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August 29, 2008

VIA E-FILING

Dr. Burl W. Haar
Executive Secretary
Minnesota Public Utilities Commission
121 Seventh Place East, Suite 350
St. Paul, Minnesota 55101

**Re: Application to Public Utilities Commission for a Route Permit
West New Ulm – Fort Ridgely 115/69 kV Rebuild Project
Alternative Permitting Process**

Docket No: E002/TL-08-956

Dear Dr. Haar:

Northern States Power Company, a Minnesota corporation (“Xcel Energy”) is electronically filing its request for a route permit for a high voltage transmission line. The application is made pursuant to Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7849. We request that the application be considered under the alternative permitting process set forth in Minnesota Rules 7849.5500 to 7849.5720 as authorized by Minn. Stat. § 216E.04, subd. 2(3) and Minnesota Rule 7849.5500, subp. 1(c).

The proposed project consists of constructing a new 115 kV transmission line between a new West New Ulm Substation in Brown County, Minnesota and the existing Fort Ridgely Substation in Nicollet County, Minnesota. This new 115 kV transmission line will be co-located on new double circuit 115/69 kV structures with an existing 69 kV line. The proposed project also involves the construction of the West New Ulm Substation near New Ulm, in Brown County, Minnesota and modifications to the Fort Ridgely Substation to accommodate the facilities.

The filing is contained in four electronic files. The application fee is being sent separately to the Department of Commerce. Please call me at (612) 330-1955 if you have any questions regarding this filing.

Sincerely,

A handwritten signature in cursive script, appearing to read "Timothy G. Rogers".

Timothy G. Rogers
Permitting Analyst

cc: Robert Cupit, MN PUC
Scott Ek, MN OES



Northern States Power Company
Application to the
Minnesota Public Utilities Commission
for a
Route Permit

West New Ulm – Fort Ridgely
115/69 kV Transmission Line Rebuild Project

Alternative Permitting Process MPUC Docket No. E002/TL-08-956

August 29, 2008



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1.0 EXECUTIVE SUMMARY

1.1 PROPOSAL SUMMARY

Northern States Power Company, a Minnesota Corporation (“NSPM,” “Xcel Energy” or the “Company”) submits this application (“Application”) for a Route Permit to the Minnesota Public Utilities Commission (“MPUC” or “Commission”) pursuant to Minnesota Statutes Chapter 216E and Minnesota Rules Chapter 7849 for the West New Ulm – Fort Ridgely 115/69 kV Transmission Line Rebuild Project (“Project”).

A Route Permit is requested to construct a new 4.2-mile 115 kilovolt (“kV”) transmission line between the new West New Ulm Substation and the existing Fort Ridgely Substation (“West New Ulm – Fort Ridgely 115 kV line”). This new 115 kV transmission line will be co-located on new double circuit 115/69 kV structures with a portion of the existing Franklin – Fort Ridgely 69 kV transmission line¹ (“Fort Ridgely 69 kV line”) for 3.8 miles. The new 115 /69 kV transmission line will be constructed, to the extent possible, on the centerline of the existing Fort Ridgely 69 kV line, including the segment that crosses the Minnesota River southwest of the Fort Ridgely Substation. Single circuit structures will be used near the Fort Ridgely and West New Ulm substations.

The proposed West New Ulm Substation will be located northwest of the intersection of U.S. Highway 14 and County Highway 12. The new 115 kV line, the Fort Ridgely 69 kV line and the Essig – Sleepy Eye – Franklin 69 kV transmission line will terminate at the West New Ulm Substation. The Project also includes a substation and equipment upgrades and relocation of an existing 115 kV termination at the Fort Ridgely Substation to accommodate the new transmission facilities. In addition, a portion of the Fort Ridgely 69 kV line will be reconducted.

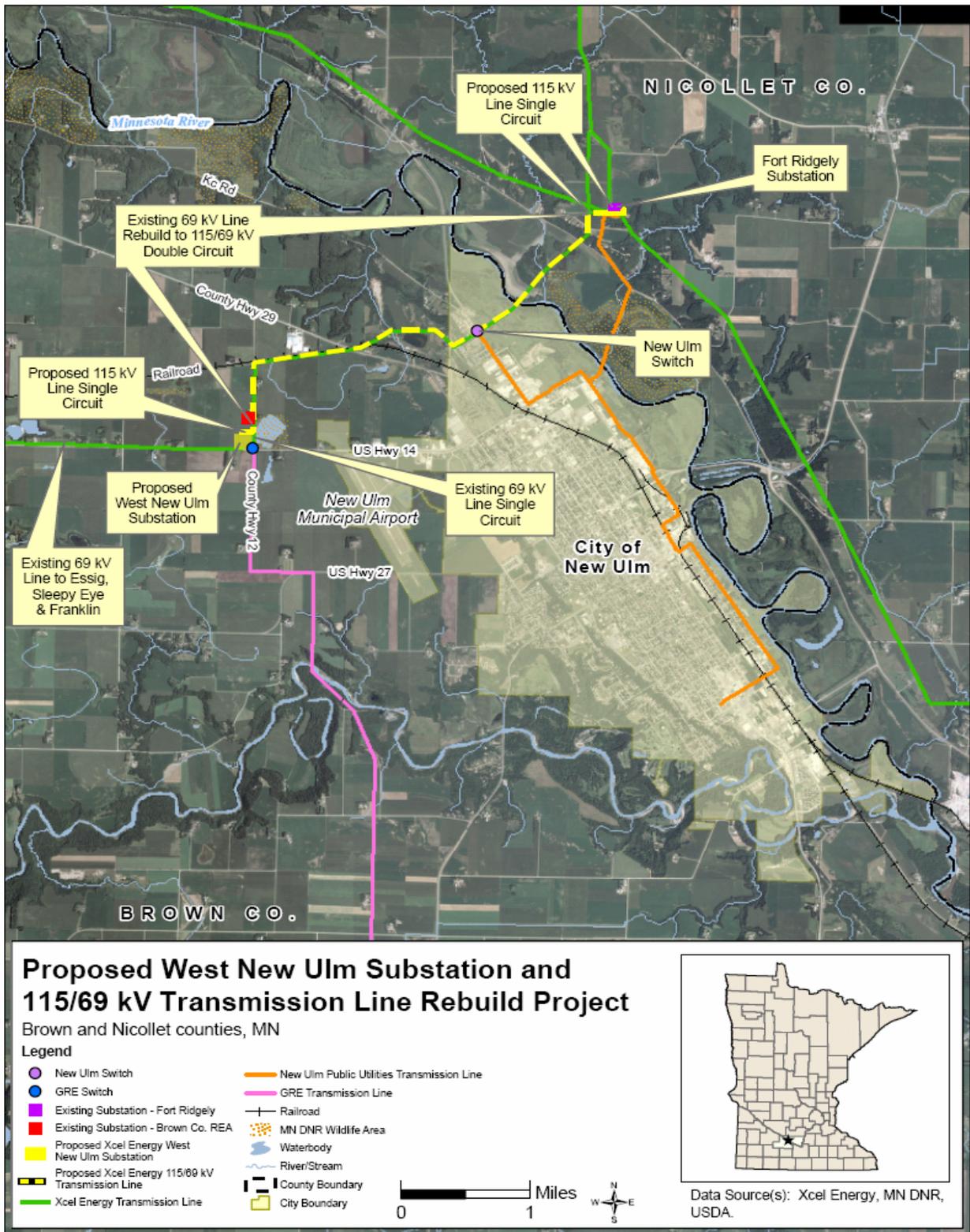
The Project will provide the New Ulm municipal utility (“New Ulm Public Utilities”) a firm transmission source capable of meeting the total peak demand on the New Ulm Public Utilities’ system (approximately 45 MW). Today, under certain contingencies, transmission limitations require New Ulm Public Utilities to self

