NORTHERN STATES POWER COMPANY AND GREAT RIVER ENERGY

APPLICATION TO THE MINNESOTA PUBLIC UTILITIES COMMISSION FOR A ROUTE PERMIT

HOLLYDALE PROJECT

115 KV TRANSMISSION LINE AND NEW POMERLEAU LAKE SUBSTATION

Alternative Permitting Process
PUC Docket No. E002/TL-11-152

June 30, 2011

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1.0 Executive Summary

1.1 Proposal Summary

Northern States Power Company, a Minnesota corporation ("Xcel Energy" or the "Company") and Great River Energy, a not-for-profit cooperative ("GRE") (collectively, the "Applicants") submit 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 (*see* **Appendix A**). A Route Permit is requested to rebuild approximately 8 miles of existing 69 kilovolt ("kV") transmission line to 115 kV, construct up to approximately 0.8 miles of new 115 kV transmission line, construct a new 115 kV substation (to be called Pomerleau Lake Substation), and modify associated transmission facilities located in cities of Medina and Plymouth, Hennepin County, Minnesota (the "Hollydale Project" or the "Project"). **Figure 1** shows the general location of the proposed Project.

Two locations in Plymouth are proposed for the new Pomerleau Lake Substation (*see* **Appendix B-1**). Substation Site A is located just southwest of the intersection of Schmidt Lake Road and Interstate Highway 494 ("I-494") and Substation Site B is located approximately one quarter mile west of the intersection of Fernbrook Lane and the railroad (or "Canadian Pacific Railway") tracks. While either Substation Site A or Substation Site B could be used for the proposed new Pomerleau Lake Substation, Site A is the preferred location for the new 115 kV substation because of its proximity to existing utility and road right-of-way, the existing GRE transmission line ("WH-PB") and future Xcel Energy transmission lines that will be connected to the new substation, and I-494. The "Proposed Route" includes an existing 8-mile long GRE transmission line route and approximately 0.8 miles of new 115 kV transmission line route that will connect the rebuilt transmission line to the proposed new Pomerleau Lake Substation as indicated in **Figure 2**.

The proposed transmission line Project begins at GRE's existing Medina Substation, extends to Xcel Energy's existing Plymouth Substation, and ends at the proposed new Pomerleau Lake Substation at Substation Site A (*see* **Figure 2**). The existing 8-mile long 69 kV transmission line is currently owned by GRE, which Xcel Energy will acquire and redesignate as Line 5551. The Project also includes modifying the existing GRE Medina

Substation, existing Xcel Energy Hollydale Substation, and constructing the new Xcel Energy Pomerleau Lake Substation to support and operate the 115 kV transmission lines associated with the Project. As described above, the proposed new Pomerleau Lake Substation will be connected to the existing transmission line that will be rebuilt in this Project, as well as an existing GRE 115 kV transmission line. *See* **Appendix B-2 to B-4**.

The Project will provide increased distribution capacity and avoid feeder circuit overloads in the Plymouth area distribution delivery system. The Project is needed to address area distribution needs. This includes increased distribution capacity in the Plymouth and Medina areas to better serve current customers and expected load growth.

Figure 1 - Proposed Project Location

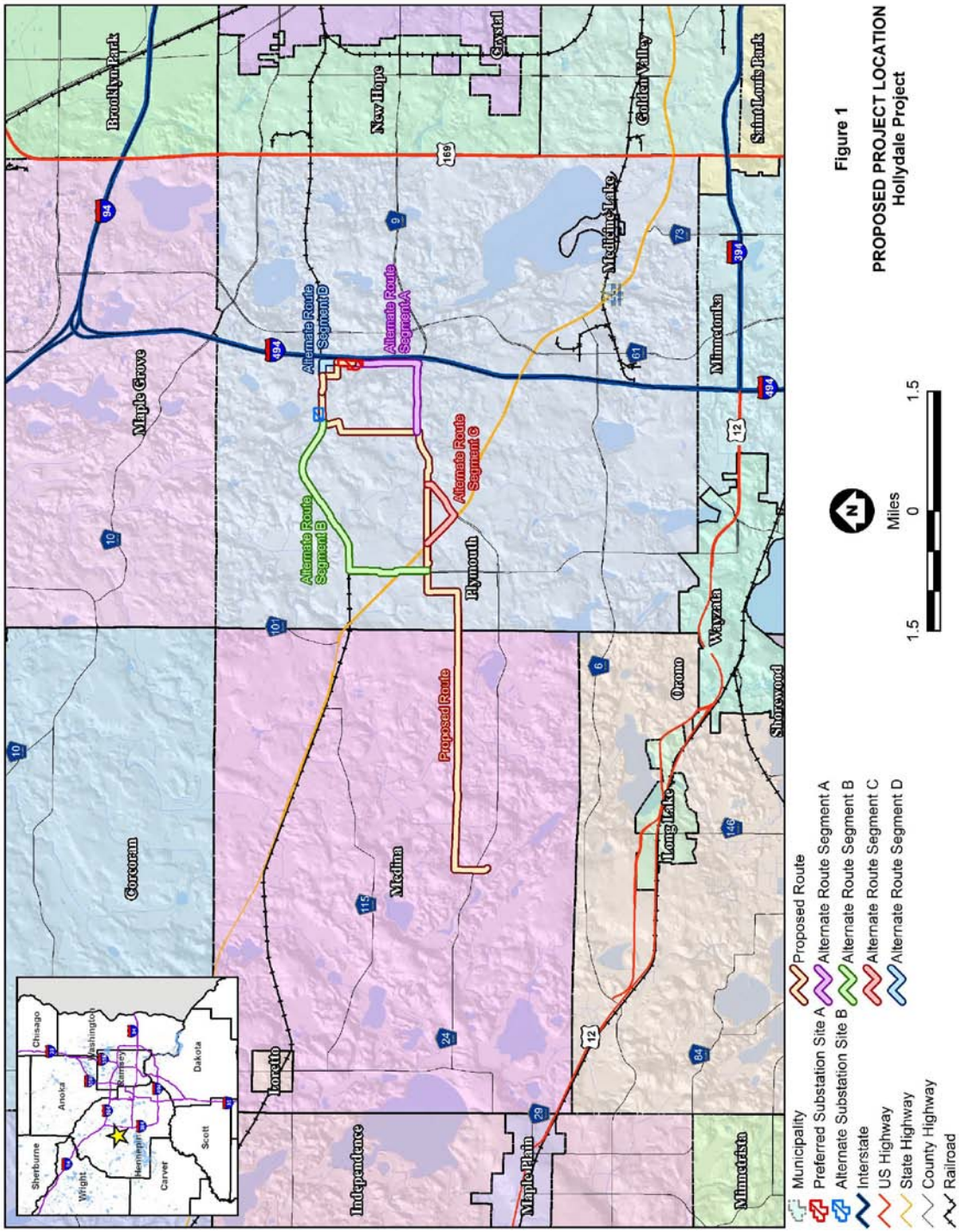
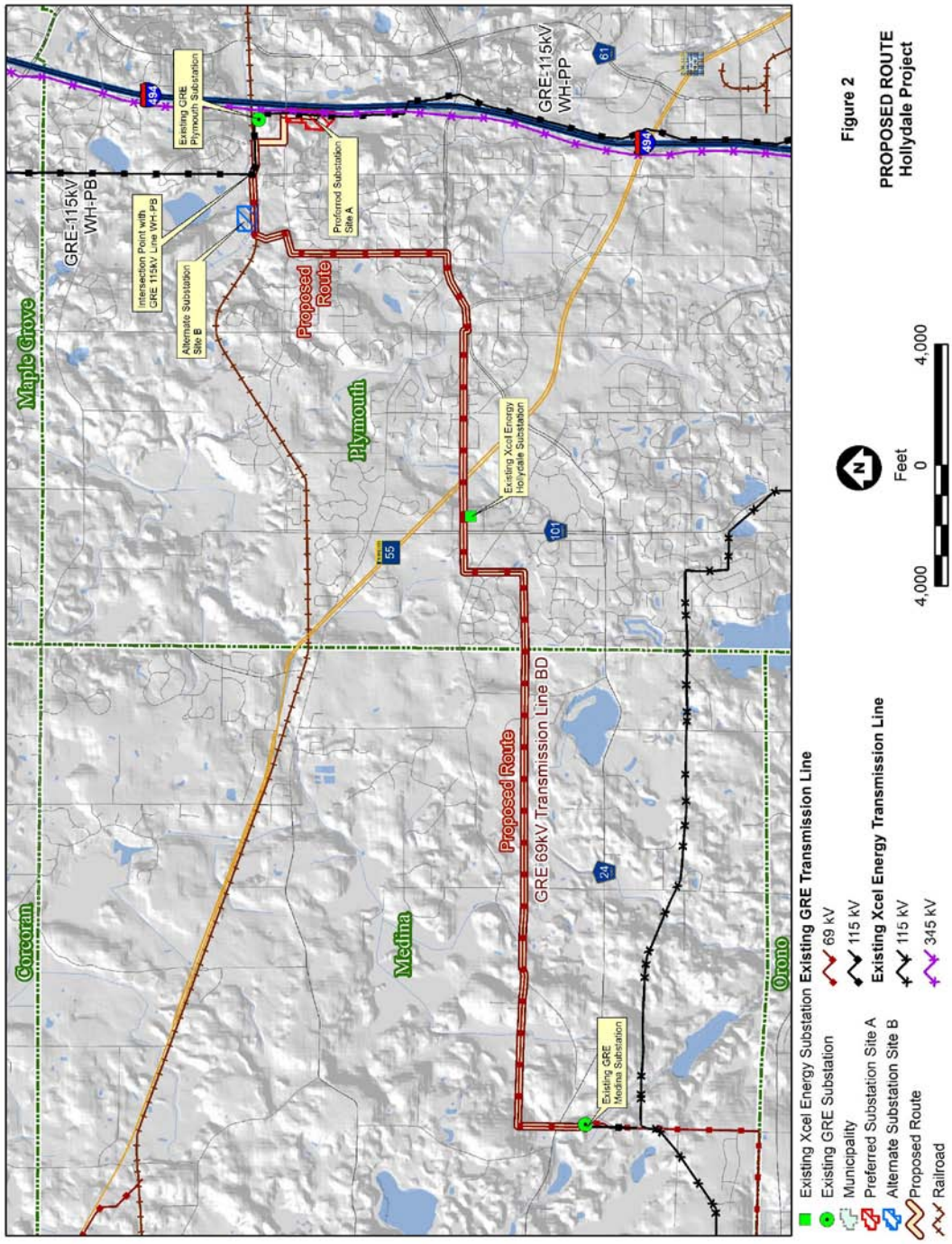


Figure 2 – Proposed Route



This Application is submitted pursuant to the Alternative Permitting Process outlined in Minnesota Rules 7850.2800 to 7850.3900. 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 proposed rebuild of the 69 kV transmission line to a 115 kV transmission line, the new 115 kV transmission line route, and associated facilities, including the new Pomerleau Lake Substation and modifications at the Medina and Hollydale Substations, qualify for consideration under the Alternative Permitting Process because the proposed new transmission line is between 100 and 200 kV. Minn. Stat. § 216E.04, subd. 2(3); Minn. R. 7850.2800, Subp. 1(C).

The Applicants respectfully request that the Commission approve the Proposed Route and Substation Site A, and authorize a route width of 100 feet on each side of the existing transmission facilities route centerline (200 feet total width) for a majority of the Proposed Route, except for new transmission line route segments proposed along Cheshire Lane and Schmidt Lake Road, where the Applicants request a route width of 200 feet on each side of the road centerline (400 feet total width). *See* **Figure 2** and **Appendix B-2 to B-4**.

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. The rule requirements are listed in **Table 1** with references indicating where the information can be found in this Application.

Table 1
Completeness Checklist

Authority	Required Information	Section
Minn. R. 7850.2800, Subp. 1(C)	**Subpart 1. 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	2.5

Authority	Required Information	Section
	procedures in part 7850.1700 to 7850.2700 for high voltage transmission lines ("HVTLs") of between 100 and 200 kV.	
Minn. R. 7850.2800 Subp. 2	**Subpart 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 PUC of such intent, in writing, at least 10 days before submitting an application for the projects.	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 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 HVTLs 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, 5.1.1

Authority	Required Information	Section
E.	The environmental information required under 7850.1900, Subp. 3	Chapter 6.0 *See* Minn. R. 7850.1900, Subp. 3 (A) – (H) below
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.	**Appendix E**
H.	United States Geological Survey topographical maps or other maps acceptable to the chair showing the entire length of the HVTL on all proposed routes.	**Appendix B**
I.	Identification of existing utility and public ROWs along or parallel to the proposed routes that have the potential to share right-of-way, the land used by a public utility (as for a transmission line), with the proposed line.	5.1.2, **Appendix B and C**
J.	The engineering and operational design concepts for the proposed HVTL, including information on the electric and magnetic fields of the transmission line.	Chapter 5.0
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, 5.1.6
L.	A description of possible design options to accommodate expansion of the HVTL in the future.	4.6
M.	The procedures and practices proposed for the acquisition and restoration of the right-of-way, construction, and maintenance of the HVTL.	5.1.3-5.1.5
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 Not applicable, per Minn. Stat. §§ 216B.2421, subd. 2(3) and 216B.243
Minn. Rules 7850.1900, Subp. 3	**Environmental Information**	
A.	A description of the environmental setting for each site or route.	6.1

Authority	Required Information	Section
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

GRE is a not-for-profit electric generation and transmission cooperative providing electrical energy and related services to 28 distribution cooperatives serving 1.5 million customers in Minnesota and Wisconsin. Headquartered in Maple Grove, Minnesota, GRE is the second largest utility in Minnesota and the fifth largest utility of its type in the country. GRE owns and operates the existing Medina Substation and property, with the transmission and distribution components of the substation owned by GRE and its member owner, Wright-Hennepin Cooperative Electric Association, respectively. GRE will continue to own and operate the Medina Substation, and it will pay for and modify the Medina Substation as proposed in this Project. GRE currently owns the 8-mile long 69 kV transmission line proposed to be rebuilt as part of the Project, which it will sell to Xcel Energy (*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 whose headquarters are also in Minneapolis. Xcel Energy provides electricity services to approximately 1.2 million customers and natural gas services to 425,000 residential, commercial and industrial customers in Minnesota, North Dakota, and South Dakota.

Xcel Energy Services Inc. is the service company for Xcel Energy and its personnel prepare, submit, and administer regulatory applications to the Commission on behalf of Xcel Energy, including Route Permit applications. Xcel Energy will acquire the existing 8-mile long 69 kV transmission line, proposed to be rebuilt as a part of this proposed Project, from GRE. Xcel Energy will also pay for, build, own and operate the new 115 kV transmission line and associated facilities (including the proposed new Pomerleau Lake Substation) between the existing Medina Substation, the existing Hollydale Substation and the proposed Pomerleau Lake Substation (*see* **Figure 2**).

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 alternate routes in the Application (*see* Minn. R. Chapter 7850.3100), the Applicants' evaluation of an alternate substation site and alternate route segments, in addition to the Proposed Route and the proposed Substation Site A for the new Pomerleau Lake Substation for the Project, is contained in this Application (*see* Section 4.3).

For the reasons presented herein, the Applicants prefer the Proposed Route for rebuilding the existing transmission line, constructing the proposed new Pomerleau Lake Substation at Substation Site A, and constructing the new transmission line within the proposed new transmission route to connect the proposed new Pomerleau Lake Substation to the rebuilt transmission line (*see* **Figure 2**). The Applicants respectfully request that the Commission approve the Proposed Route and Substation Site A, and authorize a route width of 100 feet on each side of the existing transmission line route centerline (200 feet total width) for a majority of the route, except for the new transmission route segment proposed along Cheshire Lane and Schmidt Lake Road, where the Applicants request a route width of 200 feet on each side of the road centerline (400 feet total width). *See* **Appendix B-2 to B-4**, and **Appendix C** detailed maps.

This Application demonstrates that construction of the Project along the Proposed Route and proposed Pomerleau Lake Substation at Substation Site A 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 infrastructure.

2.3 Permittees

The permittees for the proposed Project are:

Permittee:	Northern States Power Company, a Minnesota corporation	Great River Energy, a not-for-profit electric cooperative
Contact:	Joseph Sedarski Senior Permitting Analyst, Siting and Land Rights	Marsha Parlow Transmission Permitting Analyst, Environmental Services
Address:	Xcel Energy Services Inc. 414 Nicollet Mall, MP8 Minneapolis, MN 55401	Great River Energy 12300 Elm Creek Blvd. Maple Grove, MN 55369
Phone:	(612) 330-6435	(763) 445-5215
E-mail:	joseph.g.sedarski@xcelenergy.com	mparlow@GREnergy.com

2.4 Certificate of Need

Minnesota Statutes Section 216B.243, subd. 2 states that "no large energy facility" shall be sited or constructed in Minnesota without the issuance of a Certificate of Need by the Commission. The proposed Project is not classified as a "large energy facility" under Minnesota Statutes §§ 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 for the Project. *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, a 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 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 Minnesota Statutes § 216E.04, subd. 2(3) and Minnesota Rules 7850.2800, Subp. 1(c) (establishing alternative process for HVTLs between 100 and 200 kV). Accordingly, the Applicants are following the provisions of the Alternative Permitting Process outlined in Minnesota Rules 7850.2800 to 7850.3900 for this Project.

2.6 Notice to the Commission

The Applicants notified the Commission on February 14, 2011, by letter sent via the U.S. postal service and e-filed that the Applicants intend to use the Alternative Permitting Process for the Project. This letter complies with the requirement of Minnesota Rules 7850.2800, Subpart 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 Project is located in central Hennepin County, Minnesota in the cities of Medina and Plymouth. **Figure 1** shows an overview of the Project area. The Proposed Route and the proposed new Pomerleau Lake Substation (Substation Site A) are shown in **Figure 2**. More detailed overview maps of the Project area are included in **Appendix B**. Detailed maps and land features of the cities crossed by the proposed Project and the substations described in the Application are included in **Appendix C**. **Table 2** identifies the detailed location information for the Project.

Table 2
Detailed Project Location

Township	Range	Sections	City Name	County
118N	23W	13, 14, 15, 16, 21, 22, 23, 24	Medina	Hennepin
118N	22W	7, 8, 9, 10, 16, 17, 18, 19	Plymouth	Hennepin

3.2 Project Proposal

The Proposed Route includes the existing 8-mile long GRE transmission line route and approximately 0.8 miles of new 115 kV transmission line route that will connect the rebuilt transmission line to the proposed new Pomerleau Lake Substation as indicated in **Figure 2**. For the rebuild portion of the Project, it begins on the west end at the GRE Medina Substation in the central portion of Medina. *See* **Figure 2**. It then continues east to the Xcel Energy Hollydale Substation in west-central Plymouth and then turns north and east to the alternate Pomerleau Lake Substation site (Substation Site B), or east and south to the preferred Pomerleau Lake Substation (Substation Site A).

The Applicants are considering two proposed new substation sites for the planned Pomerleau Lake Substation - Substation Site A and Substation Site B. *See* **Figure 2** and **Appendix B-2 to B-4**. For reasons discussed herein, the Applicants prefer Substation Site A for the proposed new Pomerleau Lake Substation which is located

on the west side of I-494 and south of Schmidt Lake Road in Plymouth. More specifically, the Applicants propose to:

- rebuild approximately 8 miles of existing GRE 69 kV transmission line BD to a 115 kV transmission line. The proposed transmission line runs from the existing GRE Medina Substation to the existing Xcel Energy Hollydale Substation, to the intersection with existing GRE 115 kV transmission line WH-PB located north of Fernbrook Lane turnaround and north of the Canadian Pacific Railway;

- construct a new 115 kV transmission line on new right-of-way from the above described existing GRE line intersection location, which completes the connection of the rebuild line to the proposed new Pomerleau Lake Substation;

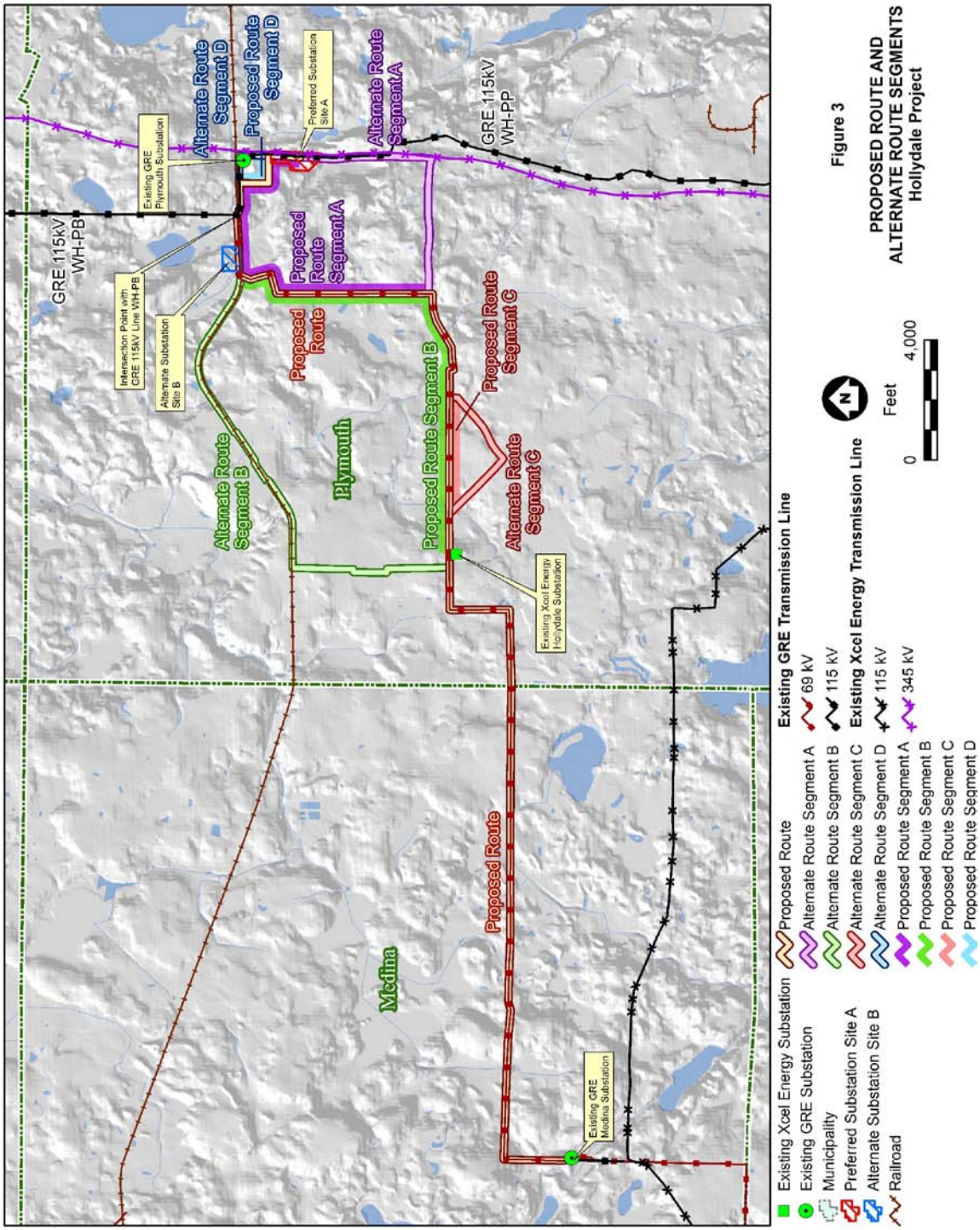
- construct the proposed new Pomerleau Lake Substation;

- construct new transmission line terminations within the proposed new Pomerleau Lake Substation for an in-out for existing GRE 115 kV transmission line WH-PP to connect this line with the Pomerleau Lake Substation; and

- modify the existing Medina and Hollydale substations to accommodate the proposed 115 kV transmission line rebuild.

Specific modifications to the existing Medina and Hollydale substations and associated transmission facilities are further described in Section 4.7.

Figure 3 – Proposed Route and Alternate Route Segments



3.3 Need for Project

The Project is needed to address electric distribution concerns, to provide increased distribution capacity, and to avoid feeder circuit overloads in the Plymouth area distribution delivery system.

