, however, can induce stray voltage on a distribution circuit that is parallel to and immediately under the transmission line. |
| Substation | A substation is a high voltage electric system facility. It is used to switch generators, equipment, and circuits or lines in and out of a system. It also is used to change AC voltages from one level to another. Some substations are small with little more than a transformer and associated switches. Others are very large with several transformers and dozens of switches and other equipment. |
| Ultraviolet Radiation | A portion of the electromagnetic spectrum with wavelengths shorter than visible light. |

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| Voltage | Electric potential or potential difference expressed in volts. A unit of electrical pressure, electric potential or potential difference expressed in volts. The term used to signify electrical pressure. Voltage is a force that causes current to flow through an electrical conductor. The voltage of a circuit is the greatest effective difference of potential between any two conductors of the circuit. |
| Voltage Drop | The difference in voltage between two points; it is the result of the loss of electrical pressure as a current flows through a resistance. |
| Waterfowl | A bird that frequents water; especially a swimming game bird (as a duck or goose) as distinguished from an upland game bird or shorebird. |
| Wetland | Wetlands are areas that are periodically or permanently inundated by surface or ground water and support vegetation adapted for life in saturated soil. Wetlands include swamps, marshes, bogs and similar areas. |

## 11.0 Acronyms

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| ACOE | U.S. Army Corps of Engineers |
| ACSS | Aluminum Core Steel Support |
| BMPs | Best Management Practices |
| Company | Northern States Power Company |
| CON | Certificate of Need |
| CR | County Road |
| CRP | Conservation Reserve Program |
| dBA | decibels |
| ELF | extremely low frequency |
| EMF | electromagnetic fields |
| FEMA | Federal Emergency Management Agency |
| GP | General Permit |
| HVTL | high voltage transmission line |
| ICNIRP | International Commission on Non-Ionizing Radiation Protection |
| IEEE | Institute of Electrical and Electronic Engineers |
| kV | kilovolt |
| kV/m | kilovolts per meter |
| L | Level Descriptors |
| $L_{10}$ | the dBA that may be exceeded 10 percent of the time within an hour |
| $L_{50}$ | the dBA that may be exceeded 50 percent of the time within an hour |
| LEF | large energy facility |
| LGU | local government units |
| LOP | Letter of Permission |
| mA | milliamperes |
| mG | milliGauss |
| MnDNR | Minnesota Department of Natural Resources |
| MnDOT | Minnesota Department of Transportation |
| MPCA | Minnesota Pollution Control Agency |
| MPUC or Commission | Minnesota Public Utilities Commission |
| NAC | Noise Area Classification |
| NEMA | National Electrical Manufacturers Association |
| NERC | North American Electric Reliability Corporation |
| NESC | National Electric Safety Code |
| NEV | Neutral to Earth Voltage |
| NHIS | Nature Heritage Information System |
| NIEHS | National Institute of Environmental Health Sciences |
| NPDES | National Pollutant Discharge Elimination System |

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| NRHP | National Register of Historic Places |
| NWI | National Wetlands Inventory |
| OES | Minnesota Department of Commerce, Office of Energy Security |
| PEM | Palustrine Emergent wetland |
| PFO | Palustrine Forested Broad-leaved Deciduous wetland |
| ppm | parts per million |
| PPSA | Power Plant Siting Act |
| PSCW | Public Service Commission of Wisconsin |
| PSS | Palustrine Shrub-Scrub Broad-leaved Deciduous wetland |
| PUBF | Palustrine Unconsolidated Bottom wetland |
| PWI | public waters inventory |
| SHPO | State Historic Preservation Office |
| SWCD | Soil and Water Conservation District |
| USDA | U.S. Department of Agriculture |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| WHO | World Health Organization |