¹ This existing 69 kV line currently runs from Fort Ridgely to Essig to Sleepy Eye to Franklin. This Project will create a new intermediate substation at West New Ulm between Fort Ridgely and Essig. In this Application, the line will be discussed in two segments: (1) the Fort Ridgely – West New Ulm 69 kV line (“Fort Ridgely 69 kV line”) and (2) the West New Ulm – Essig – Sleepy Eye – Franklin 69 kV line.

generate whenever demand exceeds approximately 15 MW. The Project will also provide needed transmission support to the electrical system served by Xcel Energy's existing Franklin – Fort Ridgely 115 kV line.

The Project area is located on the north/northwest side of New Ulm, in Brown and Nicollet counties. **Figure 1** shows the proposed Project.

**FIGURE 1
GENERAL VIEW OF PROPOSED PROJECT**



Minnesota Statutes Chapter 216E and the Commission rules provide for an Alternative Permitting Process for certain high voltage transmission line (“HVTL”) facilities (Minn. Stat. § 216E.04; Minn. R. 7849.5500). The proposed construction of a new 4.2-mile 115 HVTL, and associated facilities, including the new West New Ulm Substation, reconductoring of an existing 69 kV line and upgrades at the Fort Ridgely Substation, 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. 7849.5500, Subp. 1(C) (authorizing alternative process for HVTLs between 100 and 200 kV). This Application is submitted pursuant to the Alternative Permitting Process outlined in Minnesota Rules 7849.5500 to 7849.5720.

In this Application, Xcel Energy requests that the Commission approve the proposed route and authorize a route width of 100 feet on each side of the route centerline of the existing facilities along the route (200 feet total width), except along County Highway 12 where Xcel Energy requests a route width of 200 feet on each side of the route centerline of the existing facilities (400 feet total width).

1.2 COMPLETENESS CHECKLIST

The content requirements for an application with the Commission under the Alternative Permitting Process are identified in Minnesota Rules 7849.5500 to 7849.5720. The rule requirements are listed in **Figure 2** with references indicating where the information can be found in this Application.

**FIGURE 2
COMPLETENESS CHECKLIST**

Authority	Required Information	Where
Minn. R. 7849.5530	Contents of Application (alternative permitting process)	
	The applicant shall include in the application the same information required in part 7849.5220, 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 (See also 7849.5220, Subp. 2 below)
Minn. R. 7849.5220, Subp. 2 (applicable per Minn. R. 7849.5530)	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	2.2

Authority	Required Information	Where
	permit may be transferred if transfer of the permit is contemplated	
C.	at least two proposed routes for the proposed high voltage transmission line and identification of the applicant's preferred route and the reasons for the preference	Not applicable, per Minn. R. 7849.5530
D.	a description of the proposed high voltage transmission line and all associated facilities including the size and type of the high voltage transmission line	3.2, 4.1 , 5.1.1
E.	the environmental information required under 7849.5220, Subp. 3	See Minn. R. 7849.5220, 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 high voltage transmission line	7.2, Appendix E.1
H.	United States Geological Survey topographical maps or other maps acceptable to the chair showing the entire length of the high voltage transmission line on all proposed routes	Appendix B
I.	identification of existing utility and public rights-of-way along or parallel to the proposed routes that have the potential to share right-of-way, the land used by a public utility (as for a transmission line), with the proposed line	5.1.2 and Appendix B
J.	the engineering and operational design concepts for the proposed high voltage transmission line, 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 high voltage transmission line that are dependent on design and route	3.5 and 5.1.6
L.	a description of possible design options to accommodate expansion of the high voltage transmission line in the future	4.4
M.	the procedures and practices proposed for the acquisition and restoration of the right-of-way, construction, and maintenance of the high voltage transmission line	5.1.3 – 5.1.6
N.	a listing and brief description of federal, state, and local permits that may be required for the proposed high voltage transmission line	7.4
O.	a copy of the Certificate of Need or the certified HVTL list containing the proposed high voltage transmission line or documentation that an application for a Certificate of Need has been submitted or is not required	Not applicable per Minn. Stat. §§ 216B.243, 261B.2421, subd 2(3), <i>See</i> 2.3.
Minn. R. 7849.5220, Subp. 3	Environmental Information	
A.	a description of the environmental setting for each site or route	6.1
B.	a description of the effects of construction and operation of the facility on human settlement, including, but not limited to, public health and safety, displacement, noise, aesthetics, socioeconomic impacts, cultural values, recreation, and public services	6.2