The Xcel Energy Hollydale Substation is an existing 69-13.8 kV and 34.5-13.8 kV distribution substation located at the intersection of County State Aid Highway ("CSAH") 101 and Minnesota State Highway ("MN") 55 in Plymouth. The existing distribution delivery system in this area of the metropolitan Twin Cities has experienced feeder circuit overloads and it has no capacity for increased distribution in an area with increasing development and load growth. The current system serves the Hollydale Substation with a 34.5 kV feeder supplied at the Gleason Lake Substation. There is an emergency feed from the 69 kV transmission line tying back to the Medina Substation. The 34.5 kV and 69 kV systems are not strong enough to support the load requested by Xcel Energy's Distribution Capacity Planning team.

To assess the best way to serve the needed distribution capacity, Xcel Energy conducted a load serving study of the western suburbs of Minneapolis, Minnesota. The study area extends from the City of Medina to North Minneapolis east to west, and the City of Osseo to Interstate Highway I-394 north to south. The study was limited to the 115 kV and 69 kV systems, and the purpose was to review requests by Xcel Energy's Distribution Capacity Planning department for one new distribution substation and the expansion of another substation within the study area.

The study recommends a plan to rebuild the existing GRE 69 kV transmission Line BD between Medina and Plymouth to 115 kV, connect the Hollydale Substation to this rebuilt line, and construct a new switching station (the planned new Pomerleau Lake Substation) near GRE's existing Plymouth Substation (a distribution substation) on GRE's 115 kV line as a termination point. The study recommended that these components should be constructed by the summer of 2013 to meet distribution needs.

The Pomerleau Lake Substation connection is integral for the support of Hollydale Substation load and the area transmission system. To supply the Hollydale Substation

with a redundant 115 kV connection is a great reliability enhancement. Feeding the Hollydale Substation solely out of the Medina Substation would reduce the reliability of the local transmission system.

One outage that the transmission system needs to handle is a double circuit failure between the Parkers Lake and Gleason Lake Substations. During this outage the current transmission system is supported out of Crow River. It can be seen in future transmission planning models that voltages become depressed in the Plymouth area during this fault. In addition to providing an additional feed to the Hollydale Substation, the proposed transmission line creates a parallel path to this double circuit outage, thereby improving reliability in the area.

Xcel Energy's Distribution Capacity Planning Department has requested a new substation near the intersection of Bass Lake Road and Highway 169. While not part of this Project or Application, the study also recommends a line position should be added to construct a transmission line between the planned new Pomerleau Lake Substation and the existing Xcel Energy Twin Lakes Substation. This line will be constructed to support a future distribution substation proposed near Highway 169 and Bass Lake Road (to be named the Meadow Lake Substation). The new Pomerleau Lake Substation fits into the future configuration of the transmission system and it allows for an opportune connection point to connect this future substation into the transmission system.

Study recommendations provide the most benefits to the long term transmission system, and are also the least cost option to connect the proposed Hollydale Substation and future Meadow Lake Substation into the transmission system. The major benefits of this Project to the transmission system are:

- voltage support outside of the 345 kV transmission loop for a 115 kV double circuit loss between Gleason Lake and Parkers Lake Substations; and
- reduce loading on the two existing transmission lines between Parkers Lake and downtown Minneapolis.

In summary, the Project is needed to address area distribution needs. This includes increased distribution capacity in the Plymouth and Medina areas to better serve current customers and expected load growth.

3.4 Project Schedule

Construction of the Project is expected to begin in the second quarter 2012, and the Applicants anticipate a third quarter 2013 in-service date for the proposed facilities. **Table 3** provides an estimated permitting and construction schedule summary for the Project. This schedule is based on information available at the date of this filing and planning assumptions that balance the timing of implementation with the availability of crews, materials, and other practical considerations. This schedule may be revised as further information is developed.

Table 3
Estimated Project Schedule

Project Task	Date
File Route Permit Application ("Application") with the Commission	2nd Quarter 2011
Route Permit Review Process Complete	4th Quarter 2011
Begin Transmission Line and Substation Modification and Construction	2nd Quarter 2012
In-Service Date	3rd Quarter 2013

3.5 Project Costs

The Applicants estimate that the transmission line facilities (rebuild and new), new Pomerleau Lake Substation, and modifications to the existing Medina and Hollydale Substations will cost approximately $23.1 million, depending upon the selected route and new substation site. The estimated Project cost is shown in **Table 4**.

Table 4
Estimated Project Cost

Project Item	Cost
Rebuild and New 115 kV Transmission Line Facilities (Medina-Hollydale-Pomerleau Lake Substations)	$8 million

New Pomerleau Lake Substation	$8 million
Modifications to Existing Medina Substation	$2.6 million
Modifications to Existing Hollydale Substations	$4.5 million
Total Project Cost	$23.1 million

Xcel Energy will construct, operate, and maintain the transmission lines proposed in this Project, as well as the new Pomerleau Lake Substation and existing Hollydale Substation. Along with Wright-Hennepin Electric Cooperative, GRE will construct, operate, and maintain the proposed modifications to the Medina Substation.

Operating and maintenance costs after construction for Xcel Energy's portion of the Project will be nominal for several years, since the proposed transmission line will be new and there will be minimal initial vegetation management required. Typical annual operating and maintenance costs for 115 kV transmission lines 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 costs include inspections, which are usually conducted using fixed-wing aircraft and helicopter on a regular basis.

Xcel Energy 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 repair are performed on an as-needed basis, and therefore the cost varies from substation to substation.

Operating and maintenance costs after construction for GRE's portion of the Project will be nominal for several years, since the proposed substation modifications will be new and there will minimal initial vegetation management required. GRE and Wright-Hennepin Electric Cooperative perform 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 repair 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 Proposed Route includes rebuilding approximately 8 miles of an existing 69 kV transmission line to a 115 kV, plus construction of an additional 0.8 miles of new 115 kV transmission line that will connect the rebuild line to the proposed new Pomerleau Lake Substation at Substation Site A. *See* **Figure 2** and **Appendix B-2 to B-4**.

Throughout this Application, the Proposed Route will be discussed in two segments and include: 1) the existing 8-mile 115 kV transmission line rebuild portion from the Medina Substation to the intersection with existing GRE transmission line WH-PB; and 2) the new 0.8 mile 115 kV transmission line portion from this intersection to the preferred Substation Site A. The requested route width for the Proposed Route is 200 feet where the line is to be rebuilt on the existing 69 kV route and 400 feet along Cheshire Lane and Schmidt Lake Road where a new transmission line route is required. **Figure 2** and **Appendix B-1 to B-4** provide an overview of the Proposed Route. **Appendix C** provides detailed route figures.

The Proposed Route is 8.8 miles long and begins at the existing Medina Substation, located southwest of the intersection of Willow Drive and CSAH 24 in Medina. **Table 5** provides a detailed description of the route, including road and Public Water Inventory ("PWI") crossings. **Table 5** also indicates the beginning and end of four segments of the Proposed Route, which are used to compare to alternate routes considered but rejected (further discussed in Section 4.3).

Table 5
Detailed Description of Proposed Route

Direction	Approximate Distance (Miles)	Road and Public Waters Crossings (Distance provided in this column is cumulative)
START AT MEDINA SUBSTATION	---	None
NORTH to Intersection of Sections 16, 15, 21, and 22 of Township 118, Range 23	0.4 miles	Cross Willow Drive at 0.06 mile; cross CSAH 24 at 0.17 mile; cross Hollydale Road at 0.3 mile.
EAST to Plymouth City Limit	3.0 miles	Cross Bantle Farm Road at 0.6 mile; cross Medina Road at 1.32, 1.4 and 1.5 mile; cross Tamarack Drive at 1.9 mile; cross Cheyenne Trail at 3.0 mile; cross Holy Name Drive at 3.1 mile
EAST to Greenwood Elementary School	0.5 miles	Cross Zircon Lane at 3.5 mile; cross Public Water basin at 3.8 mile
NORTH to cul-de-sac on Troy Lane	0.4 miles	Cross Medina Road at 4.2 mile
EAST to Hollydale Substation	0.4 miles	Cross Troy Lane at 4.3 mile; cross CSAH 101 at 4.5 mile
BEGIN **Proposed Route Segment B**	--	Equivalent re-build route of Alternate Route B begins at Hollydale Substation at 4.5 mile.
EAST to beginning of **Proposed Route Segment C**	0.2 miles	Cross Lawndale Lane at 4.7 mile; cross MN 55 at 4.9 mile. Equivalent re-build route of Alternate Route C begins at MN 55.
EAST to End of **Proposed Route Segment C**	0.7 miles	Cross PWI basin at 5.0 mile; cross PWI watercourse at 5.1 mile; cross Garland Avenue at 5.3 mile; cross Dunkirk Lane at 5.4 mile; cross PWI basin at 5.45 mile; cross Black Oaks Lane at 5.5 mile; cross Zanzibar Lane 5.6 mile, reach end of Proposed Alternate Segment C at 5.7 mile.
EAST to Rockford Road	0.7 miles	Cross Vicksburg Lane 5.8 mile; cross Rockford Road at 6.0 mile; cross PWI watercourse at 6.1 mile; cross Polaris Lane at 6.3 mile; Cross Rockford Road at 6.4 mile.
BEGIN **Proposed Route Segment A**	--	Equivalent re-build route of Alternate Route A begins on north side of Rockford Road at 6.4 mile.

Direction	Approximate Distance (Miles)	Road and Public Waters Crossings (Distance provided in this column is cumulative)
NORTH to End of **Proposed Route Segment B**	1.3 miles	Cross PWI basin at 6.5 mile; cross 42nd Avenue at 6.5 mile; cross 43rd Pl at 6.6 mile; cross 44th Avenue at 6.7 mile; cross 46th Avenue at 6.9 mile; cross Schmidt Lake Road at 7.3 mile; cross Canadian Pacific Railway at 7.6 mile; reach end of Proposed Alternate Segment B at 7.6 mile.
EAST to Alternate Substation Site B	0.1 miles	Cross PWI watercourse at 7.6 mile
EAST to Intersection with GRE transmission line	0.3 miles	Cross PWI watercourse at 7.8 mile
EAST to Cheshire Lane	0.2 miles	Cross Canadian Pacific Railway at 8.0 mile; cross PWI watercourse at 8.15 mile; Cross Cheshire Lane at 8.2 mile.
BEGIN **Proposed Route Segment D**	--	Equivalent re-build route of Alternate Route D begins on east side of Cheshire Lane at 8.2 mile.
SOUTH to Schmidt Lake Road	0.2 miles	Cross PWI watercourse at 8.25 mile.
EAST to End of **Proposed Route Segment D** at I-494 right-of-way	0.2 miles	None.
SOUTH to Preferred Substation Site A and END of **Proposed Route Segment A**	0.2 miles	Cross Schmidt Lake Road at 8.45 mile.
END OF PROPOSED ROUTE AT PREFERRED SUBSTATION SITE A	End of Route	None.
Total Length of Route	8.8 miles	

4.2 Route Width and Alignment Selection Process

4.2.1 Route Width

The PPSA 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, the Applicants respectfully request that the Commission approve the Proposed Route and Substation Site A, and authorize a route width of 100 feet on each side of the existing transmission line route centerline (200 feet total width) for a majority of the route, except for the new transmission route segment proposed along Cheshire Lane and Schmidt Lake Road, where the Applicants request a route width of 200 feet on each side of the road centerline (400 feet total width). *See* **Appendix B-2 to B-4**, and **Appendix C** detailed maps.

4.2.2 Route Selection Process

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

The Proposed Route was developed by the Applicants' permitting and engineering personnel based on their investigation of the overall Project area, existing transmission facilities and utility right-of-way, and input from the public and government entities about how to minimize impacts. The Applicants also performed an analysis of environmental resources in the Project area by using Geographic Information System ("GIS") data, including aerial photographs and topographic maps.

Environmental resources identified in the Project area are discussed in Sections 6.1 to 6.6 of this Application. The Proposed Route is designed to best minimize overall impacts of the Project.

On August 23, 2010 Xcel Energy sent letters to provide Project information and to request comments from local government units ("LGUs") and applicable regulatory

agencies located within the Project area. See Section 7.1 and **Appendix D-1** and **D-2** of this Application.

After developing a preliminary route and potential substation locations, Xcel Energy mailed the notice of the first public information meeting to landowners, LGUs and applicable regulatory agencies on August 23, 2010 or September 8, 2010. *See* **Appendix E-1**. Xcel Energy also published notice of the public information meeting on September 3 and 9, 2010 (*See* **Appendix E-2**). On September 15, 2010, the first public information meeting for the Project was held at the Kelly Inn in Plymouth, Minnesota. Approximately 61 people attended this meeting. The purpose of the public information meeting was to inform area landowners, LGUs and applicable regulatory agencies about the proposed Project and to gather public comments early on in the permitting process. Public interest focused primarily on proximity of the transmission lines to residences and trees, placement and size of poles, aesthetics, noise, electromagnetic fields ("EMF") and property values. Some members of the public suggested route alternates for the Project both during and after this meeting. General comments and subsequent email and telephone responses received after the first meeting are presented in **Appendix D-3** to **D-8** (agency comments) and **Appendix E-8** (public comments).

After the first public information meeting, members of Xcel Energy attended a landowner meeting on October 11, 2010, at the request of several homeowners located on Niagara and Orchid Lanes along the existing GRE transmission line route. Approximately 11 people attended this meeting (*See* **Appendix E-4**). Route alternates were suggested by the landowners at this meeting. Other topics discussed included proximity of the transmission lines to residences and trees, placement and size of transmission structures, aesthetics, noise, EMF, and property values. At this meeting the landowners asked Xcel Energy to evaluate other route alternates and requested additional information concerning EMF and existing 115 kV transmission lines in the metro area.

Based on the above public response and suggestion to consider alternate route segments, Xcel Energy held a second public information meeting, notice of which was published on November 5 and 11, 2010 (*See* **Appendix E-6)**. On November 23,

2010, the second public information meeting for the Project was held at the Kelly Inn. The purpose of the second meeting was to inform area landowners along the Proposed Route and alternate routes about the proposed Project and the alternate routes suggested by area landowners along the existing transmission route. Approximately 37 people attended this meeting. Landowners attending this meeting generally commented about the placement of the transmission line and poles in relation to their homes and future development. Homeowners were also concerned about proximity to homes and trees, EMF, and potential impacts on their property values.

The Proposed Route was developed with the following objectives:

- maximize the use of existing transmission line alignments and rights-of-way;
- minimize land use impacts by routing along existing utility routes and roads to reduce the amount of new right-of-way required;
- minimize use of new right-of-way by locating proposed transmission facilities near existing transmission and transportation alignments;
- minimize impacts to residences; and
- minimize impacts to environmental and sensitive resources.

The Applicants believe that the Proposed Route and Substation Site A for the new Pomerleau Lake Substation best meet the objectives stated above. In particular, the Proposed Route maximizes the use of existing transmission line routes by rebuilding approximately 8 miles of an existing transmission line in an existing right-of-way, thereby reducing impacts to both residents and environmental and sensitive resources.

The additional 0.8 miles of new 115 kV transmission line route in the Proposed Route, which connects to the proposed new Pomerleau Lake Substation at Substation Site A, follows existing roadways and also minimizes impacts to future development because it is located on an existing disturbed, undeveloped site that is zoned as Public/Institutional. In contrast, Substation Site B is zoned as Future Restricted Development with adjacent new residential housing that is currently under

construction. In addition, Substation Site A is adjacent to the I-494 transportation alignment and multiple existing HVTL transmission lines (one of which would be connected to the proposed Pomerleau Lake Substation), while Substation Site B is adjacent to a park, a school, and existing and future residential development.

4.3 Alternate Route Segments Considered and Rejected

In evaluating the route for the Project, the Applicants primarily considered the alignment of the existing GRE transmission line rebuild route because it best satisfies the relevant routing criteria. Based upon information and requests gathered from two public information meetings, a landowner meeting, and LGU and agency responses, the Applicants also developed and analyzed four alternate route segments. Each of the alternate route segments requires acquisition of new right-of-way in excess of that required for the Proposed Route. These alternate route segments are identified as Alternate Route Segment A, Alternate Route Segment B, Alternate Route Segment C, and Alternate Route Segment D (collectively, "Alternate Route Segments"). In the sections below, each of these alternate route segments is compared to equivalent segments of the Proposed Route; the corresponding segments of the Proposed Route include: Proposed Route Segment A, Proposed Route Segment B, Proposed Route Segment C, and Proposed Route Segment D (*see* **Figure 3**).

During the route analysis, many considerations were evaluated including social, environmental, and engineering related factors, such as use of an existing transmission line or other rights-of-way, proximity to residential or commercial structures, proximity to areas of archeological or historical significance, and proximity to wetlands or protected waters. **Figure 3** and **Appendix B-2 to B-4** provide an overview of the Alternate Route Segments. **Appendix C** shows detailed route maps for the Alternate Route Segments. **Appendix F** provides detailed route maps for the Proposed and Alternate Route Segments; route segment descriptions for the equivalent Proposed Route Segments are provided in **Table 5**.

In identifying proposed sites for the proposed new Pomerleau Lake Substation, Xcel Energy considered land parcels that comprised 8 to 10 acres in the vicinity of the east end of the transmission line rebuild, the existing Plymouth Substation and the existing

transmission routes along the west side of I-494. Factors taken into consideration to evaluate substation site alternates included land use, site conditions, residential impacts, environmental impacts, proximity to existing transmission lines, and the location of existing transportation and utility alignments. The evaluation areas include different types of residential areas including townhomes, apartment houses, and single-family homes. There are also open spaces with golf courses, trails, and undeveloped forested areas.

Each of the rejected Alternate Route Segments and the substation evaluation areas are discussed below in Sections 4.3.1 through 4.3.6 (*see also* **Appendix F**). If any of the Alternate Route Segments are chosen, the remaining right-of-way associated with the existing GRE transmission line will be maintained for possible future distribution or transmission uses that may be needed for this area. The comparison tables in each section summarize the number of residences and environmental and sensitive resources located near each of the rejected Alternate Route Segments and each of the Proposed Route Segments. Additional information on environmental and sensitive resources for each route segment is provided in **Appendices G** and **H.**

4.3.1 Alternate Route Segment A

Alternate Route Segment A begins on the north side of Rockford Road/CSAH 9 approximately 6.4 miles from the start of the proposed rebuild at the Medina Substation. The total length of Alternate Route Segment A is 1.7 miles. Alternate Route Segment A diverges from the Proposed Route on the north side of Rockford Road/CSAH 9 and proceeds to parallel the road for 0.9 miles to the interchange of CSAH 9 and I-494. At the northwest corner of the interchange of CSAH 9 and I-494, the route would turn north and parallel the existing right-of-way of the Xcel Energy 345 kV Parkers Lake transmission line for 0.25 miles. At this point, a 115 kV GRE transmission line crosses from the east side of I-494 to the west side of the Xcel Energy 345 kV transmission line, requiring Alternate Route Segment A to divert to the west approximately 60 feet. The segment would then be aligned along the west side of the existing 115 kV GRE transmission line and continue north for 0.6 miles, crossing PWI basin #27059400 and ending at Substation Site A (*see* **Appendix F-1** for

additional information; s*ee* **Table 5** for a detailed description of Proposed Route Segment A).

Table 6 compares impacts between Proposed Route Segment A and Alternate Route Segment A. Proposed Route Segment A is longer (2.4 miles) than Alternate Route Segment A (1.7 miles); however, Proposed Route Segment A follows existing transmission line right-of-way for 85 percent of the route, while Alternate Route Segment A follows existing transmission line right-of-way for 49 percent of the route (*see* **Table 6**). Both Proposed Route Segment A and Alternate Route Segment A follow a transmission line and/or a road right-of-way for all of their respective lengths.

Proposed Route Segment A has more residences and non-residential buildings located within 200 feet of the proposed route centerline compared to Alternate Route Segment A (*see* **Table 6**); however, the existing GRE transmission line is already located within proximity of the majority of the structures associated with Proposed Route Segment A, so new impacts would be minimized by using this route segment. Use of Alternate Route Segment A would create new impacts to existing residences, non-residential buildings, and transportation alignments. Alternate Route Segment A has one more private school located within one mile of it than Proposed Route Segment A (*see* **Table 6**). Proposed Route Segment A has one communication tower within 200 feet of the proposed centerline, while Alternate Route Segment A does not have any communication towers within 200 feet of the proposed centerline (*see* **Table 6**). Proposed Route Segment A would cross more wetlands, watercourses, and PWI watercourses compared to Alternate Route Segment A (*see* **Table 6**). In addition, Proposed Route Segment A has more acres of wetland and Federal Emergency Management Agency ("FEMA") floodway within 200 feet of the proposed centerline, compared to Alternate Route Segment A (*see* **Table 6**). However, new impacts to watercourses, wetlands, and floodways would be minimal for Proposed Route Segment A because this route segment follows the existing GRE transmission line. Use of Alternate Route Segment A would create new impacts to watercourses, wetlands, and floodways.

Proposed Route Segment A is preferable to Alternate Route Segment A because it fulfills the following two main objectives of the Project: i) maximizing the use of existing utility alignments; and ii) minimizing the use of new right-of-way.

Table 6
Comparison of Proposed Route Segment A and Alternate Route Segment A

Criteria or Consideration	Proposed Route Segment A	Alternate Route Segment A
Cost Considerations		
Length (miles)	2.4	1.7
Percent of route sharing existing transmission line route	85%	49%
Percent of route paralleling existing highway right-of-way	23%	51%
Residential Considerations		
Residents within 0-35 feet	7	1
Residents within 35-50 feet	13	5
Residents within 50-100 feet	42	5
Residents within 100-200 feet	28	22
Non-Residential Buildings within 0-35 feet	2	1
Non-Residential Buildings within 35-50 feet	0	0
Non-Residential Buildings within 50-100 feet	2	2
Non-Residential Buildings within 100-200 feet	6	2
Private Schools within one mile	3	4
Public Schools within one mile	1	1
Child Care Centers within one mile	4	4
Communication Towers within 200 feet	1	0
Environmental Considerations		
Archaeological Sites (0.5 mile)	0	0
Historical Sites (0.5 mile)	1 total (1 razed)	2 total (2 razed)
Prime Farmland (acres) within 200 feet	0	0
Total Number of Watercourse Crossings	5	1
Total Number of Public Watercourse Crossings	4	0
Total Number of Public Water Basin Crossings	1	1
Total Length of Wetlands Crossed (feet)	3,402	2,813
Acres of Wetlands within 200 feet	27.6	18.3
FEMA Floodway (acres) within 200 feet	7.5	0
NHIS Species within one mile	0	2
NHIS Rare Communities within one mile	2	1
MCBS Site of Biodiversity Significance (acres) within 200 feet	0	5.6

Criteria or Consideration	Proposed Route Segment A	Alternate Route Segment A
Scientific & Natural Area (acres) within one mile	0	0
Snowmobile Trails (feet) within 200 feet	0	0

"NHIS" refers to Natural Heritage Information System; "MCBS" refers to Minnesota County Biological Survey

4.3.2 Alternate Route Segment B

The proposed Alternate Route Segment B begins at the Proposed Route on the eastern side of CSAH 101, approximately 4.5 miles from the start of route at the Medina Substation. The total length of Alternate Route Segment B is 3.1 miles.

Alternate Route Segment B diverges from the Proposed Route, expands to a route-width of 400 feet, and proceeds north, paralleling CSAH 101 and later Peony Lane, for approximately one mile before reaching the Canadian Pacific Railway tracks. At this point, the segment proceeds east along the southern side of the Canadian Pacific Railway tracks for 2.3 miles to Substation Site B. In this extent the segment is adjacent to PWI basins #27060000 and 27059900 and intersects an unnamed PWI watercourse. For approximately 800 feet to the southwest of Schmidt Lake Road, Alternate Route Segment B crosses to the north side of the railroad tracks to avoid residences and then crosses back to the south side just west of the Schmidt Lake Road crossing. Approximately 1,000 feet after crossing Schmidt Lake Road, the segment again crosses to the north side of the tracks to avoid residences on Archer Lane North. Alternate Route Segment B rejoins the existing GRE 69 kV transmission line and the Proposed Route immediately northeast of Providence Academy (*see* **Appendix F-2** for additional information; *see* **Table 5** for a detailed description of Proposed Route Segment B).