Authority	Required Information	Where
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	See all of the effects described in 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 mitigative measures	See all of the mitigative measures identified in Chapter 6.0

2.0 INTRODUCTION

2.1 STATEMENT OF OWNERSHIP

Xcel Energy is a Minnesota corporation with its headquarters in Minneapolis, Minnesota. Xcel Energy is a wholly-owned subsidiary of Xcel Energy Inc., a utility holding company with its headquarters in Minneapolis. Xcel Energy provides electricity services to approximately 1.2 million customers and natural gas services to 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 build, own and operate the new 115 kV line between the new West New Ulm Substation and the Fort Ridgely Substation and the associated facilities, including the new West New Ulm Substation, the improvements at the Fort Ridgely Substation and the re-conducted portion of the Fort Ridgely 69 kV transmission line between the West New Ulm Substation and the New Ulm Public Utilities 69 kV switch.

2.2 PERMITTEE

The permittee for the proposed Project is:

Permittee: Northern States Power Company

Contact: Timothy G. Rogers
Permitting Analyst

Address: Xcel Energy Services Inc.
414 Nicollet Mall, MP-8A
Minneapolis, MN 55401

Phone: (612) 330-1955

E-mail: timothy.g.rogers@xcelenergy.com

2.3 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 Section 216B.243 because the proposed 115 kV

transmission line will be less than 10 miles in length. Therefore, a Certificate of Need is not required. *See* Minn. Stat. §§ 216B.2421, subd. 2(3) and 216B.243.

2.4 ROUTE PERMIT, ALTERNATIVE PERMITTING PROCESS

The Project involves construction of a new 115 kV transmission line and associated facilities. The Project therefore qualifies for review under the Alternative Permitting Process authorized by Minnesota Statutes Section 216E.04, subd. 2(3) and Minnesota Rules 7849.5500, Subp. 1(c) (establishing alternative process for HVTLs between 100 and 200 kilovolts). Accordingly, Xcel Energy is following the provisions of the Alternative Permitting Process outlined in Minnesota Rules 7849.5500 to 7849.5720 for this Project.

2.5 NOTICE TO THE COMMISSION

Xcel Energy notified the Commission on August 12, 2008, by an electronically filed letter that Xcel Energy intended to use the Alternative Permitting Process for the Project. This letter complies with the requirement of Minnesota Rules 7849.5500, 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.1**.

3.0 PROJECT INFORMATION

3.1 PROJECT LOCATION

The Project is located in Brown and Nicollet counties, north-northwest of the City of New Ulm. **Appendix B.1** identifies the general vicinity of the Project area.

The northeastern end of the Project area is located in Lafayette Township, Nicollet County, at the existing Fort Ridgely Substation. From here, the Project area extends west and southwest across the Minnesota River into Milford Township, Brown County, where the proposed West New Ulm Substation will be located. **Figure 3** below identifies the counties, townships and sections in the Project area.

FIGURE 3
COUNTIES, TOWNSHIPS AND SECTIONS

County/Township	Township (N)	Range (W)	Sections
Nicollet/Lafayette	110	30	7, 8, 18
Brown/Milford	110	31	12, 13, 14

3.2 PROJECT PROPOSAL

Xcel Energy proposes to:

- Construct an approximately 4.2-mile 115 kV transmission line from a new West New Ulm Substation to the existing Fort Ridgely Substation. The new 115 kV line will be double circuited with the existing Fort Ridgely 69 kV line for about 3.8 miles;
- Construct a new 115-69 kV West New Ulm Substation;
- Remove the existing switch connecting the New Ulm Public Utilities' 69 kV line with the Fort Ridgely 69 kV line located at 23rd Street North and North Broadway Street and install a new New Ulm switch on the east side of North Broadway Street on City-owned land currently in use as a passive park.
- At the Fort Ridgely Substation, relocate the existing termination of the Fort Ridgely – Swan Lake 115 kV line 40 feet to the south and install new circuit breakers, line terminations, switches and

associated equipment to support the proposed transmission facilities and existing facilities;

- Extend and terminate Xcel Energy's Fort Ridgely 69 kV line at the new West New Ulm Substation. The line currently terminates at an existing Great River Energy switch, at the intersection of U.S. Highway 14 and County Highway 12; and
- Extend and terminate Xcel Energy's Essig – Sleepy Eye – Franklin 69 kV line at the new West New Ulm Substation. The line currently terminates at an existing Great River Energy switch, at the intersection of U.S. Highway 14 and County Highway 12.

3.2.1 CONSTRUCTION OF A NEW 115 kV TRANSMISSION LINE AND RECONDUCTOR OF SEGMENT OF THE FORT RIDGELY 69 kV LINE

A new 4.2-mile 115 kV line will be constructed between the new West New Ulm Substation and the existing Fort Ridgely Substation. Of that length, approximately 3.8 miles is proposed to be built on the existing centerline of the existing Fort Ridgely 69 kV line using double circuit 115/69 kV line structures to accommodate the new 115 kV line and this existing Fort Ridgely 69 kV line.

Single circuit 115 kV structures will be used near the Fort Ridgely and West New Ulm substations. Single circuit structures will be used for approximately 600 feet of the new 115 kV line north of the West New Ulm Substation where the 115 kV line crosses County Highway 12 to enter the West New Ulm Substation. These single circuit structures also will be used for about 1,390 feet near the Fort Ridgely Substation before the 115 kV line turns south and becomes double circuited with the existing Fort Ridgely 69 kV line.

At the West New Ulm Substation, the Fort Ridgely 69 kV line will be extended into the substation on approximately three 69 /69 kV double circuit structures. At the Fort Ridgely Substation, no 69 kV line extension is required. The Fort Ridgely line will continue to enter the Fort Ridgely Substation on existing double circuit 69/69 kV structures.

Two 795 ACSS conductors per phase are proposed to be installed for the new 115 kV line.

A new single 477 ACSR conductor per phase is proposed to be installed for the segment of the Fort Ridgely 69 kV line between the West New Ulm Substation and

the new switch to the New Ulm Public Utilities 69 kV line located at 23rd Street North and North Broadway Street. The existing 69 kV conductor (336 ACSR) is proposed to be transferred to the new double circuit structures for the segment of the Fort Ridgely 69 kV line between the switch and the Fort Ridgely Substation.

3.2.2 WEST NEW ULM SUBSTATION/EXTENSION OF EXISTING 69 kV LINE

The overall substation size for the proposed West New Ulm Substation will be approximately 10 to 15 acres. This area includes set backs, access roads, stormwater ponds, new and existing right-of-way and potential transmission line structures. The West New Ulm Substation will include one 115-69 kV, 112 MVA transformer, one 115 kV circuit breaker, four 69 kV circuit breakers, and associated electrical equipment such as switches.

Xcel Energy considered several alternative substation sites. **Appendix B.3** identifies the alternative substation locations (see Section 4.3.1 for further discussion of alternative sites).

The preferred site is an approximate 11.5-acre site south of the existing Brown County REA Substation at the northwest corner of the intersection of U.S. Highway 14 and County Highway 12. **Appendix B.4** identifies the proposed substation location. The preliminary East/West and North/South property line dimensions of the proposed site are approximately 740 feet by 675 feet. The preliminary property line dimensions include space for some existing/new/future transmission line right-of-ways, an existing underground gas line, and 150 feet of setback from the centerline of U.S. Highway 14 and 125 feet of setback from the centerline of County Highway 12.

A new 25 foot by 41 foot Electrical Equipment Enclosure will be installed within the fenced area at the site. The Electrical Equipment Enclosure will contain all the control equipment and systems for the substation. The substation will be designed to accommodate future line terminations.

A new driveway will be installed for the proposed West New Ulm Substation. A storm water retention pond will be constructed at the site to address storm water runoff from the fenced and graded substation area. Drain tiles that may exist within the substation site will be rerouted and existing drainage maintained through installation of new drain lines, trenches around the site or both. Plans for the new West New Ulm Substation are attached as **Appendix B.5**.

The West New Ulm Substation will include terminations for the proposed new 115 kV line and the Fort Ridgely 69 kV line. The substation will also accommodate the termination of Xcel Energy’s Essig – Sleepy Eye – Franklin 69 kV line. This line currently runs along U.S. Highway 14 to a Great River Energy transmission structure equipped with switches at the northeast corner of the intersection of County Highway 12 and U.S. Highway 14, east of the proposed West New Ulm Substation site, as shown in **Figure 4** below. *See also* Appendix B.2.a.

The existing Xcel Energy Essig – Sleepy Eye – Franklin 69 kV line will be shortened along U.S. Highway 14 such that this line will enter the south-central portion of the proposed West New Ulm Substation from the north side of U.S. Highway 14. The shortening of this line will involve the removal of approximately two single circuit 69 kV structures between the Great River Energy switch and the new route to the substation termination and construction of a new single circuit corner structure located outside the substation fence that routes the line north into the substation. A new intermediate single circuit structure is proposed between the corner structure and the substation termination structure.

The substation will also be designed to accommodate other terminations, including a possible termination of the Great River Energy Searles 69 kV line which connects to the Fort Ridgely 69 kV line at the existing Great River Energy switch. The Great River Energy switch is located at the northeast corner of the intersection of County Highway 12 and U.S. Highway 14.²

The new West Ulm Substation will also provide a termination with access to other 115 kV transmission facilities in the area for a potential new 115 kV line from Heron Lake to Dotson to West New Ulm being proposed by Great River Energy and ITC Midwest, LLC (“ITC Midwest”) (which recently purchased the transmission assets of Interstate Power & Light Co.) to meet the transmission needs for load growth around Dotson, Springfield and Lambertson, and to provide outlet for proposed generation near the Storden Substation.

3.2.3 FORT RIDGELY SUBSTATION MODIFICATIONS

The existing Fort Ridgely Substation will be modified as part of the Project. Equipment additions at the existing Fort Ridgely Substation will include two 115 kV

² The termination of the Great River Energy Searles 69 kV line is not included in this Project.

circuit breakers and associated electrical equipment such as switches to accommodate the termination of the 115 kV line.

To optimize the Fort Ridgely Substation layout, the existing 115 kV Fort Ridgely – Swan Lake transmission line termination will be relocated in the next substation bay (about 40 feet south of its present location) to allow the new 115 kV line to be terminated in the bay where the Fort Ridgely – Swan Lake 115 kV line currently terminates. The new termination location for the Fort Ridgely – Swan Lake 115 kV line will require the relocation of one pole outside the substation fence. Plans for modifications to the existing Fort Ridgely Substation are attached as **Appendix B.6**.

3.3 NEED FOR PROJECT

The proposed Project will enable the electrical system to reliably support load growth in and around the City of New Ulm.

The New Ulm area currently experiences a peak load of approximately 45 MW. The transmission system can provide firm transmission service to approximately 15 MW of load (maximum capacity of the system under single contingency). Without generation support from New Ulm Public Utilities' generators (four units, 80 MW total), severe low voltages will occur in this region during the loss of the Fort Ridgely 115/69 kV transformer.

New Ulm Public Utilities became Xcel Energy's firm Network Integration Transmission Service ("NITS") customer³ in 2006, obligating Xcel Energy to build the necessary transmission facilities to support New Ulm's entire load on a firm basis. The proposed Project will provide firm transmission service to the entire load of New Ulm Public Utilities by providing an alternate 115/69 kV source in the region at the proposed West New Ulm Substation.