Table 7 compares impacts between Proposed Route Segment B and Alternate Route Segment B. Both Proposed Route Segment B and Alternate Route Segment B are approximately 3.1 miles long. However, Proposed Route Segment B follows existing transmission line right-of-way for all of its length, while Alternate Route Segment B does not follow any existing transmission line right-of-way (*see* **Table 7**). Alternate Route Segment B follows existing road and railroad right-of-way for all of its length.

Proposed Route Segment B has more residences, non-residential buildings, and childcare centers located within proximity of it compared to Alternate Route Segment B (*see* **Table 7**); however, because Proposed Route Segment B follows the existing GRE line, no new impacts to these structures or facilities would occur from using the Proposed Route Segment B. Use of Alternate Route Segment B would create new impacts to residences, non-residential buildings, private schools, and childcare centers. Proposed Route Segment B has one communication tower within 200 feet of the proposed centerline, while Alternate Route Segment B does not have any communication towers within 200 feet of the proposed centerline (*see* **Table 7**). Alternate Route Segment B has approximately 7 acres of designated prime farmland within 200 feet of the proposed centerline, while Proposed Route Segment B does not have any prime farmland within 200 feet of its proposed centerline (*see* **Table 7**). In addition, Alternate Route Segment B has more miles of snowmobile trail within 200 feet of the proposed centerline compared to Proposed Route Segment B (*see* **Table 7**). Proposed Route Segment B would cross more wetlands, watercourses, and PWI watercourses and basins compared to Alternate Route Segment B (*see* **Table 7**). In addition, Proposed Route Segment B has more acres of wetland and FEMA floodway within 200 feet of the proposed centerline, compared to Alternate Route Segment B (*see* **Table 7**). However, new impacts to watercourses, wetlands, and floodways would be minimal for Proposed Route Segment B because this route segment follows the existing GRE transmission line.

Proposed Route Segment B is preferable to Alternate Route Segment B because it fulfills the following two main objectives of the Project: i) maximizing the use of existing utility right-of-way; and ii) minimizing the use of new right-of-way.

Table 7
Comparison of Proposed Route Segment B and Alternate Route Segment B

Criteria or Consideration	Proposed Route Segment B	Alternate Route Segment B
Cost Considerations		
Length (miles)	3.0	3.1
Percent of route sharing existing transmission line route	100%	0%
Percent of route paralleling existing highway right-of-way	24%	33%

Criteria or Consideration	Proposed Route Segment B	Alternate Route Segment B
Residential Considerations		
Residents within 0-35 feet	10	0
Residents within 35-50 feet	34	3
Residents within 50-100 feet	79	1
Residents within 100-200 feet	79	101
Non-Residential Buildings within 0-35 feet	2	0
Non-Residential Buildings within 35-50 feet	0	0
Non-Residential Buildings within 50-100 feet	2	3
Non-Residential Buildings within 100-200 feet	4	2
Private Schools within one mile	3	3
Public Schools within one mile	3	3
Child Care Centers within one mile	7	3
Communication Towers within 200 feet	1	0
Environmental Considerations		
Archaeological Sites (0.5 mile)	0	0
Historical Sites (0.5 mile)	12 total (11 razed)	7 total (6 razed)
Prime Farmland (acres) within 200 feet	0	6.9
Total Number of Watercourse Crossings	3	2
Total Number of Public Watercourse Crossings	2	1
Total Number of Public Water Basin Crossings	3	1
Total Length of Wetlands Crossed (feet)	4,171	679
Acres of Wetlands within 200 feet	35.5	20.2
FEMA Floodway (acres) within 200 feet	15.6	0
NHIS Species within one mile	0	0
NHIS Rare Communities within one mile	2	3
MCBS Site of Biodiversity Significance (acres) within 200 feet	0	0
Scientific & Natural Area (acres) within one mile	0	0
Snowmobile Trails (feet) within 200 feet	1,139	1,322

4.3.3 Alternate Route Segment C

Alternate Route Segment C begins on the east side of MN 55, approximately 4.9 miles from the start of the route at the Medina Substation. The total length of Alternate Route Segment C is approximately one mile.

Alternate Route Segment C diverges southeast from the Proposed Route and has a route-width of 400 feet. The segment parallels MN 55 for 0.5 mile and then turns

northeast and parallels the north side of Rockford Road for 0.5 mile. Alternate Route Segment C turns north along the western edge of a small pond for approximately 260 feet and reconnects with the Proposed Route approximately 850 feet west of Vicksburg Lane (*see* **Appendix F-3** for additional information; s*ee* **Table 5** for a detailed description of Proposed Route Segment C).

Table 8 compares impacts between the Proposed Route Segment C and the Alternate Route Segment C. Proposed Route Segment C is shorter (0.7 mile) than Alternate Route Segment C (one mile) (*see* **Table 8**). In addition, Proposed Route Segment C follows existing transmission line right-of-way for all of its length, while Alternate Route Segment C does not follow existing transmission line right-of-way for any of its length (*see* **Table 8**). However, Alternate Route Segment C follows existing road right-of-way for 95 percent of its length.

Proposed Route Segment C has more residences within proximity of it compared to Alternate Route Segment C (*see* **Table 8**); however, because Proposed Route Segment C follows the existing GRE line, no new impacts to these residences would occur from using the Proposed Route Segment C. Alternate Route Segment C has more miles of snowmobile trail within 200 feet of the proposed centerline compared to Proposed Route Segment C (*see* **Table 8**). Proposed Route Segment C would cross more wetlands and one more PWI basin than Alternate Route Segment C (*see* **Table 8**). In addition, Proposed Route Segment C has more acres of wetland and FEMA floodway within 200 feet of the proposed centerline, compared to Alternate Route Segment C (*see* **Table 8**). However, new impacts to PWI basins, wetlands, and floodways would be minimal for Proposed Route Segment C because this route segment follows the existing GRE line.

Proposed Route Segment C is preferable to Alternate Route Segment C because it fulfills the following two main objectives of the Project: i) maximizing the use of existing utility right-of-way; and ii) minimizing the use of new right-of-way.

Table 8
Comparison of Proposed Route Segment C and Alternate Route Segment C

Criteria or Consideration	Proposed Route Segment C	Alternate Route Segment C
Cost Considerations		
Length (miles)	0.7	1.0
Percent of route sharing existing transmission line route	100%	0%
Percent of route paralleling existing highway right-of-way	0%	95%
Residential Considerations		
Residents within 0-35 feet	2	0
Residents within 35-50 feet	14	0
Residents within 50-100 feet	25	6
Residents within 100-200 feet	27	13
Non-Residential Buildings within 0-35 feet	0	0
Non-Residential Buildings within 35-50 feet	0	0
Non-Residential Buildings within 50-100 feet	0	0
Non-Residential Buildings within 100-200 feet	1	1
Private Schools within one mile	1	1
Public Schools within one mile	3	3
Child Care Centers within one mile	5	5
Communication Towers within 200 feet	0	0
Environmental Considerations		
Archaeological Sites (0.5 mile)	0	0
Historical Sites (0.5 mile)	9 total (8 razed)	8 total (7 razed)
Prime Farmland (acres) within 200 feet	0	0
Total Number of Watercourse Crossings	1	1
Total Number of Public Watercourse Crossings	1	1
Total Number of Public Water Basin Crossings	2	1
Total Length of Wetlands Crossed (feet)	1,513	1,223
Acres of Wetlands within 200 feet	14.1	10.2
FEMA Floodway (acres) within 200 feet	4.6	2.2
NHIS Species within one mile	0	0
NHIS Rare Communities within one mile	0	0
MCBS Site of Biodiversity Significance (acres) within 200 feet	0	0
Scientific & Natural Area (acres) within one mile	0	0
Snowmobile Trails (feet) within 200 feet	479	2,973

4.3.4 Alternate Route Segment D

Alternate Route Segment D begins at the eastern side of Cheshire Lane, 8.2 miles from the start of the route at the Medina Substation. The total length of Alternate Route Segment D is approximately 0.4 miles and has a route-width of 400 feet.

Alternate Route Segment D diverges from the Proposed Route east along the south side of the Canadian Pacific Railway track for approximately 920 feet, crossing an unnamed PWI watercourse. The segment then turns south along the western side of I-494 and along the existing GRE Plymouth Substation and an existing 345 kV transmission line for approximately 1,000 feet where it rejoins the Proposed Route on the north side of Schmidt Lake Road (*see* **Appendix F-4** for additional information; s*ee* **Table 5** for a detailed description of Proposed Route Segment D). While use of Alternate Route D for the proposed new 115 kV transmission is possible, it will require careful siting of transmission structures and conductors due to the presence of the GRE Plymouth Substation and the number of existing overhead HVTLs in this area. Modifications to GRE's Plymouth Substation may also be required to use this route.

Table 9 compares impacts between the Proposed Route Segment D and the Alternate Route Segment D. Both the Proposed Route Segment D and the Alternate Route Segment D are approximately 0.4 miles long. Alternate Route Segment D follows existing transmission line right-of-way for all of its length, while Proposed Route Segment D does not follow any existing transmission line right-of-way (*see* **Table 9**). Proposed Route Segment D follows existing road right-of-way for all of its length.

There are no residences located within 200 feet of the proposed centerlines of Proposed Route Segment D or Alternate Segment D (*see* **Table 9**). Proposed Route Segment D has more non-residential structures within 200 feet of its proposed centerline compared to Alternate Route Segment D (*see* **Table 9**). Proposed Route Segment D also has one more childcare center within one mile of it compared to Alternate Route Segment D (*see* **Table 9**). Alternate Route Segment D has more communication towers within 200 feet of the proposed centerline compared to Proposed Route Segment D (*see* **Table 9**). Alternate Route Segment D would cross

more wetland area than Proposed Route Segment D. Proposed Route Segment D has more acres of wetland within 200 feet of the proposed centerline compared to Alternate Route Segment D (*see* **Table 9**).

Proposed Route Segment D is preferable to Alternate Route Segment D because it fulfills the following two main objectives of the Project: i) maximizing the possibility to share existing road right-of-way and associated utility right-of-way; and ii) minimizing the use of new right-of-way. Alternate Route Segment D is not preferable to Proposed Route Segment D because it will require additional detailed transmission line routing and design and possible movement of existing transmission facilities to accommodate the new 115 kV transmission line. It will also complicate future possible use of Alternate Route Segment D for a transmission route.

Table 9
Comparison of Proposed Route Segment D and Alternate Route Segment D

Criteria or Consideration	Proposed Route Segment D	Alternate Route Segment D
Cost Considerations		
Length (miles)	0.4	0.4
Percent of route sharing existing transmission line route	0%	100%
Percent of route paralleling existing highway right-of-way	100%	0%
Residential Considerations		
Residents within 0-35 feet	0	0
Residents within 35-50 feet	0	0
Residents within 50-100 feet	0	0
Residents within 100-200 feet	0	0
Non-Residential Buildings within 0-35 feet	0	0
Non-Residential Buildings within 35-50 feet	0	0
Non-Residential Buildings within 50-100 feet	1	1
Non-Residential Buildings within 100-200 feet	4	0
Private Schools within one mile	1	1
Public Schools within one mile	0	0
Child Care Centers within one mile	2	1
Communication Towers within 200 feet	1	3
Environmental Considerations		
Archaeological Sites (0.5 mile)	0	0

Criteria or Consideration	Proposed Route Segment D	Alternate Route Segment D
Historical Sites (0.5 mile)	1 total (1 razed)	1 total (1 razed)
Prime Farmland (acres) within 200 feet	0	0
Total Number of Watercourse Crossings	1	1
Total Number of Public Watercourse Crossings	1	1
Total Number of Public Water Basin Crossings	0	0
Length of Wetlands Crossed (feet)	99	181
Acres of Wetlands within 200 feet	2.6	1.1
FEMA Floodway (acres) within 200 feet	0	0
NHIS Species within one mile	0	0
NHIS Rare Communities within one mile	1	1
MCBS Site of Biodiversity Significance (acres) within 200 feet	0	0
Scientific & Natural Area (acres) within one mile	0	0
Snowmobile Trails (feet) within 200 feet	0	0

4.4 New Pomerleau Lake Substation

Xcel Energy evaluated the general area at the east end of the transmission line rebuild Project for placement of the proposed new Pomerleau Lake Substation. The area includes different types of residential uses such as townhomes, apartments, and single-family homes. There are also open spaces with golf courses, trails, and undeveloped forested areas. Because the proposed substation site requires 8 to 10 acres of land, only two locations were identified within the evaluation area. Therefore, Substation Sites A and B are considered for the location of the proposed new Pomerleau Lake Substation in this Application. *See* **Figure 2, Appendix B-5 and B-6** and **Appendix C, Figures C-14 and C-16**.

Xcel Energy prefers Substation Site A because it: 1) minimizes impacts to current land use; 2) maximizes use of existing utility and transportation alignments and rights-of-way; 3) is relatively isolated from nearby residential properties; 4) is located in close proximity to existing transmission facilities to which it will be interconnected for this Project and allow for future planned expansion (e.g. the GRE 115 kV Line WH-PP, a new future 115 kV transmission line that will connect with the Twin Lakes Substation,

and an existing 345 kV transmission line connection); and 5) minimizes impacts to environmental and sensitive resources.

4.4.1 Substation Site A

Substation Site A, the Applicants' preferred site, is located approximately 0.2 miles south of Schmidt Lake Road and adjacent to and west of the I-494 alignment (*see* **Figure 2**; **Appendix B-5**). This site is located on City of Plymouth property (currently zoned as Public/Institutional) with the adjacent property to the west owned by Aero Systems Engineering (currently zoned as Light Industrial). The City of Plymouth also owns the property to the south of Substation Site A. The middle portion of the site is elevated, and the site slopes down to the north, east, and south. The site currently being used by the City of Plymouth for placement of unused soil and related construction materials from various City projects. It is generally devoid of vegetation and is accessed from the north off of Schmidt Lake Road by an unpaved road. The access road is located between the Aero Systems Engineering building to the west and a wetland and I-494 to the east. It appears that the property is primarily vacant although parked city equipment has been observed on the site. According to the Plymouth City Manager, the City of Plymouth has plans to use the site for a future park facility (*see* Section 8.1 and letter in **Appendix D-4**).

In addition to the above-stated reasons, Substation Site A is the preferred site for the Project for the following reasons:

1. it is adjacent to existing, extensive transmission line right-of-way that runs north-south along the west side of I-494, it is appropriately zoned, and is located in a light industrial area;

2. the site is relatively close to the Canadian Pacific Railway that runs east-west which could be used in right-of-way sharing, in the future, to connect Pomerleau Lake Substation to the planned Meadow Lake Substation and existing Twin Lakes Substation located east of the new Pomerleau Lake Substation in Plymouth;

3. the location of the site greatly reduces the need for additional right-of-way for future needs, and the existing 345 kV line located along I-494 could be connected to the planned Pomerleau Lake Substation in the future with little additional right-of-way;

4. the site has vegetation (e.g. trees, bushes, etc.) and contains topographic features (e.g. higher elevation than surrounding areas) that provide some level of natural screening which can be used in developing the substation site with the use of additional vegetative screening and landscaping so that it can be positively integrated into existing surrounding land uses and minimize aesthetic impacts; and

5. there is ready access to the site via an existing private road that exits the site to the north onto Schmidt Lake Road which will assist in developing and using the site for substation use.

4.4.2 Substation Site B

Substation Site B is located north of the Canadian Pacific Railway tracks, northeast of Providence Academy and northwest of the Fernbrook Hills 3rd Addition residential development (*see* **Figure 2**; **Appendix B-6**). The land is owned by Hampton Hills Investment, LLC and currently is zoned as residential property; however, there are no residences currently located on the site. To the west of Substation Site B, there is the former Hampton Hills golf course and to the northwest and north, a residential development is currently under construction. The access to the site is from the north via Juneau Lane. The site slopes to the east into PWI basin #27059700 and an unnamed PWI watercourse. The site is hilly with bare soil present in several areas. The vegetated areas of the site are primarily covered with grass and sparse coniferous trees.

Substation Site B is not preferred for the Project for the following reasons:

1. it is adjacent to land currently being developed as residential property and an existing school;

2. due to the lower topographic elevation compared to surrounding land, the site would be visible to surrounding landowners and land users, even with screening and landscaping;

3. a double-circuit 115/115 kV transmission line would need to be constructed from this site along the railroad to the intersection with GRE's existing transmission Line WH-PB, and additional future transmission right-of-way will be needed for future possible connections to existing 345 kV transmission lines located along the west side of I-494; and

4. access to this site would be more difficult than Substation Site A and require passing through a residential neighborhood.

4.5 New Line Interconnection With Existing GRE 115 kV Transmission Line

The Project includes connection of the proposed transmission line rebuild with an existing GRE 115 kV transmission line. If the proposed Pomerleau Lake Substation is constructed at Substation Site A, the existing GRE 115 kV transmission Line WH-PP would be connected to the new substation through new termination points. *See* **Figure 2, Appendix B-5 and Appendix C-15**.

If Substation Site B is used for the proposed new substation, the rebuilt 115 kV transmission line would terminate at the new Pomerleau Lake Substation and a new double circuit 115 kV transmission line would be constructed from the new Pomerleau Lake Substation to an interconnection point with the existing GRE 115 kV transmission Line WH-PB located north of the Canadian Pacific Railway tracks north of Fernbrook Lane. *See* **Figure 2, Appendix B-6** and **Appendix C-14**.

4.6 Design Options to Accommodate Future Expansion

The proposed 115 kV transmission line is designed to meet current and projected needs.

The proposed new Pomerleau Lake Substation is designed to provide for interconnection with proposed, existing, and potential future transmission facilities.

As part of the Project, connections with existing GRE transmission facilities are described in Section 4.5 above. The proposed new Pomerleau Lake Substation site is sized at 8 to 10 acres and is designed for the proposed Project, as well as for a future new 115 kV transmission line termination which will connect the Pomerleau Lake Substation to a future, planned Xcel Energy Meadowlake Substation and the existing Xcel Energy Twin Lakes Substation located within the City Plymouth. The Pomerleau Lake Substation will also be sized and designed for a possible future double circuit interconnection with the existing 345 kV transmission system.

4.7 Associated Facilities and Substation Modifications

4.7.1 Proposed New Pomerleau Lake Substation

The amount of land required for the proposed new Pomerleau Lake Substation is approximately 8 to 10 acres. This area includes applicable setbacks, stormwater ponds, grading, foundations, fencing, new right-of-way, and potential transmission line structures. The initial fenced area for the planned substation facility measures approximately 371 by 378 feet (~3.2 acres). The approximate ultimate fenced area would be 426 by 903 feet (~8.8 acres). The buffer area outside of the fenced area is an additional 10 feet. One primary gate and one alternate gate would be installed in the fence. One Electrical Equipment Enclosure ("EEE") would be installed within the fenced area and measures approximately 25 by 41 feet. The ultimate EEE would measure approximately 25 by 82 feet. Approximately 500-700 lineal feet of a 25-foot wide access road would be required from Schmidt Lake Road to the fenced area. A stormwater pond is planned for the substation site, which has not yet been sized or designed. The proposed new Pomerleau Lake Substation includes a 115 kV, 63 kiloampere ("kA") transmission substation with the following initial equipment:

- a 4-position ring bus configuration;
- four 115 kV transmission line terminations, each with a motor-operated transmission line switches;
- a number of single-phase coupling capacitor voltage transformers ("CCTVs");

- a 3000 amp ("A") wave trap and line tuner;
- three 76 kV maximum continuous operating voltage ("MCOV") station class surge arresters;
- 115 kV circuit breakers and associated disconnect switches;
- an Electrical Equipment Enclosure ("EEE") with control panels, battery, charger, programmable logic controller ("PLC"), terminal cabinets, furniture, heaters, alternating current ("AC") and direct current ("DC") cabinets, lighting, telephone, telephone control, and cable control;
- a 115 kV service station voltage transformer ("SSVT") for primary station auxiliary power and local distribution for emergency auxiliary power; and
- all bus work, cable, controls and relaying, steel structures, trenching, foundations and fencing for the above installations.

For the Project, the proposed new Pomerleau Lake Substation will have line terminations to the Hollydale Substation (the 115 kV transmission Line 5551 rebuild) and connect to the existing GRE 115 kV transmission Line WH-PP (from Parkers Lake to Cedar Island Substations). The substation site will be designed with room for line terminations for a future 115 kV transmission line section between the Pomerleau Lake Substation and the future, new Meadow Lake Substation. It will also be large enough for a future 345 kV substation yard that will allow the Pomerleau Lake Substation to connect with the existing Parkers Lake to Creek 345 kV line and the Parkers Lake to Dickenson 345 kV line.

A new EEE will be installed within the fenced area at the new Pomerleau Lake Substation site. The EEE will contain all the control equipment and systems for the substation. Preliminary plans for the new Pomerleau Lake Substation are attached in **Appendix B-7**.

4.7.2 Modifications to Existing Medina Substation

The existing GRE Medina Substation will be converted from 69 kV to 115 kV as part of the Project. The 69 kV transmission line facilities will be removed along with the 115/69 kV transformer and a 3-way pole mounted switch. Equipment additions at these substations will include installation of a 115 kV straight bus with two breaker positions. One of the breaker positions will serve the rebuilt 115 kV transmission line and the other breaker will be reserved for future use. The distribution equipment and existing feeders will be re-oriented and the northwest fence corner will be expanded to accommodate the modifications. Modifications to the Medina Substation will occur within the existing property limits. No more than an additional 0.25-acres will be added to the substation layout and fenced area of the existing substation will be increased. However, if it is determined that over an acre will be disturbed, GRE will apply for a National Pollutant Discharge Elimination System ("NPDES") construction stormwater permit. Preliminary plans for modifications to the Medina Substation are provided in **Appendix B-8**.

4.7.3 Modifications to Existing Hollydale Substation

The Xcel Energy Hollydale Substation is an existing 69-13.8 kV and 34.5-13.8 kV distribution substation located at the intersection of Highway 101 and Highway 55 in Plymouth. The transmission portion of this substation is built to 115 kV and consists of a 115 kV dead-end structure with an empty switch porch. The Project includes converting this substation to an in-out, 115 kV, 40 kA distribution substation with a 115 kV, bus-tie circuit breaker, and removing the 69 kV transformer and installing a 118-14.3 kV, 50 megavolt-amperes ("MVA") transformer, and connecting to the Medina Substation to the west (upgraded by this Project to 115 kV) and the new 115 kV Pomerleau Lake Substation to the east. Modifications to the Hollydale Substation will occur within the existing property limits. The fenced area of the existing substation will be expanded to accommodate these changes. A new EEE will be installed within the fenced area at the Hollydale Substation site. The EEE will contain all the control equipment and systems for the substation. *See* **Appendix B-9** and **Appendix C-8**.

The following transmission facility equipment at the Hollydale Substation will be installed for the Project:

- one motor-operated 115 kV, 3000 ampere ("A"), line switch, three single-phase CCVTs, a 3000 A wave trap and line tuner, and three 76 kV MCOV station class surge arresters on the existing line termination structure for the new 115 kV Pomerleau Lake line;
- one new 115 kV Medina line termination structure, one motor-operated 115 kV, 3000A, line switch, three single-phase CCVTs, a 3000 A wave trap and line tuner, and three 76 kV MCOV station class surge arresters;
- one new 115 kV, 3000 A, 40 kA, bus-tie circuit breaker with two 3000 A, group-operated, disconnect switches; and
- all bus work, cable, controls and relaying, steel structures, trenching, and foundations for the above installations (all 115 kV bus would be sized for a minimum 3000 A capacity).

5.0 Engineering Design, Construction and Right-of-Way Acquisition for Rebuild Section, New Section and New Substation

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

5.1.1 Transmission Structures

The proposed structures for this Project are galvanized steel or weathering steel poles. A picture and schematic of these proposed structure types are shown below in **Figures 4-8**. The Applicants propose to use direct embedded galvanized steel or weathering steel poles for the tangent structures if soil conditions warrant. Rock-filled culvert or concrete drilled pier foundations may be required in areas with poor soils. The average span will be about 300 to 400 feet, with a maximum span of approximately 1,200 feet to keep the conductor within existing right-of-way or to span wetland areas, where applicable. **Table 10** summarizes the structure designs and foundation for the line.

Table 10
Structure Design Summary

Line Type	Structure Type	Structure Material	Typical Right-of-way Width (feet)	Structure Height (feet)	Structure Base Diameter (inches)	Foundation Diameter (feet)	Span Between Structures (feet)
Single Circuit 115 kV	Single Pole Braced Post (for longer spans)	Galvanized Steel or Weathering Steel	75	70 to 90	24 to 42: tangent structures 36 to 72: angle structures	Direct embedded in 4 foot culvert	300 to 500
Single Circuit 115 kV	Single Pole Horizontal Post (all one side)	Galvanized Steel or Weathering Steel	75	70 to 90	24 to 42: tangent structures 36 to 72: angle structures	5 to 6	300 to 500
Single Circuit 115 kV	Single Pole Horizontal Post	Galvanized Steel or Weathering Steel	75	70 to 90	24 to 42: tangent structures 36 to 72: angle structures	Direct embedded in 4 foot culvert	300 to 500
Single Circuit 115 kV	Single Pole, Cross Arm, Y-Frame	Galvanized Steel or Weathering Steel	75	70-90	36 to 72	5 to 8	500 to 1,200
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 6-8	300 to 500

The proposed transmission line will be designed to meet or surpass relevant local and state codes including the National Electric Safety Code ("NESC") and Company standards. Appropriate standards will be met for construction and installation, and applicable safety procedures will be followed during and after installation.

Figure 4 Typical 115 kV Single Circuit Horizontal Post Structure

Figure 5 Typical 115 kV Single Circuit Horizontal Post Structure (one side)

Figure 6 Typical 115 kV Single Circuit Braced Post Insulator Structure

Figure 7 Typical 115 kV Single Circuit, Single Pole, Cross Arm Y-Frame Structure

Figure 8 Typical 115/115 kV Double Circuit Davit Arm Structure

5.1.2 Right-of-Way Width

Xcel Energy will construct the proposed 115 kV transmission line rebuild on the current centerline and within existing easements of the existing GRE 69 kV transmission line where reasonably possible. As indicated in Section 4.3, if any of the Alternate Route Segments are chosen, the remaining right-of-way associated with the existing GRE transmission line will be maintained for possible future distribution or transmission uses that may be needed in this area.

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). The existing easements along the rebuild route range from 70 to 100 feet wide. 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 9–13** and detailed maps in **Appendix C**.

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 outside roadway right-of-way. 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. The amount of new easement required will depend upon the road configuration and the distance between the road and the transmission line. 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.

For the Proposed Route to preferred Substation Site A, approximately 0.8 miles of new right-of-way will be needed from the east end of the transmission line rebuild

(near the intersection of the Canadian Pacific Railway and Fernbrook Lane) and the proposed new Pomerleau Lake Substation. *See* **Appendix B-4** and **Appendix C-15 and C-16**. For new right-of-way, Xcel Energy will require right-of-way width of 75 feet centered on the centerline of the proposed new transmission line. **Figures 9–13** show the right-of-way requirements for the line.

Figure 9 Typical Dimensions and Right-of-Way Requirements for Single Circuit 115 kV Braced Post Structures

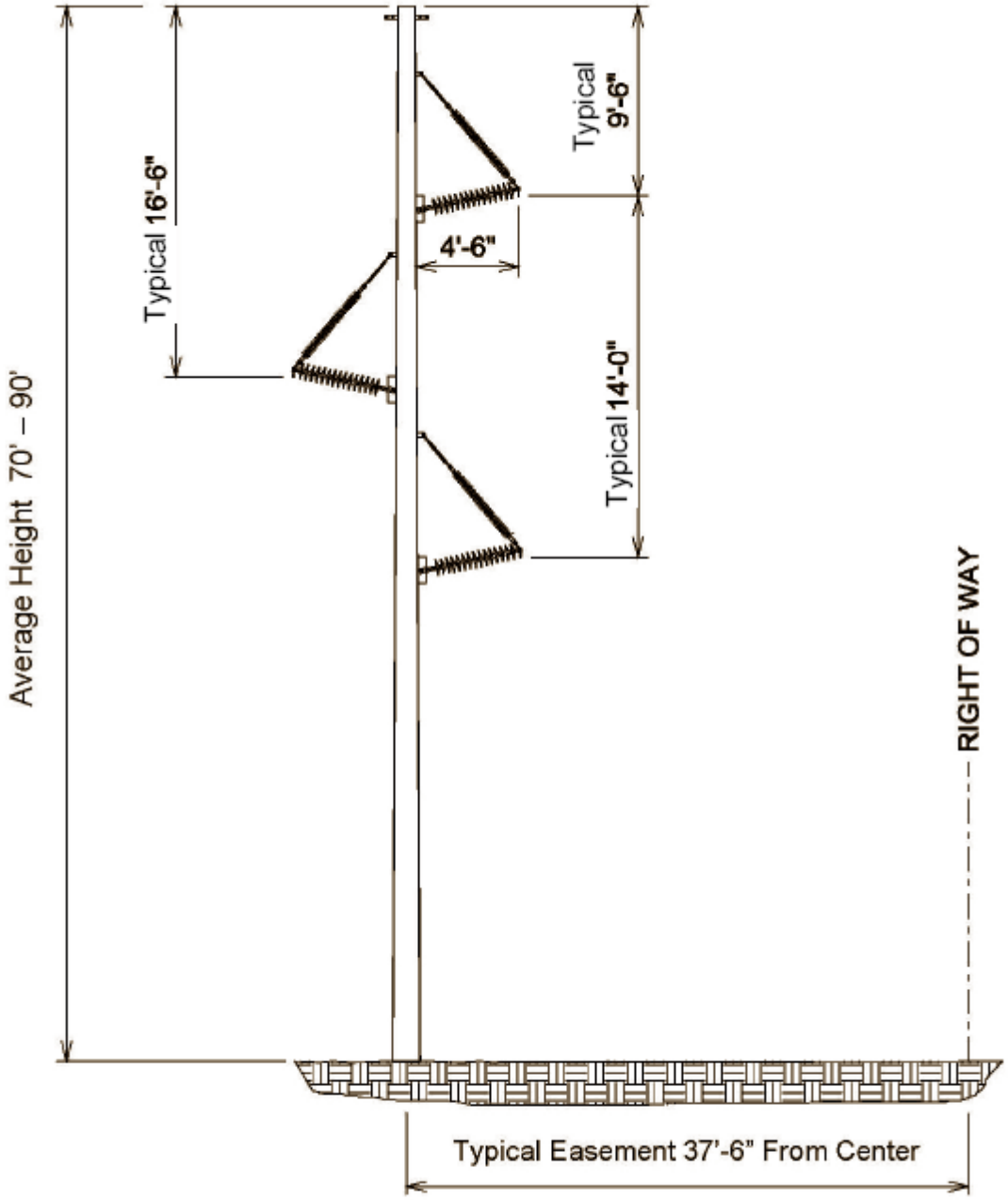


Figure 10 Typical Dimensions and Right-of-Way Requirements for Horizontal Post Structures

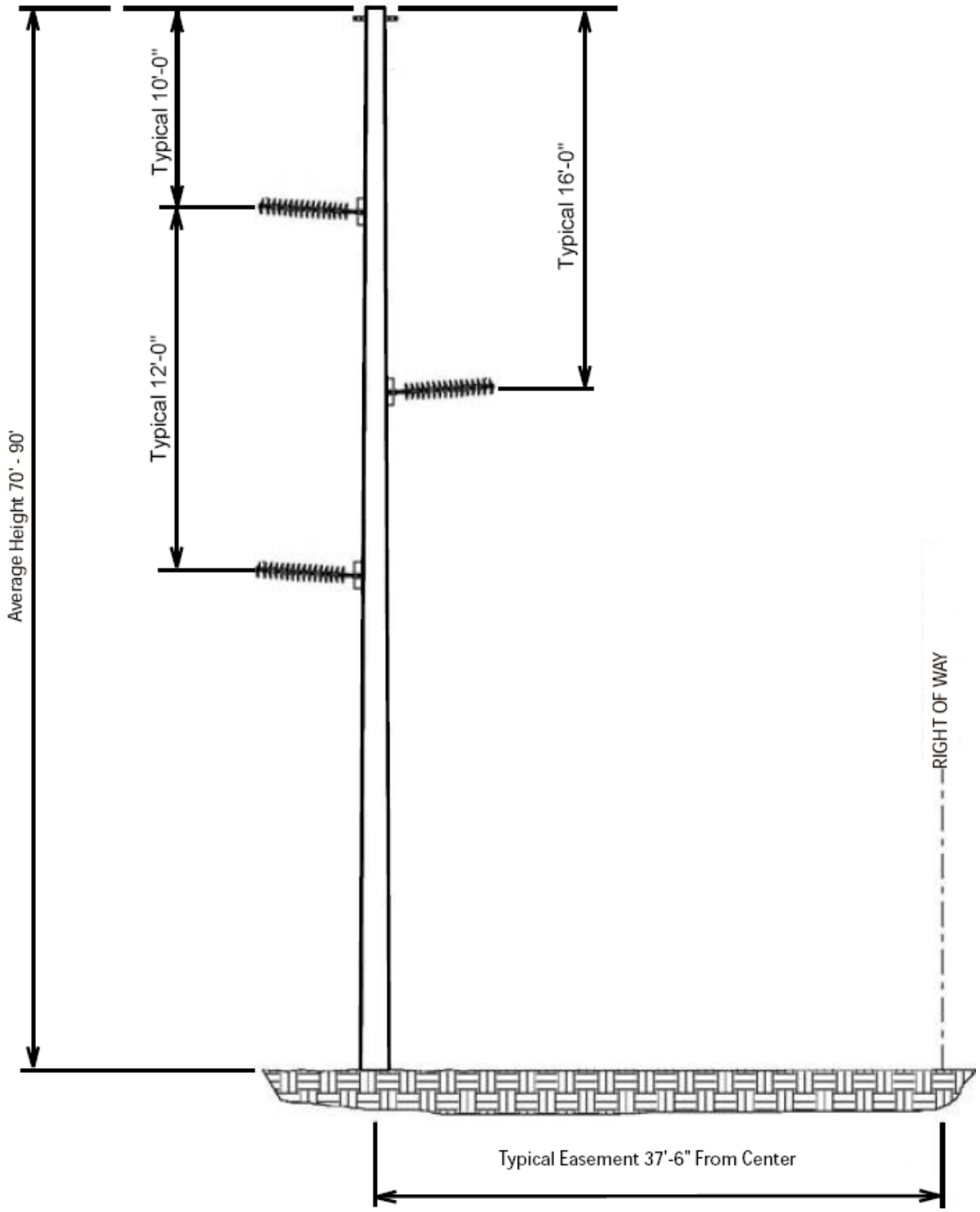


Figure 11 Typical Dimensions and Right-of-way Requirements for Horizontal Post Structures (one side)

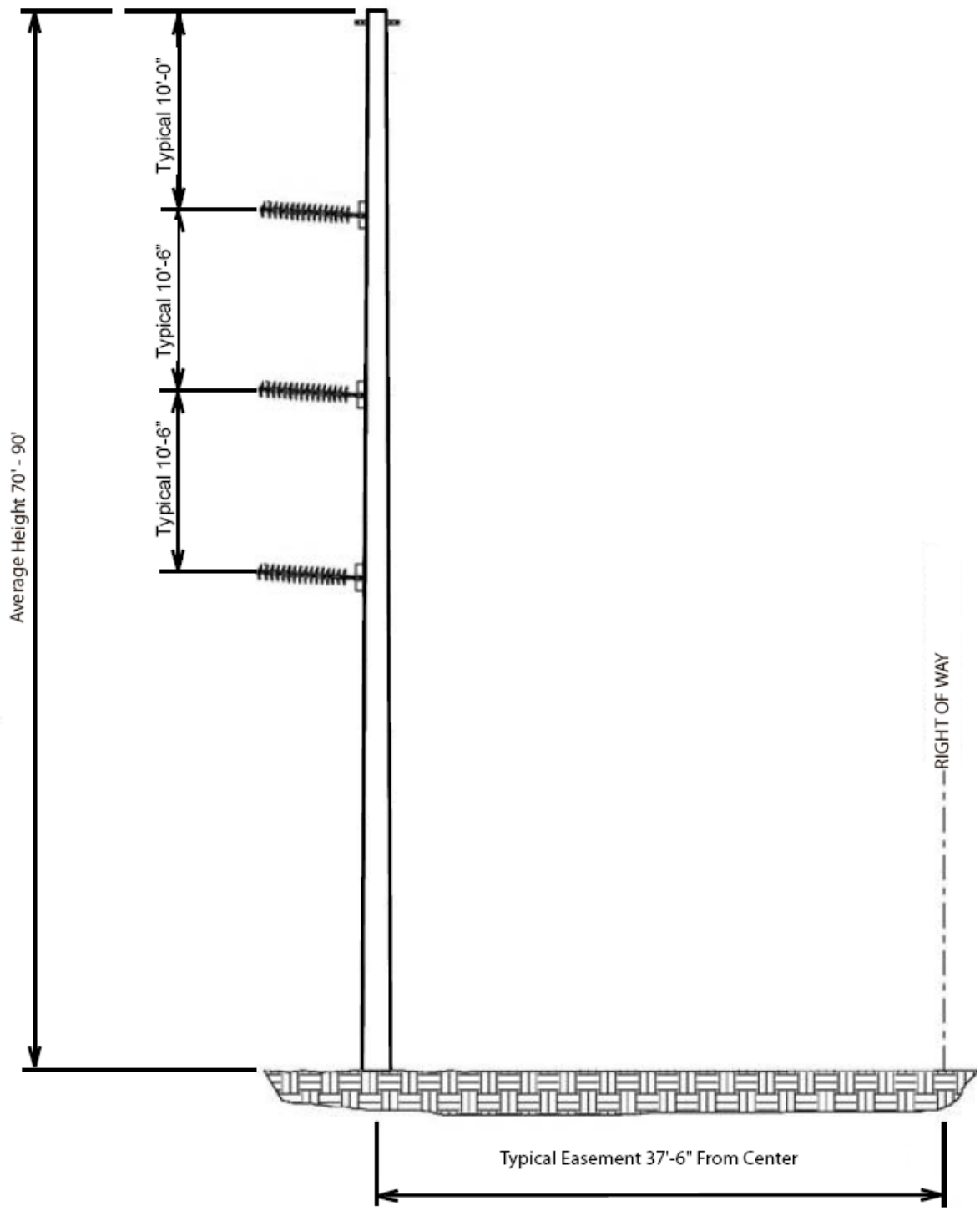


Figure 12 Typical Dimensions and Right-of-Way Requirements for Single Circuit, Single Pole, Cross Arm Y-Frame Structures

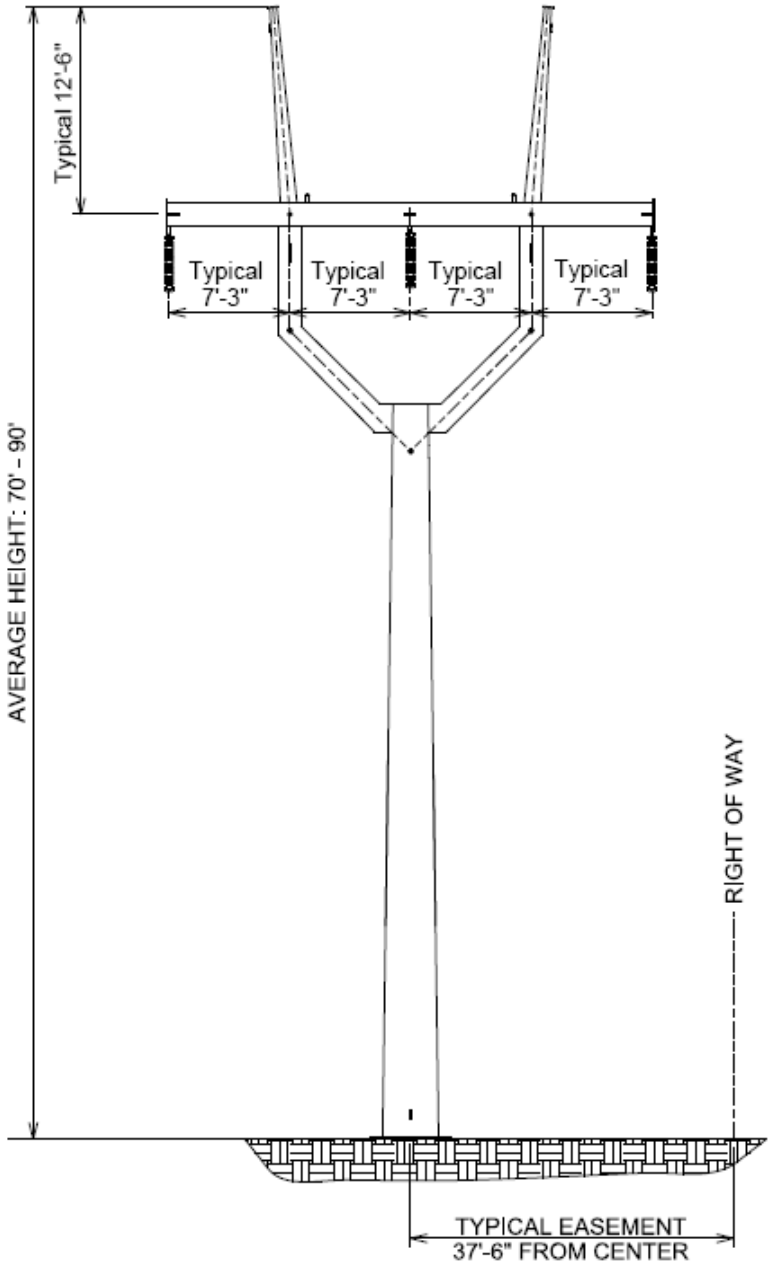
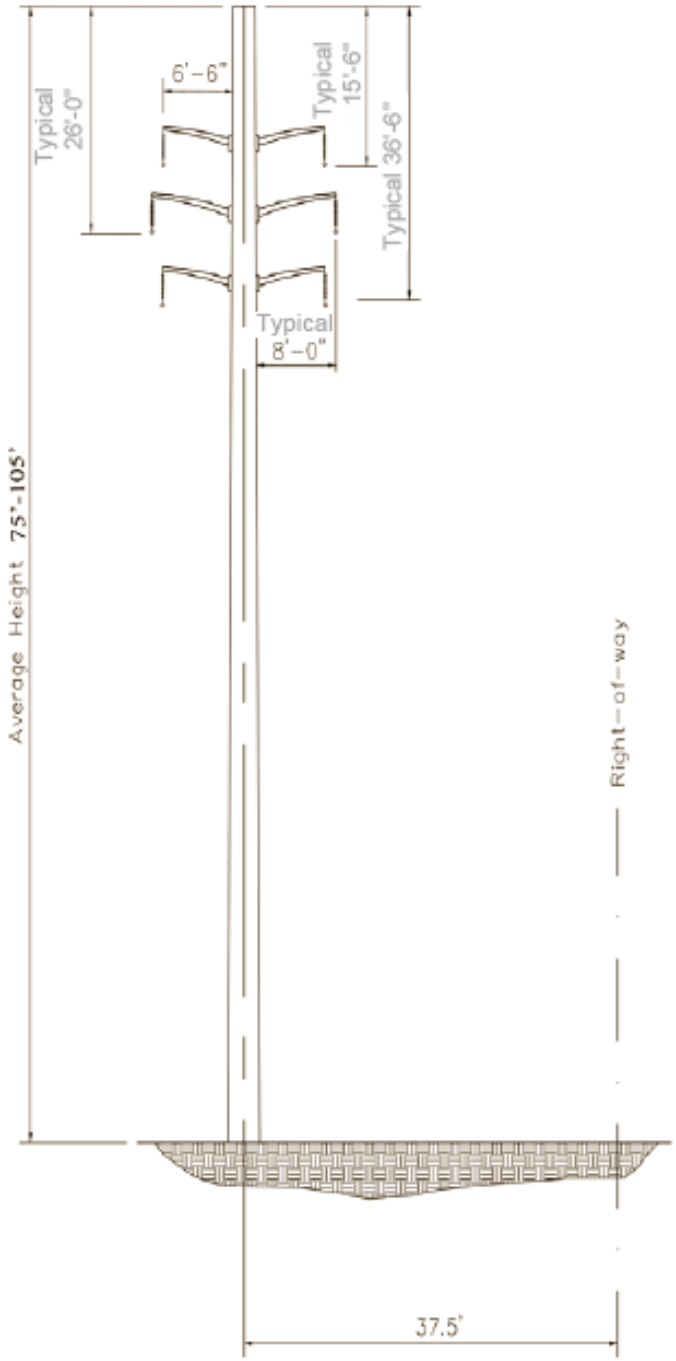


Figure 13 Typical Dimensions and Right-of-way Requirements for Double Circuit Davit Arm Structures



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 an easement condition appears to accommodate the needs of the Project and no new right-of-way is needed, the right-of-way agent will still work with the landowner in order to address any construction needs, impacts, damages, or restoration issues.

The need for some new right-of-way acquisition is anticipated for the Project. To the extent new right-of-way acquisition is 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 new right-of-way acquisition 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 personally 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 specific project may affect each parcel. The right-of-way agent also seeks information from the landowner about any specific construction concerns and their interest in providing the necessary property to support the Project.

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 rights-of-way, 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 facilities anticipated location. By doing this, the right-of-way agent can show the landowner exactly where the structure(s) will be located on the property. The right-of-way agent may also delineate the boundaries of easement area required for safe operation of the lines.

Prior to the acquisition of easements or fee purchase of property, land value data will be collected, and based upon 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 in which 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 Minn. 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 or 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 Construction Procedures

Construction will begin after federal, state and local approvals are obtained, property and right-of-ways are acquired, soil conditions are determined and 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, available workforce and materials.

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 practices. In certain cases some activities, such as schedules, are modified to minimize impacts to sensitive environments.

The existing GRE line from the Hollydale Substation to the connection point with GRE 115 kV line WH-PB located northeast of Providence Academy, north of Fernbrook Lane, is not currently energized and can be rebuilt without taking an outage. At this stage of the Project, this section will likely be rebuilt first, along with the new Pomerleau Lake Substation and new transmission lines to connect to the rebuild section. Next, the existing GRE line from the Medina Substation to Hollydale Substation will be de-energized (or a series of outages will be taken) to conduct the rebuild work on this section. The Hollydale Substation could be fed from the new rebuilt line and new transmission line from the new Pomerleau Lake Substation during the transmission line rebuild of the Medina to Hollydale Substation section. To the greatest extent possible, Xcel Energy will work within the existing rights-of-way, access areas and staging areas to complete the Project.

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 transmission projects includes 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 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 dead-end structures will have concrete foundations. In those cases, holes are drilled in preparation for the foundation. Drilled pier foundations may vary from approximately 6 to 8 feet in diameter and 20 to 30 feet or more in depth, depending on soil conditions. Steel reinforcing bars and anchor bolts are installed in the drilled holes prior to concrete placement. 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 areas and wetland areas may also require special construction techniques in some circumstances. During construction, the most effective way to minimize impacts to wet areas will be to span wetlands, streams, and rivers. In addition, the Applicants will not allow construction equipment to be driven across waterways except under special circumstances and only after discussion with the appropriate resource agency. Where waterways must be crossed to pull in the new conductors and shield wires, workers may walk across, use boats, or drive equipment across ice in the winter. These construction practices help prevent soil erosion and ensure that equipment fueling and lubricating will occur at a distance from waterways.

Wetlands present within the Project area are dominated by shallow marsh and wet meadow wetlands, with occasional shrub swamps and forested swamps also present. If impacts to wetlands occur, they will be minimized through construction practices. Construction crews will maintain sound water and soil conservation practices during construction and operation of the facilities to protect topsoil and adjacent water resources and to 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.