The Project will also provide needed transmission support to the Company's electrical system served by the existing Franklin - Fort Ridgely 115 kV line in the Morgan and Sleepy Eye areas. The loss of the Franklin – Morgan 69 kV source causes low

³ New Ulm Public Utilities has contracted for NITS transmission service under the Midwest Independent Transmission Operator, Inc. ("Midwest ISO") Open Access Transmission and Energy Markets Tariff ("TEMT") as a load in the NSPM pricing zone. New Ulm Public Utilities will thus compensate the Company for the new facilities through the payment of NITS transmission service rates to the Company via the Midwest ISO.

voltages for loads located in this region. The new 115 kV source at West New Ulm Substation is closer to these loads and will provide voltage support. The Project will thus also provide reliability benefits to the Company's retail and other network loads in the area.

3.4 PROJECT SCHEDULE

Xcel Energy anticipates a Summer 2010 in-service date for the Project. Construction of the 115 kV line and 69 kV reconductor is expected to start in the fall of 2009 and construction of the West New Ulm Substation is expected to begin in summer 2009. Modifications to the Fort Ridgely Substation are scheduled to begin in early 2010. 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.⁴

3.5 PROJECT COSTS

Xcel Energy estimates that the transmission line and substation improvements will cost approximately \$14.5 million, as follows:

Transmission Line 115/69 kV(West New Ulm-Fort Ridgely)	\$6,000,000
West New Ulm Substation	\$7,000,000
Line Extension/Reconnection of Essig – Franklin 69 kV line at at West New Ulm Substation	\$250,000
Modifications to Fort Ridgely Substation	<u>\$1,250,000</u>
Total Project Cost:	\$14,500,000

⁴ This Application is being filed on August 29, 2008 to ensure that Xcel Energy achieves a Summer 2010 in-service date for this Project. A recent amendment to Minnesota Statute Section 216E.03, subd. 3(a), which takes effect on September 1, 2008, requires that, at least 90 days before filing an application with the Commission, an applicant must provide notice to each local unit of government within which a route may be proposed. While Xcel Energy provided notice to local government units in the Project area on August 8, 2008, Xcel Energy decided to file this Application before this new legislation goes into effect, rather than waiting until early November 2008 to file, to help ensure that the Project is in-service by the Summer 2010. The new transmission capacity provided by the Project will enable the projected 2010 summer peak demand for this area to be reliably served

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

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.

4.0 FACILITY DESCRIPTION AND ROUTE SELECTION RATIONALE

4.1 DETAILED ROUTE DESCRIPTION FOR THE NEW 115/69 kV DOUBLE CIRCUIT TRANSMISSION LINE

The proposed route for the approximately 4.2 miles of new 115 kV transmission line begins on the east side of the Fort Ridgely Substation. The proposed 115 kV transmission line will exit the east side of the Fort Ridgely Substation on single circuit structures, go south approximately 150 feet and then proceed west approximately 1,200 feet between and paralleling an existing 69 kV transmission line operated by New Ulm Public Utilities and the existing Xcel Energy Fort Ridgely 69 kV line.⁵

At this point, the 115 kV line will head south and be constructed on new double circuit 115/69 kV structures. The 115 kV line and the existing Fort Ridgely 69 kV line will be placed on the structures and follow the existing Fort Ridgely 69 kV line route for approximately 1.4 miles on the west side of County Road 7 across the Minnesota River to the corner of 23rd Street North and North Broadway Street in New Ulm. At the corner of 23rd Street North and North Broadway Street, the 115/69 kV lines will run southwest for approximately 1,250 feet along 23rd Street North on an existing Fort Ridgely 69 kV line route to Boundary Street.

The new 115/69 kV lines will continue on the existing 69 kV line route northwest, and then west cross country until it parallels the railroad tracks for a total of approximately 1.6 miles to the intersection of the railroad tracks and County Highway 12. The 115/69 kV lines will then turn south and follow the east side of County Highway 12 approximately 3,500 feet to just north of the proposed West New Ulm Substation.

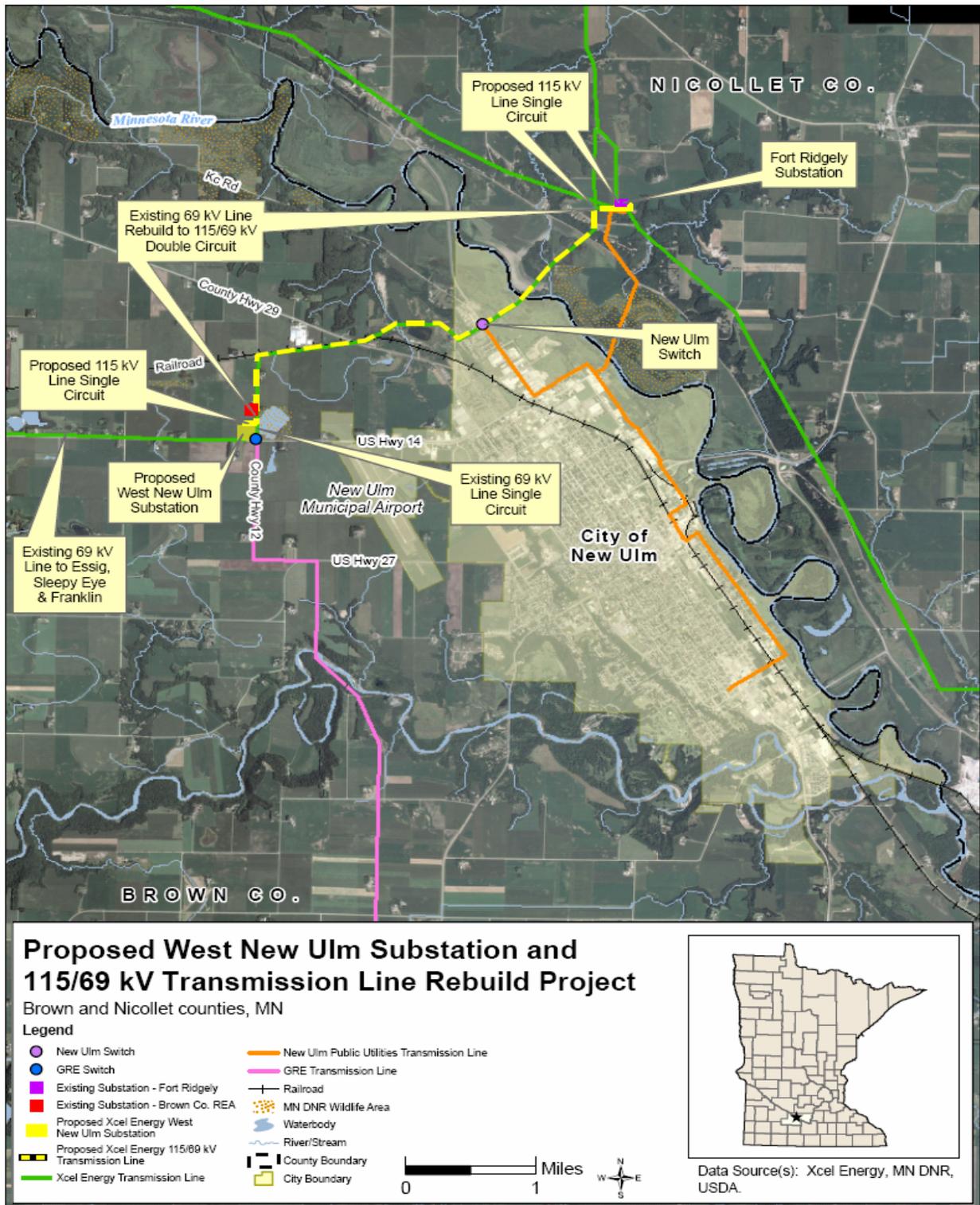
North of the proposed West New Ulm Substation, the 115 kV line will split from the 69 kV line and will go west across County Highway 12 on single circuit structures (one of these structures will be a double circuit structure to accommodate further expansion) before turning south into the West New Ulm Substation. This single circuit portion of the new 115 kV line is approximately 600 feet long.