When it is not feasible to span the wetland, construction crews will consider the following options during construction to minimize impacts:

- when possible, construction will be scheduled during frozen ground conditions;
- crews will attempt to access the wetland with the least amount of physical impact to the wetland (*i.e.*, shortest route);
- the structures will be assembled on upland areas before they are brought to the site for installation; or
- when construction during winter is not possible, construction mats will be used where wetlands would be impacted.

5.1.5 Restoration Procedures

During construction, crews will attempt to limit ground disturbance wherever possible. However, areas are typically disturbed during the normal course of work, which can take several weeks in any one location. As construction on each parcel is completed, disturbed areas will be restored to their original condition to the maximum extent practicable. The right-of-way agent contacts each property owner after construction is completed to determine whether any damage has occurred as a result of a project.

If damage has occurred to crops, fences or the property, the Applicants will fairly reimburse the landowner for the damages sustained. In some cases, the Applicants may engage an outside contractor to restore the damaged property to as near 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 route will require assistance in reestablishing vegetation and controlling soil erosion.

Commonly used methods to control soil erosion and assist in reestablishing vegetation include, but are not limited to:

- erosion control blankets with embedded seeds;
- silt fences;
- hay bales;
- hydro seeding; and
- planting individual seeds or seedlings of native species.

These erosion control and vegetation establishment practices are used regularly in construction projects and are referenced in the construction storm water permit plans. Long-term impacts are minimized by utilizing 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 the proposed transmission line for accounting purposes is approximately 40 years. However, practically speaking, HVTLs 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 is very high, in excess of 99 percent.

The principal operating and maintenance cost for transmission facilities is the cost of inspections, which is usually done monthly by air. Annual operating and maintenance

costs for transmission lines in Minnesota and surrounding states vary, however, for voltages from 69 kV through 345 kV, past experience shows that costs are 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 requirements. Transformers, circuit breakers, batteries, protective relays, and other equipment need to be serviced periodically in accordance with the manufacturer's recommendations. The substation site must be kept free of vegetation and adequate drainage must be maintained.

5.2 Electric and Magnetic Fields

The term EMF refers 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 kV 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 EF 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 EFs. The Commission, however, has imposed a maximum EF 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* Administrative Law Judge ("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.

Table 11 provides the EFs at maximum conductor voltage for the proposed 115 kV transmission line. Maximum conductor voltage is defined as the nominal voltage plus five percent. The maximum EF, measured at one meter (3.28 feet) above ground, associated with the Project is calculated to be 1.34 kV/m.

Table 11
Calculated Electric Fields (kV/m) for Proposed 115 kV Transmission Line Design (one meter/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, Braced Post, 115 kV Single Circuit	121	0.01	0.03	0.10	0.16	0.26	0.49	0.95	0.79	0.38	0.18	0.10	0.03	0.01
Single Pole, Horizontal Post (All Phases one side), 115 kV Single Circuit	121	0.01	0.02	0.05	0.07	0.12	0.25	0.83	0.90	0.31	0.14	0.08	0.03	0.01
Single Pole, Horizontal Post, 115 kV Single Circuit	121	0.01	0.02	0.09	0.15	0.29	0.66	1.34	1.01	0.35	0.12	0.11	0.03	0.01
Single Pole, Cross Arm, 115 kV Single Circuit, Y-Frame	121	0.00	0.01	0.06	0.10	0.17	0.30	0.35	0.30	0.17	0.10	0.06	0.01	0.00
Single Pole, Davit Arm, 115 kV/115kV Double Circuit	121	0.00	0.01	0.02	0.02	0.15	1.00	0.56	0.10	0.15	0.02	0.03	0.01	0.00

5.2.2 Magnetic Fields

There are presently no Minnesota regulations pertaining to magnetic field ("MF") exposure. The Applicants provide 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 12**. Magnetic fields were calculated under normal system conditions (systems intact) for the expected peak and average current flows as projected under the Midwest Independent Transmission System Operator ("MISO") model for the year 2012. 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 2012, 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 12
Calculated Magnetic Fields (mG) for Proposed 115 kV Transmission Line

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, Braced Post, 115 kV Single Circuit	Peak	250	0.32	0.69	2.53	4.25	8.30	19.43	32.10	16.27	7.04	3.63	2.16	0.55	0.24
	Average	150	0.19	0.41	1.52	2.55	4.98	11.66	19.26	9.76	4.22	2.18	1.29	0.33	0.14
Single Pole, Horizontal Post (All Phase one side), 115 kV Single Circuit	Peak	250	0.35	0.76	2.60	4.13	7.38	15.82	42.44	42.73	15.97	7.43	4.15	0.98	0.42
	Average	150	0.21	0.46	1.56	2.48	4.43	9.49	25.47	25.64	9.58	4.46	2.49	0.59	0.25
Single Pole, Horizontal Post, 115 kV Single Circuit	Peak	250	0.64	1.38	5.00	8.30	15.93	35.35	67.75	51.18	19.25	9.31	5.35	1.32	0.57
	Average	150	0.38	0.83	3.00	4.98	9.56	21.21	40.65	30.71	11.55	5.59	3.21	0.79	0.34
Single Pole, Cross Arm, 115 kV Single Circuit, Y-Frame	Peak	250	0.44	0.99	3.65	5.91	10.38	18.10	23.18	18.19	10.54	6.07	3.79	1.07	0.49
	Average	150	0.26	0.59	2.19	3.54	6.23	10.86	13.91	10.91	6.33	3.64	2.27	0.64	0.30
Single Pole, Davit Arm, 115 kV/115kV Double Circuit	Peak	250/250	0.21	0.37	1.76	3.59	8.91	25.75	41.99	24.30	7.97	3.02	1.39	0.28	0.18
	Average	150/150	0.12	0.22	1.06	2.15	5.35	15.45	25.19	14.58	4.78	1.81	0.83	0.17	0.11

Note: The assumed peak and average line loading assumed for these calculations is the estimated flow for the year 2012 per MISO model.

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 EFs 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 EMFs. 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 (HVTLs) EMF effects. The Working Group consisted of staff from various state agencies and published its findings in a White Paper on 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 Commission, based on the Working Group and WHO 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 GRE 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 GRE 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 Administrative Law Judge ("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. Because transmission lines convey power for subsequent distribution and are not connected to non-utility structures, stray voltage is not encountered in such lines.

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. Shield wires are typically installed to mitigate possible stray voltage issues. The rebuilt transmission line will be three phase balanced, which should also mitigate stray voltage.

5.2.4 Farm Operations, Vehicle Use and Metal Buildings Near Power Line

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:

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

2. 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 to mitigate induced charges. Any person with questions about a new or existing metal structure can contact the Applicants for further information about proper grounding requirements. If other problems exist, the Applicants could conduct an inspection to assess and determine the cause of problems that may be related to the transmission line, and identify possible solutions to such problems.

If a customer suspects that stray voltage/NEV is a concern on their property, they can call the Xcel Energy stray voltage hotline. The customer can contact an Xcel Energy technician or engineer and discuss the situation. If an on-site 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 site and the site wiring. The team will discuss the preliminary results with the customer before leaving the site. 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 customer to discuss the results.

6.0 Environmental Information

This section analyzes potential resource impacts associated with the proposed Project. This section provides a description of the environmental setting, potential impacts and mitigative measures the Applicants propose, where appropriate, to minimize the impacts of siting, constructing, and operating the proposed Project. If the proposed transmission line and the substations were removed in the future, the land could be restored to its prior condition and/or put to a different use. The majority of the measures proposed are part of the standard construction process for the Applicants. Unless otherwise identified in the following text, the costs of the mitigative measures proposed are considered nominal.

6.1 Environmental Setting

The proposed transmission line rebuild, new transmission line, and the proposed new Pomerleau Lake Substation are located in the cities of Medina and Plymouth, in Hennepin County, Minnesota. The Proposed Route extends east along an existing transmission line route from the existing GRE Medina Substation in south central Medina to the existing Xcel Energy Hollydale Substation in west central Plymouth; the transmission line rebuild then continues east and north to the proposed new Pomerleau Lake Substation, which would be located in northwest Plymouth (*see* **Figure 2**; **Appendix B-1 to B-5**; and **Appendix C-1 to C-16**). The Project area is primarily located within rural residential and residential areas, with some small areas of cropland also present.

The Project area is located within the Minnesota and Northeast Iowa Morainal Section, a section within the biogeographic province known as the Eastern Broadleaf Forest Province under the Ecological Classification System ("ECS") developed by the Minnesota Department of Natural Resources ("MnDNR") and the United States Forest Service ("USFS") (MnDNR 2010a). The Project is further located within the Big Woods, a subsection of the Minnesota and Northeast Iowa Morainal Section.

The Big Woods subsection is characterized by gently to moderately rolling topography with the primary landform consisting of a loamy mantled end moraine associated with the Des Moines lobe of the Late Wisconsin glaciations. Soils are primarily loams,

ranging in texture from loam to clay loam. While hardwoods such as northern red oak, sugar maple, basswood, and American elm were once common in this region, presently most of the region is developed or farmed (MnDNR 2010a).

6.2 Human Settlement

6.2.1 Public Health and Safety

The Project will be designed in compliance with local, state, NESC, and the Applicants standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and right-of-way widths. The Applicants' construction crews and/or contract crews will comply with local, state, NESC, and the Applicants' standards regarding installation of facilities and standard construction practices. Safety procedures established by the Applicants and the industry will be followed during and after installation of the transmission lines and substation. This will include clear signage during all construction activities.

The proposed transmission line will be equipped with protective devices to safeguard the public from the transmission lines if an accident occurs, such as a structure or conductor falling to the ground. The protective devices are breakers and relays located where the lines connects to the substation(s). The protective equipment will de-energize the line should such an event occur. Proper signage will be posted warning the public of the risk of coming into contact with the energized equipment.

Mitigative Measures

No impacts are anticipated and, therefore, no mitigative measures are proposed.

6.2.2 Residential and Non-Residential Land Use

Based on the MnDNR Gap Analysis Program ("GAP") Land Cover data set (MnDNR 2002), the Proposed Route within Medina is primarily designated as cropland and within Plymouth is primarily designated as low and high intensity urban (*see* **Appendix B-10)**. In the Plymouth area, there is also some cropland located in the north. The existing Medina and Hollydale Substations are located in areas primarily

designated as cropland by GAP data. However, based on field review the Hollydale Substation is actually surrounded by residential use.

The existing GRE Medina Substation site is zoned Rural Residential ("RR") and the existing Xcel Energy Hollydale Substation site is zoned Planned Unit Development ("PUD") (*see* **Appendix B-11 and B-12**). According to the Plymouth zoning map (*see* **Appendix B-12**), preferred Substation Site A is zoned as Public/Institutional ("P-I") and Substation Site B is zoned as Future Restricted Development ("FRD").

Proposed Route

The number of structures within various distances of the Proposed Route are provided in **Table 13** for the Proposed Route to preferred Substation Site A and alternate Substation Site B. The closest residence to the Proposed Route is approximately 20 feet from the proposed centerline; the location of this residence is 3963 Garland Lane North in Plymouth. The closest non-residential building to the Proposed Route appears to be a detached garage that is approximately 8 feet from the proposed centerline; the location of this structure is 2412 Holy Name Drive in Medina. See **Appendix B-3** and **Appendix C-5 and C-8**.

Table 13
Residential and Non-residential Buildings within Various Distances of Proposed Route

Structure Type	Proposed Route Segment	Number of Structures within Various Distances			
		0-35 feet	From 35-50 feet	From 50-100 feet	From 100-200 feet
Residence	Rebuild Portion of 115 kV Line (Medina Substation to Intersection with GRE 115 kV Line WH-PB)	13	50	104	119
	New Portion of 115 kV Line (Intersection with GRE 115 kV Line WH-PB and Preferred Substation Site A)	0	0	0	0
Non-residential building	Rebuild Portion of 115 kV Line (Medina Substation to Intersection with GRE 115 kV Line WH-PB)	6	3	3	10

	New Portion of 115 kV Line (Intersection with GRE 115 kV Line WH-PB and Preferred Substation Site A)	0	0	1	4

There are seven schools (four private and three public) within one mile of the Proposed Route **(***see* **Appendix H)**. The four private schools include Holy Name of Jesus, West Lutheran High School, Ascension Lutheran School, and Providence Academy; the three public schools include Kimberly Lane Elementary School, Greenwood Elementary School, and Plymouth Creek Elementary School. The closest school to the Proposed Route is Providence Academy, which is located at 15100 Schmidt Lake Road in Plymouth, approximately 200 feet from the rebuild portion of the Proposed Route. See **Appendix B-4** and **Appendix C-14**.

There are seven child care centers within one mile of the Proposed Route, these include: KinderCare Learning Center, Rockford KinderCare, two New Horizon Academies, The Goddard School, The Primrose School of West Plymouth, and Yellow Brick Road Childcare. The closest child care center to the Proposed Route is Rockford KinderCare, which is located at 15755 Rockford Road in Plymouth, approximately 200 feet south of the rebuild portion of the Proposed Route. *See* **Appendix B-4** and **Appendix C-10**.

Proposed Pomerleau Lake Substation

There are no residences within 200 feet of Substation Site A or Site B (*see* **Appendix H**). The closest residence to preferred Substation Site A is just over 200 feet to the west, and the closest residence to Substation Site B is approximately 600 feet to the southeast (*see* **Appendix B-4**).

There are three non-residential buildings within 200 feet of preferred Substation Site A and no non-residential buildings within 200 feet of alternate Substation Site B (*see* **Appendix H**). The closest non-residential building to preferred Substation Site A is approximately 100 feet to the west and the closest non-residential building to Substation Site B is approximately 550 feet to the southwest (*see* **Appendix B-4**).

Mitigative Measures

No impacts are anticipated and, therefore, no mitigative measures are proposed.

6.2.3 Displacement

No displacement of residential homes or businesses will occur as a result of the proposed Project. The NESC and Applicants' standards require certain clearances between transmission line facilities and buildings for safe operation of the proposed transmission line. The Applicants acquire a right-of-way for the proposed transmission line that is sufficient to maintain these clearances. Displacement can occur when an existing structure is located within the right-of-way. The proposed transmission line will be designed so that all existing residences are located outside of the right-of-way. The Project will not require displacement of structures.

Mitigative Measures

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

6.2.4 Noise

Transmission Line Noise

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

Noise emission from a transmission line occurs during certain weather conditions. In foggy, damp, or rainy weather, power lines can create a crackling sound due to the small amount of electricity ionizing the moist air near the wires. During heavy rain the background noise level of the rain is usually greater than the noise from the

transmission line. As a result, people do not normally hear noise from a transmission line during heavy rain.

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 dBA, which is the A-weighted sound level recorded in units of decibels.

A noise level change of 3 dBA is barely perceptible to human hearing. A 5 dBA change in noise level, however, is clearly noticeable. A 10 dBA change in noise level is perceived as a doubling of noise loudness, while a 20 dBA change is considered a dramatic change in loudness. **Table 14** below shows noise levels associated with common, everyday sources.

Table 14
Common Noise Sources and Levels

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

Source: Minnesota Pollution Control Agency ("MPCA") (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 Minnesota Pollution Control Agency ("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 15** identifies the established daytime and nighttime noise standards by NAC.

Table 15
Noise Standards by Noise Area Classification (dBA)

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

Approximately 286 residences are located within 200 feet of the Proposed Route ending at preferred Substation Site A (*see* **Appendix B-2** to **B-4**). The closest distance that a residence is located to the proposed transmission line rebuild is approximately 20 feet, which occurs at 3963 Garland Lane North in Plymouth (*see* **Appendix B-3 and Appendix C-8**). The closest distance that a residence is located to the proposed new line construction is 320 feet which occurs at 4830 Cheshire Lane North in Plymouth (*see* **Appendix B-4 and Appendix C-15**).

Noise levels produced by a 115 kV transmission line are generally less than outdoor background levels and are therefore not usually audible. Additionally, noise levels from the proposed 115 kV double circuit transmission line are expected to be only slightly higher than a typical 115 kV single circuit transmission line. Therefore, noise

levels from proposed double circuit line should not be noticeably greater than existing levels.

The Electric Power Research Institute ("EPRI") "Transmission Line Reference Book, 345kV and Above", Chapter 6, provides empirically-derived formula for predicting audible noise from overhead transmission lines. Computer software produced by the Bonneville Power Administration ("BPA") (BPA 1977) is also frequently used to predict the level of audible noise from power transmission lines that is associated with corona discharge. Audible noise is predicted for dry and wet conditions, with wet conditions representing a worst case. These procedures are considered to be reliable and represent International best practice.

The proposed transmission lines were modeled using the EPRI, ENVIRO, EMF Workstation, Version 3.51. Where possible, the model was executed as a worst-case scenario benchmark, to ensure that noise was not under-predicted. **Table 16** presents the L_5 and L_{50} noise levels predicted for proposed transmission line structures and voltages for the Project. The worst case indicated that the audible L5 and L50 noise levels measured at the edge of the proposed 70-100 foot wide ROW (35 to 50 feet from centerline) is 23.0 and 19.5 dBA, respectively, well below the MPCA nighttime L50 limit of 50 dBA for NAC 1.

Table 16
Calculated Audible Noise (dBA) for Proposed Single/Double Transmission Line Designs

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, Braced Post, 115 kV Single Circuit	21.4	17.9
Single Pole, Horizontal Post (All Phases one side), 115 kV Single Circuit	20.2	16.7
Single Pole, Horizontal Post, 115 kV Single Circuit	15.2	11.7
Single Pole, Cross Arm, 115 kV Single	16.3	12.8

Structure Type	Noise L_5 (Edge of Right-of-way) (Decibels a weighted)	Noise L_{50} (Edge of Right-of-way) (Decibels a weighted)
Circuit, Y-Frame		
Single Pole, Davit Arm, 115 kV/115kV Double Circuit	23.0	19.5

The proposed transmission line will be designed and constructed to comply with state noise standards established by the MPCA.

Transformer Substation Noise

Transformer "hum" is the dominant noise source at substations. Transformer hum is caused by magnetostrictive forces within the core of the transformer. These magnetic forces cause the core laminations to expand and contract, creating vibration and sound at a frequency of 100 Hz (twice the a.c. mains frequency), and at multiples of 100Hz (harmonics). Typically, the noise level does not vary with transformer load, as the core is magnetically saturated and cannot produce any more noise.

The nearest occupied homes to preferred Substation Site A and alternate Substation Site B are located approximately 200 feet and 600 feet away, respectively (*see* **Appendix B-4** and **Appendix C-15 and C-16**). It would be very unlikely that substation noise would be audible at these homes. The proposed substation and substation modifications will be designed and constructed to comply with state noise standards established by the MPCA.

Mitigative Measures

No impacts are anticipated and, therefore, no mitigative measures are proposed.

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 previously providing good reception can be restored by appropriate modification of (or addition to) the receiving antenna system. 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 usually do not pick up interference from transmission lines because:

- corona-generated radio frequency noise currents decrease in magnitude with increasing frequency and are quite small in the FM broadcast band (88-108 Megahertz); 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/or behind a large metallic structure (such as a steel tower) may experience interference because of signal-blocking effects. Movement of either mobile unit so that the metallic structure is not immediately between the two units should restore communications. This would generally require a movement of less than 50 feet by the mobile unit adjacent to a 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 and/or damaged hardware may also cause television interference. If television or radio interference is caused by or from the operation of the proposed facilities in those areas where good reception is presently obtained, the Applicants will inspect and repair any loose or damaged hardware in the transmission line, or take other necessary action to restore reception to the present level, including the appropriate modification of receiving antenna systems if deemed necessary.

Mitigative Measures

No impacts are anticipated and, therefore, no mitigative measures are proposed. If radio or television interference occurs due to the Project, the Applicants will work with the affected landowner to restore reception to pre-Project quality.

6.2.6 Aesthetics

Proposed Route

Because the proposed transmission line will primarily follow an existing 69 kV transmission line, it is anticipated that the Project will have minimal incremental effects on the visual and aesthetic character of the area. The structures on the existing GRE 69 kV transmission line are single-pole and H-frame structures which are 60-75 feet tall with spans from 300 to 500 feet. The proposed structures for the 115 kV transmission line are single-pole, galvanized steel or weathering steel structures, which are similar to the structures for other 115 kV transmission lines in the Applicants' system. In comparison to the existing 69 kV structures, the proposed structures will be slightly taller with similar or slightly shorter span distances between structures. The single circuit structures will be about 70 to 90 feet tall (or 75 to 105 feet tall for double circuit structures) with an average span of 300 to 500 feet between the structures. Where Y-frame structures are used to span wetlands, the structures will be 70-90 feet tall and the spans between them from 500 and 1,200 feet. The typical right-of-way required for these types of structures is a minimum of 75 feet wide. However, the new 115 kV transmission line will be designed to be maintained within the existing easements (typically 70 feet wide, with some areas up to 100 feet) where reasonably possible.

Similar to the existing GRE 69 kV transmission line, the proposed 115 kV transmission line will be visible to residents of Medina and Plymouth. Existing transmission lines are common throughout the viewshed of the Project area (**Figure 1**).

Construction of the Proposed Route to preferred Substation Site A requires a new transmission line route for approximately 0.18 miles along Cheshire Lane and

approximately 0.18 miles along Schmidt Lake Road (*see* **Appendix B-4**). Along both roads, the transmission line would be proposed to be located along the side of the road with the industrial use, rather than the side of the street with residential areas.

Proposed Pomerleau Lake Substation

The location of the proposed new Pomerleau Lake Substation at preferred Substation Site A is within a slightly elevated and sparsely wooded area that is primarily industrial use with I-494 visible to the east and industrial facilities located to the north and west of the site (*see* **Appendix B-4**). With the existing conditions, it is unlikely that the construction of a substation at this location will impact the visual integrity of the surrounding area.

The location of the proposed new Pomerleau Lake Substation at Substation Site B would be within an area just north of the Canadian Pacific Railway northeast of Providence Academy in an area previously used as a golf course (*see* **Appendix B-4**). Currently, the land surrounding this alternate substation location is a relatively open area with former golf course fairways, wetlands and forested areas. The adjacent land to the north and west is under construction for a residential development. Construction of a substation at this location could impact the visual integrity of the new residential development currently under construction in the area.

Mitigative Measures

Although the proposed transmission line will alter views of surrounding land uses, the Applicants have identified that the Proposed Route predominantly uses existing utility and transportation alignments and avoids residences and businesses to the greatest extent practicable. Also, the preferred Substation Site A location is adjacent to an existing electric transmission route that contains one 115 kV transmission line and two 345 kV transmission lines that result in a visual impact and, therefore, the installation of new transmission facilities associated with the Project will incrementally increase visual impacts in this area. The Applicants will work with landowners to identify concerns related to the transmission line aesthetics.

6.2.7 Socioeconomic

Population and economic characteristics based on the 2000 and 2009 U.S. Census are provided in **Table 17**. According to the U.S. Census data, Hennepin County residents are comprised of 79.8 percent Caucasian and 20.2 percent minority groups. The minority residents represent a small portion of the population within the Project area, with 2.7 percent and 9.6 percent of the population represented by minority groups in Medina and Plymouth, respectively.

Per capita incomes within Medina and Plymouth are higher than Hennepin County and the State of Minnesota. None of the routes contain disproportionately high minority populations or low-income populations.

Approximately 10 to 15 workers will be required by Xcel Energy for transmission line construction and 8 to 12 workers will be needed, on average, for the substation construction. The transmission line work will take approximately 6 months to construct and the new and modified substation work will take approximately 6 to 12 months to construct.

Table 17
Population and Economic Characteristics

Location	Population	Minority Population (percent)	Caucasian Population (percent)	Per Capita Income	Percentage of Population Below Poverty Level
State of Minnesota	5,266,214	11.4	88.6	$23,198 (2009)	9.6
Hennepin County	1,156,212	20.2	79.8	$28,789(2009)	11.0
City of Medina	4,000	2.7	97.3	$49,127 (2000)	1.7 (2009)
City of Plymouth	65,894	9.6	90.4	$36,309 (2000)	4.1 (2009)

Source: 2009 U.S. Census: General Demographic Characteristics for Minnesota and Hennepin County, 2000 U.S. Census: General Demographic Characteristics for Medina and Plymouth

There will be short-term impacts to community services as a result of construction activity and an influx of contractor employees during construction of the various projects. Utility personnel or contractors will be used for all construction activities. The communities near the Project area 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 by any of these actions. 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 where feasible. Long-term beneficial impacts from the proposed transmission lines and substation additions include increased local tax base resulting from the incremental increase in revenues from utility property taxes.

Socioeconomic impacts resulting from the proposed Project will be primarily positive with an influx of wages and expenditures made at local businesses during Project construction, and increased tax revenue once the Project is operational.

Mitigative Measures

No impacts are anticipated and, therefore, no mitigative measures are proposed.

6.2.8 Cultural Values

Cultural values include those perceived community beliefs or attitudes in a given area, which provide a framework for community unity. The cities of Medina and Plymouth have strong cultural ties to recreation, with the diversity of trails, parks and lakes present within the area. In addition, residents of Medina and Plymouth value the highly regarded school systems, proximity to nearby shopping and entertainment districts, and easy access to Minneapolis and St. Paul. Medina also has cultural values tied to farming.

Construction of the proposed substation, substation modifications and the rebuild and new transmission line Project are not expected to conflict with the cultural values along the Proposed Route. No impacts to cultural values are anticipated.

Mitigative Measures

No impacts are anticipated and, therefore, no mitigative measures are proposed.

6.2.9 Recreation

Proposed Route

Recreational opportunities within the vicinity of the Project area primarily include local parks and trails. The existing GRE 69 kV transmission line passes through Turtle Lake Park, between Rockford Road and Schmidt Lake Road (*see* **Appendix B-13**). There is a network of paved trails within the vicinity of the Project area, some of which are associated with Turtle Lake Park. Some of these trails are located beneath the existing 69 kV transmission line within the existing route, including the trail exiting the north end of Turtle Lake Park which goes toward Schmidt Lake Road (*see* **Appendix B-13**). It is not anticipated that the Proposed Route would result in permanent impacts to Turtle Lake Park or nearby trails because the alignment follows the existing GRE 69 kV transmission line route.

The Clifton E. French Park is located east and across I-494 from Alternate Route Segment A and southeast of the preferred Substation Site A and the Proposed Route (*see* **Appendix B-13**). There are two planned regional trails that would go north out of the Clifton E. French Park along I-494, including the Medicine Lake Trail and the North Hennepin Regional Trail (*see* **Appendix B-13**). Although the Proposed Route and Substation Site A may be visible from the Clifton E. French Park and the planned regional trails, there are existing transmission lines that parallel the west side of I-494 that are currently within the viewshed of the park. Because of the existing transmission lines, new impacts are not anticipated.

The MnDNR Wolsfeld Woods Scientific and Natural Area ("SNA") is located approximately 0.7 miles southeast of the Medina Substation (*see* **Appendix B-13**). Because the Proposed Route runs primarily along an existing transmission route, the terrain is slightly hilly and wooded, and the Wolsfeld Woods SNA is located over 0.5 mile from the Project area, impacts to this recreational resource are not anticipated from the Project.

The Northwest Trails Association snowmobile trail parallels MN 55 from Vicksburg Lane to Old Rockford Road. The Proposed Route from the Medina Substation to the intersection with the existing GRE 115 kV transmission line WH-PB intersects the Northwest Trails Association snowmobile trail where it crosses MN 55 from west to east (*see* **Appendix B-13**). Because the Proposed Route follows the existing GRE 69 kV transmission line route, new impacts to the snowmobile trail are not anticipated.

New Pomerleau Lake Substation

There are no recreational resources within the vicinity of alternate Substation Site B (*see* **Appendix B-13**). The Clifton E. French Park is located southeast across I-494 from the location of preferred Substation Site A (*see* **Appendix B-13**). The new substation may be visible from the park and planned trails (Medicine Lake and North Hennepin); however, the viewshed of the trails are currently impacted by I-494 and existing transmission lines located along the west side of I-494.

Mitigative Measures

The Applicants have proposed routes to avoid or minimize any impacts on the recreational facilities in the vicinity of the Project. The Project will be visible from Turtle Lake Park and associated trails, the Northwest Trails Association snowmobile trail, the planned Medicine Lake Regional Trail, and the planned North Hennepin Regional Trail. However, direct impacts to these resources are not expected. Some areas along the existing GRE 69 kV transmission line to be rebuilt for the Proposed Route may need to be temporarily closed during Project construction (e.g. portions of Turtle Lake Park and the Northwest Trails). The Applicant will work with the City of Plymouth and Northwest Trails Association to notify the public of any temporary park or trail closure. Because the Proposed Route will not directly affect recreational areas, no other mitigative measures are proposed.

6.2.10 Public Services

Public services and facilities in the Project area generally include emergency services provided by government entities, including hospitals, fire departments, and police

departments, water supply or wastewater disposal systems, and gas and electricity services, and existing and future transportation alignments and projects.

Emergency Services

Any required temporary lane closures would be coordinated with the local jurisdictions, and would provide for safe access of police, fire, and other rescue vehicles.

Utilities

Public sewer and water service is managed by the Plymouth Public Works Department for the portion of the Project area located within City of Plymouth. Along the portion of the route located in Medina, landowners and residences are served by privately owned septic systems and wells. Gas, telephone, internet, and electric services are supplied to residents in the Project area by variety of providers.

Construction and operation of the Project is not anticipated to permanently affect any public service utilities. Where any impacts to utilities have the potential to occur, Xcel Energy will work with both landowners and local agencies and utility providers to determine the most appropriate placement for pole structures. It may be necessary for the applicants to work with other public service utilities to relocate their facilities if they conflict with the location of the transmission line. Disruptions to public services during construction may occur; however, these would be temporary with service restored promptly.

Transportation

Transportation infrastructure in the Project area includes roads, railroads, and airports. The Proposed Route runs parallel to and crosses roads, including township roads, county roads and highways. Operation of the transmission line is not expected to impact traffic along these roadways and pole placement and construction procedures will be developed in consultation with state, county, and local roadway authorities to meet requirements for clear zones and roadside obstructions. Roadways can potentially be impacted temporarily during construction activities and during maintenance of the transmission line. Access during construction and maintenance is

expected to be primarily from existing roads and would only cause minor and temporary disruption to traffic. Pole placement along roadways can also impact future road expansions, as poles placed within the right-of-way must be moved to allow a safe distance between power poles and the edge of the roadway. Comments were requested regarding the proposed Project from both Hennepin County and MnDOT. Hennepin County responded with comments regarding placement of transmission line structures (*see* **Appendix D-5**). No comments have been received from MnDOT.

The closest airport to the Project area is the Crystal Airport, which is located approximately 5 miles away in the City of Crystal. The Crystal Airport is a publicly owned airport with four runways. Tall high-voltage transmission lines can conflict with the safe operation of public and private airports and air strips. The Federal Aviation Administration ("FAA") and MnDOT have each established development guidelines on the proximity of tall structures to public use airports. The FAA has also developed guidelines for the proximity of structures to Very-High-Frequency Omni-Directional Range ("VOR") navigation systems. The Crystal Airport is located more than five miles from the proposed Project, therefore construction and operation of the line and substation will not impact safe operation and use of the airport.

Municipal Meetings

Xcel Energy met with staff from the City of Plymouth in September 2010 and April 2011, and staff from the City of Medina in September 2010. A summary of these meetings is included in Section 8.1.

Mitigative Measures

Because the proposed routes will not directly affect public services, no mitigative measures are proposed. Xcel Energy will continue to coordinate with applicable municipal and regulatory agencies concerning the Project and no significant conflicts are anticipated. Transmission line planning will also be coordinated with MnDOT and Hennepin County transportation policies.

6.3 Land Based Economics

6.3.1 Agriculture

Proposed Route

The Proposed Route is primarily located within rural residential and urban areas with few agricultural fields. These fields are located in Medina along the rebuild portion of the Proposed Route of the Project from the Medina Substation to the intersection with existing GRE 115 kV Line WH-PB (*see* **Appendix B-2 and B-3**). Generally, the existing 69 kV transmission line is located along the edges of fields which minimizes disturbance for farming operations. **Table 18** summarizes the areas designated as prime farmland within various distances of the Proposed Route. No designated prime farmland is located within 200 feet of the proposed new 115 kV transmission line from the intersection with GRE 115 kV Line WH-PB to the preferred Substation Site A segment of the Proposed Route.

While permanent impacts to farmland are not anticipated, temporary impacts may occur during Project construction. Construction of the new transmission line 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.

Table 18
Prime Farmland within Various Distances of Proposed Route

Segment of the Proposed Route	Acres of prime farmland* within various distances of the Proposed Route			
	35 feet	50 feet	100 feet	200 feet
Medina Substation to Intersection with GRE 115 kV Line WH-PB (115 kV rebuild portion)	6.1	8.7	18.1	38.6
From Intersection with GRE 115 kV Line WH-PB to Preferred Substation Site A (new 115 kV portion)	0	0	0	0

* Prime farmland includes prime farmland if drained and farmland of statewide importance

Proposed Pomerleau Lake Substation

There is no designated prime farmland within the vicinity of either proposed Substation Site A or B. Although the GAP data identifies the area for preferred Substation Site A and alternate Substation Site B as cropland (*see* **Appendix B-10**), neither site is zoned as agricultural (*see* Section 6.2.2). Substation Site A is zoned as PI and Substation Site B is zoned as FUD (*see* **Appendix B-11 and B-12**). In addition, neither site is currently used for agriculture. Therefore, constructing the new substation at either site would not impact agricultural resources.

Mitigative Measures

Landowners will be compensated for the use of their land through easement payments. Additionally, for new right-of-way adjacent to roadways, the Applicants intend to place the poles approximately five feet from, and overhang, the roadway right-of-way to minimize loss of farmland and rural properties and to ensure reasonable access to the land near the poles.

When possible the Applicants will rebuild the transmission lines before crops are planted or following harvest; attempts will be made to avoid spring time construction. However, if construction during spring time is necessary, disturbance to farm soil from access to each structure location will be minimized by using the shortest access route. This may require construction of temporary driveways between the roadway and the structure, but would limit traffic on fields between structures. Construction mats may also be used to minimize impacts on the access paths and in construction areas. The Applicants' construction team will work with the property owner, right-of-way agent, and engineers to minimize the impact on property through use of the landowner's knowledge of the property. In addition to payments for easements acquired, the Applicants will compensate landowners for any crop damage and soil compaction that occurs as a result of the Project.

6.3.2 Forestry

There are no federal or state forests located within the Project area. However there is an approximate 7-acre tree farm located in Medina, southeast of the intersection of Medina Road and Tamarack Drive (see **Appendix B-2** and **Appendix C-4**). This tree farm abuts the existing GRE 69 kV transmission line along the Proposed Route. In addition, although not considered economically important forest resources, there are several densely forested areas present within the Project area (see **Appendix B-2 to B-4**). Construction of the 115 kV transmission line rebuild and new 115 transmission line route will require removing trees and vegetation located within existing and new right-of-ways.

Trees and vegetation that are growing into the rights-of-way which pose a risk to the operation of the transmission line may also be trimmed or removed. Some tree and vegetation removal may also be needed in areas needed to access the existing and new rights-of-way and staging areas for construction of the transmission line. Access and staging areas will be negotiated with applicable landowners.

The removals are necessary for several reasons: 1) construction of the Project; 2) compliance with federal NERC requirements for the bulk electric system (greater than 100 kV); and 3) reliability. In some areas of the existing GRE transmission line, vegetation management has not been recently conducted and will require clearing. In these areas the removal will be evident based upon existing vegetation. After construction, certain low and slow growing species that do not exceed a mature height of 15 feet may be allowed within the right-of-way. Xcel Energy will work with landowners on what needs to be removed, access areas, mitigation, repair for damages, appropriate revegetation and landscaping, on a case-by-case basis.

Mitigative Measures

No substantial impacts to forestry resources are anticipated and, therefore, no mitigative measures are proposed.

6.3.3 Tourism

Medina and Plymouth are primarily rural residential and urban residential areas. With the exception of Turtle Lake Park and several recreational trails (*see* **Appendix B-13**), the Project area is not located near any main tourist attraction.

Mitigative Measures

No impacts to tourism resources are anticipated and, therefore, no mitigative measures are proposed.

6.3.4 Mining

Based upon review of 2005 data from the Metropolitan Council data, there are no gravel pits, rock quarries, commercial aggregate sources or any other mining resources located within three miles of the Project area.

Mitigative Measures

No impacts to mining resources are anticipated and, therefore, no mitigative measures are proposed.

6.4 Archaeological and Historic Resources

A Phase Ia review for the proposed Project was conducted in 2011 (EMR Inc., 2011). As part of the review, the Minnesota Archaeological Site Files and Minnesota Architectural History Site Files at the Minnesota State Historic Preservation Office ("SHPO") were reviewed to determine if any historic or archaeological sites had been recorded within the proposed Project area.

<u>Proposed Route</u>

The Phase Ia review identified 16 historic sites and no archaeological sites within 0.5 mile of the Proposed Route; historic sites are shown at the section level (in order to protect their identity) in **Appendix B-14**. The historic sites are represented by farm houses and historic houses; none of these sites are registered on the National Register

of Historic Places ("NRHP"). **Table 19** identifies the historic sites that are located within 0.5 mile of the Proposed Route.

Table 19
Identified Historic Sites within 0.5 Mile of the Proposed Route

Site Inventory Number	Site Type	Rebuild Portion of 115 kV Line (Medina Substation to Intersection with GRE 115 kV Line WH-PB)	New Portion of 115 kV Line (Intersection with GRE 115 kV Line WH-PB and Preferred Substation Site A)
HE-PLC-018*	Farmstead*	x*	
HE-PLC-023*	Farmhouse*	x*	
HE-PLC-025*	House*	x*	
HE-PLC-026*	House*	x*	
HE-PLC-031*	House*	x*	x*
HE-PLC-058*	House*	x*	
HE-PLC-059*	House*	x*	
HE-PLC-060*	House*	x*	
HE-PLC-061*	House*	x*	
HE-PLC-062	House	x	
HE-PLC-119*	House*	x*	
HE-PLC-130*	House*	x*	
HE-PLC-144*	House*	x*	
HE-PLC-145	House	x	
HE-PLC-146*	House*	x*	
HE-PLC-147*	House*	x*	
TOTAL NUMBER		2	0

* These structures were listed in the SHPO records but no longer exist; therefore, they will not be impacted by the proposed Project.

The proposed rebuild portion of the Proposed Route (Medina Substation to the intersection with GRE 115 kV Line WH-PB) has 16 historical sites located within 0.5 mile. One of these sites (Site Inventory No. HE-PLC-031) is also located within 0.5 mile of the proposed new 115 kV line of the Proposed Route (the intersection point with GRE 115 kV Line WH-PB to the preferred Substation Site A), as well as both proposed Substation Sites A and B. However, based on further review, this historic site, along with 13 other historic sites within the proposed rebuild portion of the Proposed Route are no longer present (*see* **Table 19**). The two historic sites (HE-

PLC-062 and HE-PLC-145) that are still present within 0.5 mile of Proposed Route may be locally significant, but they are not nationally significant. These properties have generally been affected by construction and development in the Project area over the last few decades. Because of these previous impacts, and the fact that the Project consists primarily of rebuilding an existing transmission line, the proposed Project is not likely to adversely impact the historical integrity of the structures listed above.

Proposed Pomerleau Lake Substation

There are two historic sites (Site Inventory Numbers HE-PLC-030 and HE-PLC-031identified within 0.5 mile of proposed Substation Site A, however), both are no longer present (*see* **Appendix B-14)**. There are no historic sites located within 0.5 mile of proposed Substation Site B.

There are no known archaeological sites within 0.5 mile of proposed Substation Site A or alternate Substation Site B. However, the Phase Ia report suggests that the proposed Substation Site B has moderate to high potential to contain intact archaeological remains due to the fact that the site is a former golf course that is only moderately affected by development and construction activities.

Mitigative Measures

The proposed Project will avoid impacts to identified archaeological and historic architectural resources to the extent possible. Should a specific impact be identified, the Applicants will consult with the SHPO on whether the resource is eligible for listing in the NRHP. While avoidance would be a preferred action, mitigation for Project-related impacts on NRHP-eligible archaeological and historic resources may include resource investigations and/or additional documentation through data recovery.

If alternate Substation Site B is chosen, as the location for the Pomerleau Lake Substation, and no evidence can be produced to show that the area has been previously disturbed, an archaeological survey may be necessary.

With the exception of alternate Substation Site B, no mitigative measures are indicated for cultural resources within the proposed Project location for the Proposed Route

because no impacts are anticipated. After a definitive route is determined, the Applicants 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, the Applicants will stop construction activities and consult with a professional archaeologist and the 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.

As stated in Section 8.1, the Applicants sent a letter to the SHPO on March 14, 2011, requesting comments on the proposed Project and the Phase Ia Background Literature Search Report. A response was received from the SHPO on April 27, 2011 stating that the Project was reviewed and no further action is required unless a federal permit is required for the Project. *See* **Appendix D-7**.

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 (0_3) and nitrogen oxides (NO_X). 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. The national ozone standard is 0.075 parts-per-million ("ppm") during an eight-hour averaging period. The state ozone standard is 0.08 ppm based upon the fourth-highest eight-hour daily maximum average in one year.

The only potential air emissions from transmission line operation 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. The Project area presently meets federal air quality standards, and 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

The Applicants 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, the Applicants anticipate nominal impacts to air quality. Therefore, no other mitigative measures are proposed.

6.5.2 Water Resources

6.5.2.1 Water Quality

Water resources located within the Project area are identified in **Appendix B-15**. A summary of wetland resources in included in **Appendix G**. The construction of the Proposed Route and new Pomerleau Lake Substation may have minor, short term effects on water quality. Impacts on water quality are possible during the construction phase of the Project, when sediment could possibly reach surface waters as excavation, grading and construction traffic disturb the ground.

Mitigative Measures

Implementation of BMPs to prevent water quality impacts are discussed in Section 5.1. The construction, restoration, and maintenance of the proposed transmission line are also discussed in Section 5.1. With the use of BMPs, no significant impacts on water quality are anticipated.

6.5.2.2 MnDNR Public Waters Inventory

The MnDNR PWI identifies basins (lakes and wetlands) and watercourses over which the MnDNR has regulatory jurisdiction. The statutory definition of public waters is found in Minn. Stat. Section 103G.005, Subdivisions 15 and 15a. A MnDNR License to Cross Public Waters will be required for designated crossings.

Proposed Route

The PWI basins and watercourses within proximity of the Project area are shown in **Appendix B-15**. The PWI basins and watercourses that are crossed by the Proposed Route are identified in **Table 20**.

Table 20
PWI Watercourses and Basins Crossed by the Proposed Route

PWI Number	PWI Type	Rebuild Portion of 115 kV Line (Medina Substation to Intersection with GRE 115 kV Line WH-PB)	New Portion of 115 kV Line (Intersection with GRE 115 kV Line WH-PB and Preferred Substation Site A)
No Number	Bassett Creek	2	0
No Number	Unnamed Creek	2	2
27046100	Basin (Wetland)	1	0
27060100	Basin (Wetland)	1	0
27060200	Basin (Wetland)	1	0
27060300	Basin (Wetland)	1	0

The rebuild portion of the Proposed Route crosses Bassett Creek twice and an unnamed creek twice; both are PWI watercourses (*see* **Table 20 and Appendix B-15**). The new portion of the 115 kV transmission line of the Proposed Route crosses the same unnamed creek two more times. There are four PWI basins (wetlands) that are crossed by the rebuild portion of the Proposed Route (*see* **Table 20 and Appendix B-15**). When the span across the wetland is more than 500 feet (*see* **Appendix G**), a longer distance between the transmission structures will be considered up to 1,200 feet. However, the additional distance may require Y-frame structures rather than other proposed structures. The PWI basins are further discussed in Section 6.5.2.3 below.

Proposed New Pomerleau Lake Substation

There are no PWI watercourses or basins located within preferred Substation Site A (*see* **Appendix B-15** and **Appendix C-15 and C-16**). There is one PWI watercourse,

an unnamed creek, present in the southwest corner of Substation Site B (*see* **Appendix B-15 and Appendix C-14**).

Mitigative Measures

Unless a MnDNR License to Cross Public Lands and Waters is currently in place for the existing GRE transmission line, the Applicants are required to obtain such license from the MnDNR Division of Lands and Minerals if the lines pass over, under or across any state land or public waters, under Minn. Stat. Section 84.415. This license will include specific mitigation required for each PWI crossing. A NPDES construction stormwater permit will also be applied for if required and a stormwater pollution prevention plan ("SWPPP") will be prepared to assist in keeping construction areas in compliance with the NPDES construction stormwater permit. The SWPPP will outline strategies and steps that will be taken to prevent nonpoint source pollution discharging from construction areas.

6.5.2.3 Wetlands

Wetland locations were initially identified using the U.S. Fish and Wildlife Service ("USFWS") National Wetland Inventory ("NWI") maps. Field review was conducted to verify the presence and classification of the majority of wetlands present with the Proposed Route. The locations of wetlands that were not field verified were identified using NWI maps and aerial photography.

The tables in **Appendix G** identify the wetlands located within the Proposed Route and rejected Alternate Route Segments. Wetlands within 200 feet of the Proposed Route and Alternate Route Segments are shown in **Appendix B-15**. **Table 21** provides a summary of the wetlands crossed by the Proposed Route.

<u>Proposed Route</u>

The majority of the wetlands within the vicinity of the rebuild portion of the Proposed Route are shallow marshes dominated by cattails (*see* **Table 21**). The second most abundant wetland type within this portion of the Proposed Route is wet meadow dominated by reed canary grass, goldenrods and Canada bluejoint. Within the wet meadows, a small shrub-carr component is occasionally present dominated by

willows and other shrubs. Other wetland types found along the Proposed Route include a small shrub-carr wetland, a hardwood swamp dominated by box elders and willows and small areas of shallow, open water. The rebuild portion of the Proposed Route crosses approximately 11,200 lineal feet of wetland and six of these crossings consist of wetland areas that are more than 500 feet in span distance. The distance that the existing GRE transmission line crosses the wetlands ranges from 13 to 1,518 feet. Eight of these wetland crossings are PWI basins and 24 of these wetland crossings are potentially U.S. Army Corps of Engineers ("ACOE") jurisdictional wetlands based upon review of aerial maps (*see* **Appendix G**).

Table 21
Acres of Wetland within Various Distances of Proposed Route

	Rebuild Portion of 115 kV Line (Medina Substation to Intersection with GRE 115 kV Line WH-PB)				New Portion of 115 kV Line (Intersection with GRE 115 kV Line WH-PB and Preferred Substation Site A)			
Eggers & Reed Wetland Type	**0-35 feet**	**0-50 feet**	**0-100 feet**	**0-200 feet**	**0-35 feet**	**0-50 feet**	**0-100 feet**	**0-200 feet**
Shallow marsh	14.99	20.67	39.06	75.72	1.40	2.00	3.89	6.72
Wet meadow	2.11	3.05	6.00	11.38	0	0	0	0
Shallow, open water	0.68	1.02	2.31	4.08	0	0	0	0
Hardwood swamp	0.14	0.28	0.79	1.09	0	0	0	0
Deep marsh	0	0	0.03	0.37	0	0	0	0
Shrub-carr	0	0.001	0.11	0.48	0	0	0	0
Total acres	17.92	25.02	48.30	93.12	1.40	2.00	3.89	6.72

The new portion of the Proposed Route has three wetland crossings, with a total crossing length of approximately 640 feet; one of these crossings is more than 500 feet in span distance (*see* **Appendix G**). The distance the proposed new 115 kV transmission line on the Proposed Route crosses the wetlands ranges from 11 to 529 feet. None of these wetland crossings are PWI basins or potential ACOE jurisdictional wetlands based upon review of aerial maps (*see* **Appendix G**).

When the span across the wetland is more than 500 feet (*see* **Appendix G**), a longer distance between the transmission structures will be considered up to 1,200 feet.

However, the additional distance to span the wetlands may require Y-frame structures rather than other proposed structures.