⁵ This portion of the new 115 kV line cannot be double circuited with Xcel Energy's existing Fort Ridgely 69 kV line because this existing 69 kV line is already double circuited with itself (the other portion of this 69 kV line is the Fort Ridgely – Winthrop 69 kV line).

The Fort Ridgely 69 kV line will continue south along County Highway 12 and will turn west on new double circuit structures into the West New Ulm Substation. This single circuit portion of the 69 kV line is approximately 600 feet long.

Figure 4 provides an overview of the Proposed Route.

**FIGURE 4
PROPOSED ROUTE**



4.2 ROUTE SELECTION PROCESS

The proposed route for the Project was developed by Xcel Energy permitting and engineering personnel based on their investigation of the overall Project area and input from government entities and the public about how to minimize impacts. Xcel Energy also performed an analysis of environmental resources in the Project area by using computer mapping of data including aerial photographs and topographic maps. Environmental resources identified in the Project area are discussed in Sections 6.5 and 6.6 of the Application. A list of wildlife species that is representative of the Project area is contained in **Appendix C**. The final proposal is designed to best minimize overall impacts of the Project.

A public open house meeting was held at the Civic Center in New Ulm, Minnesota on July 15, 2008. Approximately twenty-seven people attended this open house meeting. Public interest focused primarily on the future location of the West New Ulm Substation and transmission line route alternatives if the West New Ulm Substation was placed in various locations (see Section 7.3 of the Application).

On August 8, 2008 Xcel Energy provided Project information and requested comments from local units of government (“LGUs”) located within the Project area. *See* Section 7.1 and **Appendix D** of the Application.

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

- Maximize use of existing transmission alignments;
- Minimize impacts to residences;
- Minimize use of new right-of-way;
- Minimize impacts to environmental and sensitive resources;
- Avoid a new crossing of the Minnesota River;
- Minimize the length of the new transmission line to reduce the impact area and Project; and
- Locate substations near the intersection of existing transmission lines to minimize the need for new corridors.

Xcel Energy believes the proposed route and substation site for the Project best meet the objectives stated above.

In particular, the proposed Project maximizes the use of existing corridors – the proposed route follows an existing transmission right-of-way for 3.8 of the 4.2 miles of the 115 kV line route. The use of existing transmission line corridors was an important factor for this Project because using existing corridors reduces transmission line proliferation and impacts to residences. The proposed route and substation location also avoids environmental and sensitive resources. Therefore, impacts to such resources are minimized.

The proposed West New Ulm Substation site is located near the intersection of Xcel Energy's Essig – Sleepy Eye – Franklin 69 kV line (along U.S. Highway 14) and the Great River Energy Searles 69 kV line (along County Highway 12). The Essig – Sleepy Eye – Franklin 69 kV line will be tied into the new West Ulm Substation. The Great River Energy Searles 69 kV line may also be tied into the substation at a future time. Locating the substation at the intersection of these lines reduces the proliferation of new transmission line corridors.

4.3 ALTERNATIVES CONSIDERED AND REJECTED

In evaluating the route for the proposed West New Ulm Substation – Fort Ridgely 115 kV transmission line, Xcel Energy focused solely on the existing alignment of the Fort Ridgely 69 kV line because it best satisfied the routing criteria listed above. Xcel Energy concluded that no other alignment could maximize use of existing right-of-way and avoid a new crossing of the Minnesota River. Therefore, no other line route alternatives were considered.

In identifying the proposed substation location for the West New Ulm Substation proposed in this Application, Xcel Energy considered several alternatives along the alignment of the existing Fort Ridgely 69 kV line. Factors taken into consideration to evaluate site alternatives included land use, site conditions, residential impacts, environmental impacts and the location of existing utility corridors.

Xcel Energy evaluated the following three alternative sites for the proposed West New Ulm Substation. **Appendix B.3** identifies the locations of these three alternative sites.

Alternative Site 1: West of County Highway 12 and North of Residence and Brown County REA

Xcel Energy evaluated Alternative Site 1 located at the west side of County Highway 12 north of a rural residence and the existing Brown County REA substation. This site has fewer associated impacts than Alternative Sites 2 and 3, but was rejected in favor of the proposed substation location because Alternative Site 1 would be in close proximity to an existing rural residence and because the residence would then be situated between two substation facilities.