Proposed Pomerleau Lake Substation

There is one shallow marsh wetland (~3.5 acres) located within preferred Substation Site A. *See* **Appendix B-15** and **Appendix C-15 and C-16**. There is one shallow marsh wetland and a small piece of another shallow marsh wetland (~3.2 acres) located within Substation Site B. *See* **Appendix B-15** and **Appendix C-14**. However, impacts to these wetlands can likely be avoided with careful planning and substation design.

Mitigative Measures

During construction, the most effective way to minimize impacts to 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. Equipment fueling and lubricating will occur at a distance from wetlands. The Applicants will follow standard erosion control measures identified in the MPCA Stormwater BMP Manual, such as using silt fencing to minimize impacts to adjacent water resources.

Impacts to wetlands will be minimized through appropriate construction practices. An NPDES construction stormwater permit will be applied for if required and a SWPPP will be prepared to assist in keeping construction areas in compliance with the NPDES construction stormwater permit. The SWPPP will outline strategies and steps that will be taken to prevent nonpoint source pollution discharging from construction areas. 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 will need to 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 would be affected.

The Applicants will design the Project to avoid and minimize wetland impacts, and will apply erosion control measures identified in the MPCA Storm Water BMPs Manual, such as using silt fence to minimize impacts to adjacent water resources. During construction, the Applicants 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. The Applicants will minimize impacts to public waters and public water wetlands to the greatest extent possible. By maximizing the typical span length in these areas, permanent impacts to these areas can be minimized.

The Project may require waters and wetlands permits or no-loss determinations from the ACOE or Hennepin County. Wetland and surface water impacts will be avoided and minimized to the extent practicable.

The MnDNR Division of Waters requires a Public Waters Work Permit for any alteration of the course, current, or cross-section below the ordinary high water level of a Public Water or Watercourse. No such alterations are anticipated.

The MPCA regulates construction activities that may impact storm water under the Clean Water Act. In the event that an NPDES construction storm water permit and SWPPP is required for the Project, the Applicants will obtain the permit and SWPPP. An NPDES permit is required for owners or operators for any construction activity disturbing: 1) one acre or more of soil; 2) less than one acre of soil if that activity is part of a "larger common plan of development or sale" that is greater than one acre; or 3) less than one acre of soil, but the MPCA determines that the activity poses a risk to water resources.

6.5.2.4 Floodplain

Floodplain resources were identified within the Project area using maps created by FEMA (FEMA 2003).

Proposed Route

There are several locations within the Project area that are mapped as 100-year and 500-year floodplains (*see* **Appendix B-15** and **Appendix C**). Although the Applicants will minimize impacts to floodplains by spanning them to the extent possible, it may be possible that a few poles for the Proposed Route will need to be placed in a mapped floodplain because the span distances across at least one floodplain area is greater than 1,200 feet.

Proposed New Pomerleau Lake Substation

There are no areas of mapped 100-year or 500-year floodplains within preferred Substation Site A or alternate Substation Site B (*see* **Appendix B-15** and **Appendix C-14 to C-16**).

Mitigative Measures

During design, the Applicants will minimize impacts to floodplains by siting transmission structure to span them to the extent possible. During construction, sediment could possibly reach surface waters as ground is disturbed by excavation, grading or construction traffic. A NPDES construction stormwater permit will be applied for, if necessary, and a SWPPP developed and implemented for the Project. In addition, standard erosion control measures identified in the applicable MPCA Storm Water BMPs 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 area. The Applicants will maintain sound water and soil conservation practices while building and operating the proposed 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 proposed 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.

6.5.3 Flora

Proposed Route

Land cover in the Project area consists primarily of residential/industrial development, with cropland, wetland, open grassland, and some wooded areas also present (*see* **Appendix B-10**). Cropland consists primarily of soybeans. Reed canary grass and cattails are the dominant species found in the wetlands. Grasslands are typically mowed and are likely dominated by Kentucky bluegrass. Wooded areas primarily occur along property lines and consist of a combination of ornamental trees, such as blue spruce, crab apples, and amur maples and non-ornamental trees, such as ashes, maples and oaks. Transmission line construction impacts to trees and woodlands will be minimized because a majority of the proposed transmission line Project will be a rebuild of an existing transmission line and follow existing right-of-way. Rare and Unique Resources are discussed in Section 6.6.

Proposed New Pomerleau Lake Substation

Preferred Substation Site A includes one large shallow marsh wetland dominated by cattails at the north end of the site and large, disturbed open areas dominated by weedy vegetation throughout the remainder of the site. *See* **Appendix B-10 and B-15**, **Appendix C-15 and C-16**. Substation Site B is located on a former golf course, a portion of which located west of Substation Site B that is currently undergoing grading in preparation for construction of a new housing development and therefore, vegetation is sparse within that construction site. Shallow marsh wetlands dominated by cattails are present in the southwest and southeast portions of Substation Site B. *See* **Appendix B-10 and B-15**, **Appendix C-14**. Rare and Unique Resources are discussed in Section 6.6

Mitigative Measures

To minimize impacts to trees in the Project area, the Applicants will limit tree clearing and removal to the transmission line right-of-way (existing and new), areas that limit construction access to the Project area, and areas that impact the safe operation of the facilities. 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. In addition, the Project design will locate and design the proposed substation to avoid tree removal to the extent possible. The Applicants will work with municipalities, landowners and businesses to modify the proposed construction area such that tree removal is avoided to the extent possible.

6.5.4 Fauna

Proposed Route

There are no MnDNR Wildlife Management Areas ("WMA") or USFWS Waterfowl Production Areas ("WPA") within the vicinity of the Project area. However, the croplands, grasslands, wetlands, and woodlands in the area provide habitat for a variety of wildlife species that are commonly found in rural and urban areas. These wildlife species may include deer, small mammals, waterfowl, raptors, perching birds, and amphibians.

Wildlife that resides within the construction zone will be temporarily displaced to adjacent habitats during the construction process. It is anticipated that fish and mollusks that inhabit the local watercourses will not be affected by transmission line rebuild or new transmission line.

The reconstructed transmission line may affect raptors, waterfowl, and other bird species. Birds have the potential to collide with all elevated structures, including power lines. Avian collisions with transmission lines can occur in proximity to agricultural fields that serve as feeding areas, wetlands and water features, and along riparian areas that may be used during migration.

The majority of the Project is located along an existing transmission line route. Because of this, significant new impacts to wildlife species are not anticipated. 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. The Applicants' transmission line design standards, however, provide adequate spacing to eliminate such risks, so it is unlikely that any birds will be electrocuted as a result of the Project. *See* Section 6.6 for additional information on minimizing avian impacts.

Proposed Pomerleau Lake Substation

Construction of the proposed Pomerleau Lake Substation will result in the removal of 8 to 10 acres of potential habitat. However, both preferred Substation Site A and alternate Substation Site B are located in previously disturbed areas, where the quality of wildlife habitat is relatively poor. Construction of the proposed Pomerleau Lake Substation may result in temporary displacement of some wildlife species within the vicinity of the proposed substation location.

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 including Minnesota, South Dakota and North Dakota.

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

- working with resource agencies, including the MnDNR, USFWS, and ACOE, to identify any areas that may require marking transmission line shield wires or using alternate structures to reduce collisions, 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. See Section 6.6 for additional information on minimizing avian impacts.

6.6 Rare and Unique Natural Resources

The MnDNR NHIS database was queried to obtain the locations of rare and unique natural resources within the vicinity of the Project area. **Appendix B-16** identifies the locations of rare and unique resources within one mile of the Project area. The MnDNR was contacted regarding possible impacts of the proposed Project on state-listed species. On October 21, 2010 and January 13, 2011, the MnDNR provided comments on the proposed Project stating they generally agree that significant impacts to state-listed species are unlikely from the proposed Project (*see* discussion below and **Appendix D-3**). On September 29, 2010, the USFWS provided

comments on the proposed Project, expressing concerns of impacts to bald and golden eagles (*see* discussion below and **Appendix D-6**).

Proposed Route

Table 22 summarizes the rare species documented in the NHIS database query. There are no federally-listed rare species known to occur within one mile of the Proposed Route. None of the species listed in **Table 22** have federal rare species status. The only federally-listed species known to occur in Hennepin County is the Higgin's eye pearly mussel (*Lampsilis higginsi*) (USFWS 2010). The Higgin's eye pearly mussel, which is endangered at both the federal and state level, lives primarily in the Mississippi River (MnDNR 2010b). The Mississippi River does not flow through the Project area and all streams will be spanned. Because of this, impacts to the Higgin's eye pearly mussel will not occur from the proposed Project.

Table 22
Rare and Unique Resources

Common Name	Scientific Name	Number of Occurrences	Most Recent Occurrence	Federal Status	MN Status	State Rank	Habitat
Blanding's turtle	*Emydoidea blandingii*	1	2006	No Status	THR	S2	Wetland complexes with adjacent sandy uplands
Trumpeter Swan	*Cygnus buccinator*	1	2009	No Status	THR	S2	Small lakes and ponds
Red-shouldered hawk	*Buteo lineatus*	3	2007	No Status	SPC	S3	Large tracts of mature deciduous forest with scattered wetland openings
Cerulean warbler	*Dendroica cerulea*	1	1982	No Status	SPC	S3	Large tracts of deciduous forest with structurally diverse canopy

"No Status" refers to species not listed at the federal level that do not have federal protection. "THR" refers to species listed as threatened at the state level and "SPC"

refers to species that are special concern status at the state level. Minnesota also assigns a rank to listed species reflecting 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) to SU (undetermined, more information is needed).

Within one mile of the rebuild portion of the Proposed Route, the NHIS database documented four rare species (*see* **Table 22**). Two of these species are state-listed as threatened and include the Blanding's turtle and the trumpeter swan. The other two species are state-listed as special concern and include the red-shouldered hawk and the cerulean warbler. Although these two special concern species are monitored by the MnDNR, there is no legal protection for them. No rare species were documented within one mile of the proposed new 115 kV transmission line segment from the intersection point with the GRE 115 kV Line WH-PB to the preferred Substation Site A of the Proposed Route.

Blanding's turtles typically inhabit wetland complexes with adjacent sandy uplands (MnDNR 2010c). It is possible that this habitat type, and possibly Blanding's turtles, may be within the vicinity of the Project area. Trumpeter swans prefer small ponds and lakes with areas of at least 100 meters of open water for take-off (MnDNR 2010d). Trumpeter swans have been documented nesting within one mile of the Project area and the wetland complexes within the Project area that contain areas of open water may provide habitat for trumpeter swans. Both the red shouldered hawk and Cerulean warbler prefer large tracts of mature deciduous forest (MnDNR 2010e and MnDNR 2010f). Although not common, there are a few areas of deciduous forest within the Project area, which may provide habitat for red-shouldered hawks and cerulean warblers.

It is possible that bald eagles are present in the Project area. Although they are only designated as special concern at the state level, bald eagles are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

As mentioned above in Section 6.5.4, the majority of the proposed Project consists of rebuilding an existing transmission line within existing right-of-way. Because

transmission lines are already present, new impacts to avian species are not anticipated to be significant.

In addition to rare species, the NHIS database also documented three rare native plant communities within one mile of the rebuild portion of the Proposed Route; these include a Tamarack Swamp, an Oak Forest (mesic subtype), and a Maple-Basswood Forest. The Maple-Basswood Forest is located within one mile of the proposed new 115 kV transmission line segment from the intersection point with the GRE 115 kV Line WH-PB to the preferred Substation Site A of the Proposed Route. None of the native plant communities are located within 200 feet of either segment of the Proposed Route. Because of this, impacts to these native plant communities are not anticipated.

A portion of the Maple-Basswood Forest documented in the NHIS database is designated as a MnDNR MCBS Site of Biodiversity Significance ("SBS") that is classified as having Moderate Biodiversity Significance. Because this SBS site is not within 200 feet of the Proposed Route, impacts are not expected. There is one SBS site of Moderate Biodiversity Significance (approximately 0.63 acres) present within 35 feet of the rebuild portion of the Proposed Route (*see* **Appendix B-16**). Because this SBS site is located along the existing transmission line, new impacts are not anticipated. However, it is possible that some additional tree clearing within the existing right-of-way may be necessary during construction.

Proposed Pomerleau Lake Substation

According to the NHIS database, no rare species have been documented within one mile of preferred Substation Site A or alternate Substation Site B. However, the NHIS database has documented rare native plant communities within one mile of both substation sites. The Maple-Basswood Forest mentioned above is within one mile of both sites (*see* **Appendix B-16**). In addition, the Oak Forest (mesic subtype), mentioned above is located within one mile of alternate Substation Site B (*see* **Appendix B-16**). Because neither of these native plant communities are located within the boundaries of the proposed new Pomerleau Lake Substation sites, no impacts to them are anticipated from the Project.

Mitigative Measures

The proposed Project and construction process will be designed to avoid encroachment and effects on rare species and unique natural resources to the extent practicable. If rare species or unique natural resources will be affected, Xcel Energy will coordinate with the MnDNR and/or the USFWS and consider modifying either the construction footprint or the construction practices to minimize impacts. As stated above, comments on the proposed Project were received from the MnDNR and the USFWS regarding rare and unique resources in the Project area (*see* **Appendix D-3 and D-6**).

The MnDNR recommends that if Blanding's turtles are found on-site during construction and are in imminent danger, they should be relocated by hand in order to be out of harm's way. However, if they are found on-site during construction, but not in imminent danger, they should be left undisturbed. Xcel Energy intends to adopt the following mitigation measures during construction, and as needed for construction, for Blanding's turtles:

- 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 and 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 during project construction 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).

The MnDNR recommends using bird diverters near lakes and rivers in order to decrease the risk of trumpeter swans (and other avian species) colliding with the transmission lines (*see* **Appendix D-3**). In addition, the USFWS recommends using bird diverters near watercourses, open waterbodies, wetlands, wooded areas, and grasslands in order to minimize impacts to migratory birds. The USFWS also recommends conducting a bald eagle nest study along the proposed Project alignment to identify newly constructed nests that may be affected during Project construction. In addition, the USFWS recommends avoiding construction of the propose Project within potential migratory bird nesting habitats during the primary nesting seasons (*see* **Appendix D-6**). In the event that an eagle nest is later located and determined to be occupied, efforts will be made to minimize potential impacts from construction activities, which may include alteration of pole locations or scheduling construction to avoid nesting season.

Xcel Energy will work with the MnDNR and USFWS to identify areas where bird flight diverters should be installed. In most cases, the shield wire of an overhead transmission line is the most difficult part of the structure for birds to see. Xcel Energy has successfully reduced collisions on certain transmission lines by marking the shield wires with bird flight diverters, which are pre-formed spiral shaped devices made of polyvinyl chloride that are wrapped around the shield wire.

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.

7.0 Comparison of Proposed Route and Proposed and Alternate Substation Sites

The extent of the area used to analyze issues for the proposed Project varies depending on the applicable siting factors, including:

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

2. rare and unique natural resources were identified within 1.0 mile of the proposed Project;

3. archaeological and historic resources were identified within 0.5 miles of the proposed Project;

4. air quality, water quality, route specific design issues and existing infrastructure were identified within the requested 100- to 200-foot route width and the proposed Project;

5. residences, noise and public health and safety were identified within 200 feet of the various route centerlines and the proposed Project; and

6. agriculture, public water crossings, wetlands, floodplains, and flora were identified within a typical 75-foot right-of-way width.

For each siting factor, the potential effect of the Proposed Route and the proposed Substation Sites A and B is briefly discussed in the tables below. Summary tables with more detailed information of potential effects of the Proposed Route, Proposed and Alternate Route Segments, and the proposed Substation Sites A and B is included in **Appendix H**.

<u>Proposed Route</u>

For the Proposed Route, there are no anticipated effects for several siting factors including: displacement of residents and structures, noise, cultural values, recreation, public services, public health and safety, forestry, air quality, tourism, mining,

archaeological resources, water quality, electrical system reliability and pole placement, and loss of prime farmland.

Table 23 summarizes the potential impacts of the factors set forth in Minn. R. 7850.4100 for the Proposed Route.

Table 23
Summary of Issues for the Proposed Route

Factor	Rebuild Portion of 115 kV Line (Medina Substation to Intersection with GRE 115 kV Line WH-PB)	New Portion of 115 kV Line (Intersection with GRE 115 kV Line WH-PB and Preferred Substation Site A)	Summary of Proposed Route
Effects on Human Settlement			
Residences within 200 feet of the route centerline	286 residences within 200 feet of the route	0 residences within 200 feet of the route	286 residences within 200 feet of the route
Residences within 35 feet of the route centerline	13 residences within 35 feet of the route	0 residences within 35 feet of the route	13 residences within 35 feet of the route
Non-residential buildings within 200 feet of the route centerline	22 non-residential buildings within 200 feet of the route	5 non-residential buildings within 200 feet of the route	27 non-residential buildings within 200 feet of the route
Non-residential buildings within 35 feet of the route centerline	6 non-residential buildings within 35 feet of the route	0 non-residential buildings within 35 feet of the route	6 non-residential buildings within 35 feet of the route
Schools	7 schools within one mile of the route	1 school within one mile of the route	7 schools within one mile of the route
Child Care Center	7 child care centers within one mile	2 child care centers within one mile – previously included within the 7 for the rebuild portion.	7 child care centers within one mile of the route
Aesthetics	Viewshed currently includes the transmission lines and	Viewshed will include the transmission lines and poles	Viewshed will include the transmission lines and poles

Factor	Rebuild Portion of 115 kV Line (Medina Substation to Intersection with GRE 115 kV Line WH-PB)	New Portion of 115 kV Line (Intersection with GRE 115 kV Line WH-PB and Preferred Substation Site A)	Summary of Proposed Route
	poles		
Displacement	No effect	No effect	No effect
Noise	No effect	No effect	No effect
Cultural Values	No effect	No effect	No effect
Recreation	There is one snowmobile trail, local parks, and associated trails that will be crossed but not impacted in the City of Plymouth	No effect	There is one snowmobile trail, local parks and associated trails that will be crossed but not impacted in the City of Plymouth
Public Services	City of Medina and Plymouth sewer and water will not be affected; rural septic systems will not be affected	City of Plymouth sewer and water will not be affected	No effect
Effects on Public Health and Safety			
Public Health and Safety	No impacts from noise or EMF	No impacts from noise or EMF	No impacts from noise or EMF
Effects on Land-based Economics			
Agriculture	Crosses 38 acres of prime farmland within 200 feet of the route	Crosses 0 acres of prime farmland within 35 feet of the route	Crosses 38 acres of prime farmland within 200 feet of the route, however this is within the existing route
Forestry	There are no federal or state forests present; however, a tree farm is located in Medina that is adjacent to the Proposed Route	No effect	There are no federal or state forests present; however, a tree farm is located in Medina that is adjacent to the Proposed Route
Tourism	No effect	No effect	No effect
Mining	No effect	No effect	No effect

Factor	Rebuild Portion of 115 kV Line (Medina Substation to Intersection with GRE 115 kV Line WH-PB)	New Portion of 115 kV Line (Intersection with GRE 115 kV Line WH-PB and Preferred Substation Site A)	Summary of Proposed Route
Effects on Archaeological and Historic Resources			
Archaeological Resources	No archaeological resources within 0.5 miles of the route	No archaeological resources within 0.5 miles of the route	No archaeological resources within 0.5 miles of the route
Historic Resources	16 structures within 0.5 miles of the route; however, 14 have been razed and the remainder will not be affected by the route	1 structure within 0.5 miles of the route; however, it has been razed	16 structures within 0.5 miles of the route; however, 14 have been razed and the remainder will not be affected by the route
Effects on the Natural Environment			
Air Quality	No effect	No effect	No effect
Water Quality	No effect with implementation of BMPs	No effect with implementation of BMPs	No effect with implementation of BMPs
Public Water Watercourses Crossed	4 crossings	2 crossings	6 crossings
Public Water Basins Crossed	6 crossings	0 crossings	6 crossings
Wetlands	11,198 feet spanned in the right-of-way; 38 wetland crossings	638 feet spanned in the right-of-way; 3 wetland crossings	11,836 feet spanned in the right-of-way; 41 wetland crossings
Floodplains	There are several locations where the 100- or 500-year flood plain will be crossed and may require pole placement	There are several locations where the 100- or 500-year flood plain will be crossed and may require pole placement	There are several locations where the 100- or 500-year flood plain will be crossed and may require pole placement
Flora	Tree removal or trimming will be necessary	Tree removal or trimming will be necessary	Tree removal or trimming will be necessary
Fauna	No effect	No effect	Similar fauna is expected to be present throughout the Project area; see Rare and

Factor	Rebuild Portion of 115 kV Line (Medina Substation to Intersection with GRE 115 kV Line WH-PB)	New Portion of 115 kV Line (Intersection with GRE 115 kV Line WH-PB and Preferred Substation Site A)	Summary of Proposed Route
			Unique Natural Resources
Scientific and Natural Areas	There is one SNA within one mile	There are no SNAs within one mile	There is one SNA within one mile
Site of Biodiversity Significance	There is one SBS site of Moderate Biodiversity Significance present within 35 feet of the Proposed Route	No effect	There is one SBS site of Moderate Biodiversity Significance present within 35 feet of the Proposed Route
Rare and Unique Natural Resources	4 organisms (6 total occurrences) within one mile of the route – includes reported occurrences of Blanding's turtle, trumpeter swans, red-shouldered hawk and cerulean warbler	0 organisms within one mile of the Proposed Route	4 organisms (6 total occurrences) within one mile of the route – includes reported occurrences of Blanding's turtle, trumpeter swans, red-shouldered hawk and cerulean warbler
Application of Design Options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity			
Route Specific	Follows existing 69 kV GRE transmission line route for majority of Proposed Route	New right-of-way required along existing utility route and roads	Proposed Route utilizes an existing transmission line route or parallels existing roads
Use or paralleling of existing right-of-way, survey lines, natural division lines and agricultural field boundaries			
Existing Right-of-way, survey lines, natural division lines and agricultural field boundaries	100 percent of the route follows an existing transmission line route	66 percent shared right-of-way with utility route and roads	Proposed Route follows existing transmission line routes or roads for more than 99 percent of its length
Use of Existing Transportation, Pipeline, and Electrical Transmission Systems or ROWs			

Factor	Rebuild Portion of 115 kV Line (Medina Substation to Intersection with GRE 115 kV Line WH-PB)	New Portion of 115 kV Line (Intersection with GRE 115 kV Line WH-PB and Preferred Substation Site A)	Summary of Proposed Route
Existing transportation, pipeline and electrical transmission systems or ROWs	100 percent is within or adjacent to right-of-way with existing transmission line right-of-way	66 percent is within or adjacent to right-of-way with existing transportation right-of-ways	Proposed Route follows existing transmission line routes or roads for more than 99 percent of its length
Electrical System Reliability			
Electrical System Reliability	Provides reliability to system	Provides reliability to system	Provides reliability to system
Cost of Constructing, Operating and Maintaining the Facility which are Dependent on Design and Route			
Costs	$8 million for all construction of Proposed Route; $300-500 per mile per year for maintenance	8 million for all construction of Proposed Route; $300-500 per mile per year for maintenance	Total cost of transmission line construction is $8 million; $300-500 per mile per year for maintenance
Adverse Human and Natural Environmental Effects Which Cannot Be Avoided			
General	Pole placement and tree impacts; proximity to existing residences along the existing transmission line right-of-way	Pole placement and tree impacts	Pole placement and tree impacts; proximity to existing residences along the existing transmission line right-of-way
Irreversible and Irretrievable Commitments of Resources			
General	Pole placement and tree impacts; proximity to existing residences along the existing transmission line right-of-way	Pole placement and tree impacts; proximity to existing residences along the existing transmission line right-of-way	Pole placement and tree impacts; proximity to existing residences along the existing transmission line right-of-way

Proposed Pomerleau Lake Substation

For the Proposed Pomerleau Lake Substation, there are no anticipated effects for several siting factors including: displacement of residents and structures, noise, cultural values, public services, public health and safety, forestry, air quality, tourism,

mining, archaeological resources, water quality, electrical system reliability and pole placement, and loss of prime farmland.

Table 24 summarizes the potential impacts of the factors set forth in Minn. R. 7850.4100 for the Proposed Pomerleau Lake Substation Sites A and B.

Table 24
Summary of Issues for the Proposed Pomerleau Lake Substation

Factor	Substation Site A	Substation Site B	Comparison of Substation Sites
Effects on Human Settlement			
Residences within 200 feet of substation site boundary	0 residences within 200 feet of site	0 residences within 200 feet of site	No residences within 200 feet of either site
Residences within 35 feet of substation site boundary	0 residences within 35 feet of site	0 residences within 35 feet of site	No residences within 35 feet of either site
Non-residential buildings within 200 feet of substation site boundary	3 non-residential buildings within 200 feet of site	0 non-residential buildings within 200 feet of site	More non-residential buildings within 200 feet of Substation Site A
Non-residential buildings within 35 feet of substation site boundary	0 non-residential buildings within 35 feet of site	0 non-residential buildings within 35 feet of site	No residences within 35 feet of either site
Schools	1 school within one mile of site	2 schools within one mile of site	Substation Site B has one more school within one mile of site
Child Care Center	2 child care centers within one mile of site	0 child care centers within one mile of site	Substation Site A has 2 more child care centers within one mile
Aesthetics	Substation site is more isolated from residential areas	Substation site would be adjacent to future residential areas	Viewshed around Substation Site B would be more negatively impacted due to residences
Displacement	No effect	No effect	No effect
Noise	No effect	No effect	No effect
Cultural Values	No effect	No effect	No effect

Factor	Substation Site A	Substation Site B	Comparison of Substation Sites
Recreation	The substation site may be visible from Clifton E. French Park and associated trails	No effect	Substation Site A could influence the viewshed from Clifton E. French Park and associated trails
Public Services	City of Plymouth sewer and water will not be affected	City of Plymouth sewer and water will not be affected	No effect
Effects on Public Health and Safety			
Public Health and Safety	No impacts from noise or EMF	No impacts from noise or EMF	No impacts from noise or EMF
Effects on Land-based Economics			
Agriculture	No prime farmland within 200 feet of site	No prime farmland within 200 feet of site	No prime farmland within 200 feet of either site
Forestry	There are no federal or state forests present	There are no federal or state forests present	There are no federal or state forests present within vicinity of either site
Tourism	No effect	No effect	No effect
Mining	No effect	No effect	No effect
Effects on Archaeological and Historic Resources			
Archaeological Resources	No archaeological resources within 0.5 miles of site	No archaeological resources within 0.5 miles of site	No archaeological resources within 0.5 miles of either site
Historic Resources	2 structures within 0.5 miles of site, however both have been razed	0 structure within 0.5 miles of site	No remaining historic structures within 0.5 mile of either site
Effects on the Natural Environment			
Air Quality	No effect	No effect	No effect
Water Quality	No effect with implementation of BMPs	No effect with implementation of BMPs	No effect with implementation of BMPs
Public Water Watercourses	No PWI watercourses within site	1 PWI watercourse within site	Substation Site B has more PWI watercourses within site
Public Water Basins	0 PWI basins within site	0 PWI basins within site	No PWI basins within either site
Wetlands	3.5 acres of wetland within site	3.2 acres of wetland within site	Substation Site A has slightly more acres of wetland

Factor	Substation Site A	Substation Site B	Comparison of Substation Sites
Floodplains	0 floodplain within site	0 floodplain within site	No floodplain within either site
Flora	Site vegetation is currently disturbed	Site vegetation is currently disturbed	Vegetation is already disturbed at both sites
Fauna	Will result in removal of 8-10 acres of habitat	Will result in removal of 8-10 acres of habitat	Both sites will result in removal of 8-10 acres of habitat; however, habitat is poor quality
Scientific and Natural Areas	There are no SNAs within one mile of site	There are no SNAs within one mile of site	There are no SNAs within one mile of either site
Site of Biodiversity Significance	No SBS sites within 200 feet of site	No SBS sites within 200 feet of site	No SBS sites within 200 feet of either site
Rare and Unique Natural Resources	No rare species within one mile of site; 1 rare community within one mile of site	No rare species within one mile of site; 2 rare communities within one mile of site	No rare species within one mile of site; Substation Site B has more rare plant communities within one mile; however impacts are not likely
Cost of Constructing, Operating and Maintaining the Facility which are Dependent on Design and Route			
Costs	$8 million for construction of the proposed Pomerleau Lake Substation; $2.6 million for modifications to Medina Substation; and $4.5 million for modifications to Hollydale Substation	$8 million for construction of the proposed Pomerleau Lake Substation; $2.6 million for modifications to Medina Substation; and $4.5 million for modifications to Hollydale Substation	$8 million for construction of the proposed Pomerleau Lake Substation; $2.6 million for modifications to Medina Substation; and $4.5 million for modifications to Hollydale Substation
Adverse Human and Natural Environmental Effects Which Cannot Be Avoided			
General	Pole placement and tree impacts; proximity to existing residences along the existing transmission line right-of-way	Pole placement and tree impacts	Pole placement and tree impacts; proximity to existing residences along the existing transmission line right-of-way
Irreversible and Irretrievable Commitments of Resources			

Factor	Substation Site A	Substation Site B	Comparison of Substation Sites
General	Pole placement and tree impacts; proximity to existing residences along the existing transmission line right-of-way	Pole placement and tree impacts; proximity to existing residences along the existing transmission line right-of-way	Pole placement and tree impacts; proximity to existing residences along the existing transmission line right-of-way

8.0 Agency Involvement, Public Participation and Required Permits and Approvals

8.1 Agency Contacts

The Applicants sent letters to LGUs within the Project area giving LGUs notice of the Project, requesting comments and concerns, and allowing LGUs the opportunity to request a meeting to discuss the Project. A list of the LGUs who received this letter (and a sample letter) is included in **Appendix D-1**. To date, Xcel Energy has received comments from the USFWS, MnDNR, SHPO, City of Plymouth, Shingle Creek Watershed District, and Hennepin County (*see* **Appendix D**), further discussed below.

The Applicants also sent letters to various regulatory and governmental authorities to request review of the Project for applicable comments and concerns. A list of the agencies who received this letter is included in **Appendix D-2**. Xcel Energy has had an opportunity to meet with representatives of Medina and Plymouth regarding the Project, further discussed below.

United States Fish and Wildlife Service

The Applicants sent a letter to the USFWS on August 23, 2010, requesting review of the proposed Project. On September 29, 2010, Richard Davis of the USFWS responded and indicated that there did not appear to be any federally-listed threatened or endangered species within the vicinity of the proposed area (*see* **Appendix D-6**). However, the USFWS recommended that a bald eagle nest survey be conducted along the proposed Project alignment to identify newly constructed nests that may be affected by the Project during construction.

United States Army Corps of Engineers

The Applicants sent a letter to the ACOE on August 23, 2010, requesting comments on the proposed Project. The ACOE has not commented on the Project as of the date of this Application.

Minnesota Department of Natural Resources

On behalf of the Applicants, Barr Engineering Company ("Barr") sent a letter to the MnDNR Division of Ecological Resources on September 1, 2010, requesting review of the proposed Project for potential effects on state listed threatened and endangered species and other rare natural resources. Lisa Joyal of the MnDNR responded on October 21, 2010 indicating that significant impacts to state-listed species are unlikely from the proposed Project, but that two state-threatened species, the Blanding's turtle and the trumpeter swan, could be present within the Project area (*see* Section 6.5.5 for additional information on this topic and **Appendix D-3**). Barr sent a follow-up letter to the MnDNR with a revised Project area on December 29, 2010. Lisa Joyal, MnDNR, responded on January 13, 2011 indicating that her assessment remained the same as her October 21, 2010, assessment based upon the revised Project area (*see* **Appendix D-3**).

Minnesota State Historic Preservation Office

The Applicants sent a letter to the SHPO on March 14, 2011, requesting comments on the proposed Project and the Phase Ia Background Literature Search Report. A response was received from the SHPO on April 27, 2011 stating that the Project was reviewed and no further action is required unless a federal permit is required for the Project. (*see* **Appendix D-7**).

Minnesota Department of Transportation

The Applicants sent a letter to the MnDOT on August 23, 2010, requesting comments on the proposed Project. As of this date, MnDOT has not responded to the Applicant's request.

Metropolitan Council

The Applicants sent a letter to the Metropolitan Council on August 23, 2010, requesting comments on the proposed Project. As of this date, the Metropolitan Council has not responded to the Applicant's request.

Hennepin County

The Applicants sent letters to representatives of Hennepin County Public Works and Transportation departments on August 23, 2010, requesting comments on the proposed Project. Carolyn Fackler, an engineer with the Transportation Department, provided written comment on August 31, 2010 (*see* **Appendix D-5**).

Cities of Plymouth and Medina

The Applicants sent letters to representatives of the cities of Plymouth and Medina on August 23, 2010, requesting comments on the proposed Project. Xcel Energy staff subsequently met with staff from each city, which is summarized below.

City of Plymouth

On September 7, 2010, Xcel Energy met with City of Plymouth staff to introduce the City to the proposed Project, to discuss the need for the Project and to review the permitting process. Xcel Energy also discussed plans for the new Pomerleau Lake Substation, size, and layout of the new substation, and preliminary sites identified in Plymouth for the new substation.

At that time, preliminary sites under consideration included: 1) City of Plymouth property located south of Schmidt Lake Road and alongside the western side of I-494; 2) land located north of Providence Academy and the Canadian Pacific Railway west of Fernbrook Lane; and 3) the Begin Oaks Golf Course site. City of Plymouth staff indicated the City uses its site as a fill site from City utility projects, and that it has plans to create ball fields once the site is filled in the next five years. The Three Rivers Park District also has plans for a regional trail in this area. City staff indicated that if there was a place to take fill, it would consider use of this site as a new substation.

City staff also indicated that the property located north of Providence Academy is being developed by Hampton Hills Development, and some utilities, road improvements and residences are currently being constructed in this area. At that time, the City expected to see an application from Hampton Hills Development for additional platting of this land.

The City also indicated that the Begin Oaks Golf Course appears to be doing very well and that this site does not seem to be feasible for use as a planned substation site. The City also suggested that Xcel Energy consider an industrial site located at the southwest corner of MN 55 and I-494 near Cheshire Lane that is for sale. This industrial site is located approximately 1-2 miles south of the intersection of I-494 and Schmidt Lake Road, which would require new impacts for transmission line routing.

The City of Plymouth City Manager provided written comments on February 7, 2011 regarding the proposed Project. The letter mentions that the City of Plymouth has future plans for a park facility at the location of Preferred Substation Site A (*see* **Appendix D-4)**. Xcel Energy met with City staff on April 20, 2011, to discuss the February 7th letter, the need for the Project, and the steps Xcel Energy is taking to identify and assess potential substation sites for the Project. The parties discussed available parcels of land in Plymouth that are 8-10 acres in size, including the City property along the west side of I-494 and south of Schmidt Lake Road, the Hampton Hills LLC development north of Providence Academy, and the Begin Oaks Golf Course. Because the Begin Oaks Golf Course is an active business, it is located a greater distance from existing transmission facilities the Project will connect, and the other two sites are generally undeveloped, Xcel Energy indicated that the City and Hampton Hills sites will be included in the Application as possible substation sites. The City indicated the land associated with Preferred Substation Site A is the last property available to the City for the east side of Plymouth for use as ballfields. The parties discussed current development of the Hampton Hills property and that the proposed Substation Site B is not currently platted for that development. On conclusion, the City agreed to allow Xcel Energy to install soil borings at Preferred Substation Site A once the site dried out. Xcel Energy will continue to work with the City regarding siting of Substation Site A.

<u>City of Medina</u>

On September 20, 2010, Xcel Energy met with City of Medina staff to discuss the proposed Project. Xcel Energy staff explained the need for the proposed Project, plans for rebuilding the existing GRE transmission line to 115 kV and the new Pomerleau Lake Substation in Plymouth and the permitting process. The City of

Medina indicated their concern over tree trimming, vegetation management, construction access, construction disturbance, and impacts to landowner property, and requested that the Applicants communicate their plans to the City regarding these issues as the Project progresses. City staff inquired about the possibility of another route or moving the existing GRE transmission line from existing right-of-way to new right-of-way. Xcel Energy noted moving the existing line to a new right-of-way that will create new impacts and require new easement rights. Xcel Energy indicated that the City or public could propose another route in the permitting process. Xcel Energy staff indicated that once the Route Permit Application is prepared and filed, there will be additional times for the public and City to provide comments during the permit process to the Department of Commerce, Energy Facilities Permitting and the Commission.

Elm Creek, Bassett Creek, and Shingle Creek Watershed District

The Applicants sent letters to representatives of the watershed districts within the Project area on September 1, 2010, requesting comments on the proposed Project. As of this date, only Shingle Creek Watershed District has provided comments regarding the proposed project. Dawn Swanson, a board member of Shingle Creek Watershed District, expressed concerns regarding impacts to watersheds, Pomerleau Lake, wildlife, and the potential for health risks to people (*see* **Appendix D-8).**

8.2 Identification of Landowners

Two landowner lists were created for the Project because Xcel Energy held two public information meetings. The first public information meeting was held to inform landowners along the Proposed Route and in the vicinity of proposed Substation Site A and B. A list of these landowners is included in **Appendix E-1**.

The second public information meeting was held to inform landowners along the Alternate Route Segments that were added to the Project after the first public information meeting, as well as landowners along the Proposed Route and in the vicinity of proposed Substation Site A and B. A list of these landowners is included in **Appendix E-5**. Addresses have been redacted from the landowner list and comment forms due to privacy concerns.

8.3 Public Participation

In developing the route alternates, the Applicants 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 August 23, 2010. Xcel Energy also sent a request for comment letter to various agencies in the Project location on August, 2010. Agencies generally responded with specific environmental or other data (e.g., special status species, land use maps) and applicable guidelines, rules, and regulations. The Applicants will continue to communicate with these agencies throughout the permitting process.

In addition to meetings with the LGUs discussed above, the following summarizes the several meetings Xcel Energy has participated in during the route development process.

First Public Informational Meeting

Xcel Energy held a public informational meeting on September 15, 2010. Approximately 50 people attended the September 2010 meeting. This meeting was held to inform landowners and public officials of the proposed Project and to gather input to be used in further assessing Project impacts, routing and substation locations. A notice for the first public informational meeting was published in the Plymouth newspaper "The Plymouth Sun Sailor" on Thursday September 9, 2010, and in the Medina newspaper "The South Crow River News" on Friday September 10, 2010. A copy of the notice is included in **Appendix E-2**. Attendees at the meeting are included in **Appendix E-3**.

Landowner Meeting

At the request of several landowners along the Proposed Route in the vicinity of Orchid, Niagara, and Minnesota Lanes in Plymouth, Xcel Energy attended a meeting with these landowners on October 11, 2010. Approximately 11 people attended the landowner meeting. The landowners expressed their concerns over the proposed transmission line rebuild near their residences, health, land use, vegetation management and property values. Xcel Energy reviewed with the landowners the

proposed Project, the need for the Project, the permitting process, assessment of impacts within this Application, and engineering and construction processes for the Project. The landowners requested Xcel Energy to consider other routes for the Project. Attendees at the meeting are included in **Appendix E-4**.

Second Public Informational Meeting

Additional route alternates were suggested by the public following the first public meeting. A second additional public informational meeting was held on November 23, 2010 to review the proposed Project and discuss alternate route segments. Approximately 40 people attended the November 2010 meeting. A notice for the meeting was published in the Plymouth newspaper "The Plymouth Sun Sailor" on Thursday November 11, 2010, and in the Medina newspaper "The South Crow River News" on Friday November 12, 2010. A copy of the notice is included in **Appendix E-6**. Attendees at the meeting are included in **Appendix E-7**.

Both public informational meetings were held at the Kelly Inn in Plymouth between 3 and 7 pm. Approximately 100 people submitted comments following the public and landowner meetings. Public interest focused primarily on proximity of the transmission lines to residences and trees and impacts on health and property values.

Xcel Energy has worked with the public throughout the Project development process. A summary of landowner comments received and the comment forms submitted throughout the route selection process is included in **Appendix E-8**. A copy of public comments received to date is included in **Appendix E-8**.

8.4 Required Permits and Approvals

In addition to a Route Permit, other federal, state, and local permits could potentially be required for the proposed Project. These are identified below in **Table 25**.

Table 25
Potential Permits Required

Permit	Jurisdiction
Federal	
Section 404 Jurisdictional Determination/Permit	ACOE
Section 10 Rivers and Harbors Permit	ACOE
State	
Route Permit	MPUC
License to Cross Public Waters	MnDNR Division of Lands and Minerals
Utility Permit	MnDOT
NPDES Construction Stormwater Permit	MPCA
Section 401 Water Quality Certification	MPCA (required if the ACOE requires an individual permit for wetland dredging and filling activities, this certification is required)
Local	
Minnesota Wetland Conservation Act Certification	Hennepin County
County Road Access Permit/Right-of-way Permit	Hennepin County

For the other permits listed in **Table 25** above, and any additional permit requirements identified during subsequent agency consultations, the Applicants 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.

8.4.1 Federal Permits

U.S. Army Corps of Engineers

The ACOE regulates the placement of fill material into wetlands that are located adjacent to, or hydraulically connected to, interstate or navigable waters under the authority of Section 404 of the Clean Water Act. After coordination and application submission, authorization from the ACOE would likely fall under the utility line discharge provision of a Regional General Permit (RGP-3-MN) which provides for utility line discharges. Notification would be required because the proposed Project

would cross more than 500 feet of wetland and require direct fill for placement of structures in wetlands.

The ACOE could also require that the Project be authorized under Section 10 of the Rivers and Harbors Act, which requires an ACOE permit to do work in, over or under Navigable Waters.

8.4.2 State of Minnesota Permits

Minnesota Public Utilities Commission

Minnesota Statutes Section 216E.03, subd. 2, provides that no person may construct a HVTL without a Route Permit from the Commission. The Applicants are seeking a Route Permit from the Commission with this Application.

Minnesota Department of Natural Resources

The MnDNR Division of Lands and Minerals regulates utility crossings on, over or under any state land or public water identified on the Public Waters and Wetlands Maps. A license to cross Public Waters is required under Minn. Stat. § 84.415 and Minn. R. Chapter 6135. The Applicants work closely with the MnDNR on these permits and will file for them once the route is selected and the line design is complete. The MnDNR Division of Waters requires a Public Waters Work Permit for any alteration of the course, current, or cross-section below the ordinary high water level of a Public Water or Watercourse. No such alterations are anticipated for the Project.

Minnesota Pollution Control Agency

MPCA requires an NPDES construction storm water permit and SWPPP if you are the owner or operator for any construction activity disturbing: 1) one acre or more of soil; 2) less than one acre of soil if that activity is part of a "larger common plan of development or sale" that is greater than one acre; or 3) less than one acre of soil, but the MPCA determines that the activity poses a risk to water resources. Most construction activities are covered by the general NPDES storm water permit for construction activity, but some construction sites need individual permit coverage.

The Applicants will determine if such permit is required, and, if so, obtain the permit from the MPCA.

8.4.3 Local Permits

Once the Commission issues a Route Permit, zoning, building and land use regulations and rules are preempted per Minn. Stat. § 216E.10, subd. 1. Applicable permits from Hennepin County concerning road access, road right-of-way and wetlands under Minnesota Wetland Conservation Act ("WCA") will be secured as needed for the Project.

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10.0 Definitions

Following are a list of definitions used in this Application:

Avian	Of or relating to birds.
A-weighted Scale	The sensitivity range for human hearing.
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.
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 Fields ("EMF")	The term EMF refers to electric and magnetic fields that are coupled together, 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.
Habitat	The place or environment where a plant or animal naturally or normally lives and grows.
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. High voltage transmission lines typically have a voltage of 69 kV or more.
Hydrocarbons	Compounds that contain carbon and hydrogen, found in fossil fuels.
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.
Scientific and Natural Area	A program administered by the MnDNR with the goal to preserve and perpetuate the ecological diversity of Minnesota's natural heritage, including landforms, fossil remains, plant and animal communities, rare and endangered species, or other biotic features and geological formations, for scientific study and public edification as components of a healthy environment.
Site of Biodiversity Significance	The Minnesota County Biological Survey collects baseline data on the distribution and ecology of native plant communities. At the conclusion of the work, the MCBS assigns a biodiversity significance rank to each site surveyed.
Stray Voltage	"Stray voltage" is a condition that can occur on the electric service entrances to structures from distribution lines, not transmission lines. More precisely, stray voltage is a voltage that exists between the neutral wire of the service entrance and grounded objects in buildings such as barns and milking parlors. 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.
Voltage	Electric potential or potential difference expressed in volts.
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.
Waterfowl Production Area (WPA)	Waterfowl Production Areas preserve wetlands and grasslands critical to waterfowl and other wildlife. These public lands, managed by the U.S. Fish and Wildlife Service, were included in the National Wildlife Refuge System in 1966 through the National Wildlife Refuge Administration Act.
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.
Wildlife Management Area (WMA)	Wildlife Management Areas are part of Minnesota's outdoor recreation system and are established to protect those lands and waters that have a high potential for wildlife production, public hunting, trapping, fishing and other compatible recreational uses.

11.0 Acronyms

A	Ampere
AC	Alternating Current
ACOE	U.S. Army Corps of Engineers
ALJ	Administrative Law Judge
APP	Avian Protection Plan
Applicants	Xcel Energy and Great River Energy
Application	Route Permit Application
Barr	Barr Engineering Company
BMP	Best Management Practice
BPA	Bonneville Power Administration
Brookings Project	Brookings County – Hampton 345 kV Route Permit proceeding
CCTV	Coupling Capacitor Voltage Transformer
Commission	Minnesota Public Utilities Commission
CSAH	County State Aid Highway
dBA	A-weighted sound level in decibels
DC	Direct Current
ECS	Ecological Classification System
EEE	Electrical Equipment Enclosure
EF	Electric Field
ELF	Extremely Low Frequency
EMF	Electric and Magnetic Fields
EPRI	Electric Power Research Institute
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FRD	City of Plymouth Zoning, Future Restricted Development
GAP	Gap Analysis Program
GIS	Geographic Information System
GRE	Great River Energy
HVTL	High Voltage Transmission Line
I-494	Interstate Highway 494

ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEEE	Institute of Electric and Electronic Engineers
kA	Kiloampere
kV	Kilovolt
kV/m	Kilovolts Per Meter
L	Level Descriptors or Statistical Sound Levels
L10	the dBA that may be exceeded 10 percent of the time within an hour
L50	the dBA that may be exceeded 50 percent of the time within an hour
LGU	Local Government Unit
MCBS	Minnesota County Biological Survey
MCOV	Maximum Continuous Operating Voltage
MF	Magnetic Field
mG	Milligauss
MISO	Midwest Independent Transmission System Operator
MN	Minnesota State Highway
MnDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
mG	milliGauss
MOU	Memorandum Of Understanding
MPCA	Minnesota Pollution Control Agency
MPUC	Minnesota Public Utilities Commission
MVA	Megavolt-ampere
NAC	Noise Area Classification
NESC	National Electric Safety Code
NEV	Neutral to Earth Voltage
NHIS	National Heritage Information System
NIEHS	National Institute of Environmental Health Sciences
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places

NWI	National Wetlands Inventory
OES	Office of Energy Security
P-I	City of Plymouth Zoning, Public/Institutional
PLC	Programmable Logic Controller
ppm	parts per million
PPSA	Power Plant Siting Act
Project	Hollydale Project
PUD	City of Plymouth Zoning, Planned Unit Development
PSCW	Public Service Commission of Wisconsin
PWI	MnDNR Public Water Inventory
Railroad	Canadian Pacific Railway
RGP	Regional General Permit
RR	City of Medina Zoning, Rural Residential
SHPO	Minnesota State Historic Preservation Office
SBS	Site of Biodiversity Significance
SNA	Scientific and Natural Area
SSVT	Service Station Voltage Transformer
SWPPP	Stormwater Pollution Prevention Plan
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
VOR	Very-High-Frequency Omni-Directional Range
WCA	Wetland Conservation Act
WHO	World Health Organization
WMA	Wildlife Management Area
Working Group	Interagency Working Group
WPA	Waterfowl Production Area
Xcel Energy	Northern States Power Company

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