Alternative Site 2: Southeast Corner of U.S. Highway 14 and County Highway 12

Xcel Energy also evaluated Alternative Site 2 located on the southeast corner of the intersection of U.S. Highway 14 and County Highway 12, which is currently being used for row crops. A farmstead residence is located approximately 700 feet east of Alternative Site 2. The site was rejected because rerouting the transmission lines that will be terminated in the new substation would require additional road crossings, *i.e.*, crossings over U.S. Highway 14. These additional crossings would also require additional right-of-way to extend these lines. The proposed West New Ulm – Fort Ridgely 115 kV line and existing Fort Ridgely 69 kV transmission lines would need to be double circuited on new structures along the west edge of the Somsen Wildlife Management Area (“WMA”). This site was also rejected because of potential impacts to a wetland area located on the east edge of Alternative Site 2. In addition, Alternative Site 2 was rejected due to the close proximity to the existing farmstead and because an access driveway would be needed off of either County Highway 12 or U.S. Highway 14. Finally, Alternative Site 2 was rejected because future expansion of the City of New Ulm Airport may require abandonment or relocation of County Highway 12, which could affect use of the site for the substation or impact access to the substation site.

Alternative Site 3: East of County Highway 12 and North of Somsen WMA

Xcel Energy evaluated Alternative Site 3, which is located east of County Highway 12 and north of Somsen WMA. Alternative Site 3 was rejected for airport safety reasons because it is located near the approach zone for the north-south runway at the City of New Ulm Airport. Additionally, when compared to the proposed site, the impact to farming operations would be greater at Alternative Site 3 because the substation would be located along the mid-row of the existing field. Locating a substation in the mid-row of a field leads to inefficient crop layout. Finally, Alternative Site 3 was rejected because of the closer proximity to a residence than the proposed site.

4.4 DESIGN OPTIONS TO ACCOMMODATE FUTURE EXPANSION

The proposed West New Ulm Substation is designed to provide for interconnection with proposed, existing and potential future transmission facilities. The West New Ulm Substation will be built with four 69 kV breakers to accommodate terminations of existing 69 kV lines in the area and a 115 kV yard designed to accommodate an interconnection with an anticipated Great River Energy and ITC Midwest Heron Lake to Dotson to West New Ulm 115 kV line to the west. In addition, double circuit structures will be used for the Fort Ridgely 69 kV termination to allow for the potential co-location with the existing Great River Energy Searles 69 kV line.

Fort Ridgely Substation is also designed to provide for interconnection with future transmission facilities in addition to those proposed here.

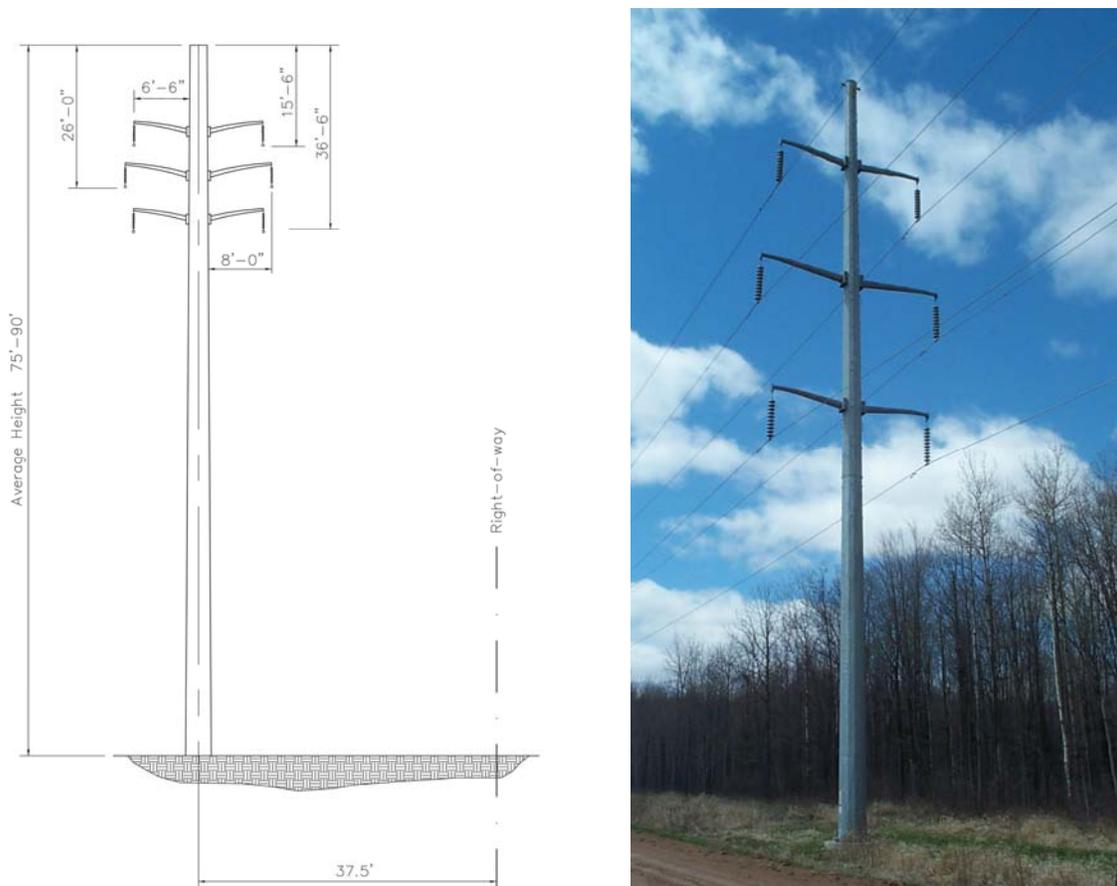
5.0 ENGINEERING DESIGN, CONSTRUCTION AND RIGHT-OF-WAY ACQUISITION

5.1 STRUCTURES, RIGHT-OF-WAY, CONSTRUCTION AND MAINTENANCE

5.1.1 TRANSMISSION STRUCTURES

The proposed structures for the majority of the proposed route are steel, double circuit 115/69 kV poles with davit arms. A picture and schematic of this proposed structure type are shown below in **Figure 5**. The Company proposes to use direct embedded galvanized steel or weathering steel poles with davit arms for the tangent structures if soil conditions warrant. Rock-filled culvert or concrete drilled pier foundations may be required in areas with poor soils.

FIGURE 5
115/69 KV DOUBLE CIRCUIT DAVIT ARM STRUCTURE



Self-supporting galvanized steel or weathering steel poles with davit arms on drilled pier concrete foundations are proposed to be used for all long span, angle and dead-end structures.

The Company proposes to use steel poles with davit arms for the West New Ulm – Fort Ridgely 115 kV single circuit line near the substations. The Company proposes to use steel poles with davit arms or horizontal post insulators for the 69 kV single circuit line entering the proposed West New Ulm substation. The average span will be about 325 feet with maximum span of about 400 feet. The Minnesota River crossing spans will be longer due to the elevation change and to minimize the number of structures in the river/wetland area. Xcel Energy requests the flexibility to use either single pole structures or double pole structures for the Minnesota River crossing.

Figure 6 summarizes the structure design for the line.

**FIGURE 6
STRUCTURE DESIGN SUMMARY**

Line Type	Structure Type	Structure Material	Right-of-Way Width (feet)	Structure Height (feet)	Foundation	Foundation Diameter (feet)	Span Between Structures (feet)
115 kV Single Circuit	Single pole, davit arm	Weathering steel	75	65-80	Direct embedded for tangents and self-supporting for angle/dead-end structures	Direct embedded or 4 foot diameter culvert or 5 to 6 foot concrete	300 to 400
115/69 kV Double Circuit	Single pole, davit arm	Weathering steel (rural) and galvanized steel (urban)	75 (with some existing 50 foot)	75-90 typical with taller structures at the river crossing	Direct embedded for tangents and self-supporting for angle/dead-end and switch structures	Direct embedded or 4 foot diameter culvert or 6 to 8 foot concrete	300 to 400 typical with longer spans of 600 to 1,200 at the Minnesota River crossing

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.

5.1.2 RIGHT-OF-WAY WIDTH/EASEMENT REQUIREMENTS

Xcel Energy will require a right-of-way width up to 75 feet wide for the new 115 kV line. However, Xcel Energy will construct the new 115 kV transmission line approximately on the center line and within existing easements of the existing Fort Ridgely 69 kV line where reasonably possible.

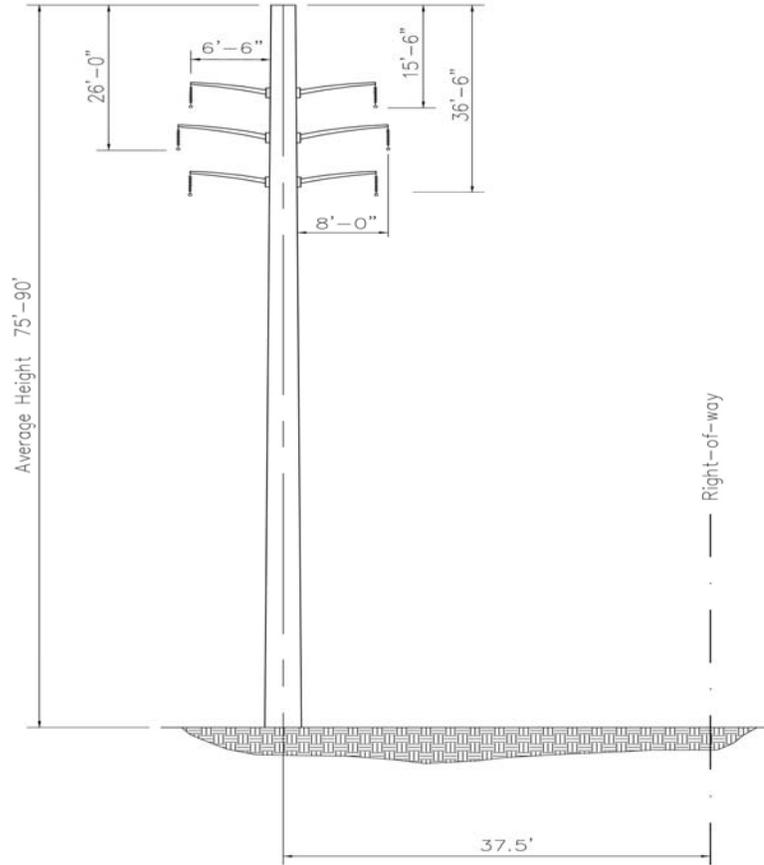
The need for new easements is anticipated on the east and west sides of the existing Fort Ridgely Substation for the proposed 115 kV line to reach the existing Fort Ridgely 69 kV line right-of-way as indicated in **Appendix B.6**. New easements will also likely be required on the west side of County Highway 12 for the new 115 kV line

to reach the new West New Ulm Substation once it splits from the Fort Ridgely 69 kV line.

When the line goes cross country, Xcel Energy will acquire up to a 75-foot wide easement for the transmission line. When the line parallels a roadway, poles will generally be placed approximately 5 to 10 feet outside the public right-of-way in private land. Therefore, a little less than half of the line right-of-way will share the existing road right-of-way, resulting in an easement of lesser width being required from the landowner. In general, the structures will be placed as close to the property line as practical. The amount of new easement required will depend upon the road configuration and the distance between the road and the transmission line.

For the proposed Project, approximately 1.1 miles of the 4.2 miles (26%) will be parallel to existing roadways, approximately 0.9 miles (21%) will be parallel to existing railroad right-of-way, and approximately 2.25 miles (53%) will be cross country transmission lines. **Figure 7** shows the general right-of-way requirements for the line.

FIGURE 7
RIGHT-OF-WAY REQUIREMENTS



115 kV Line Typical Span 400'
75' Typical Right-of-Way Width

5.1.3 RIGHT-OF-WAY EVALUATION AND ACQUISITION

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

After owners are known, 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 right-of-way corridors, natural features, man-made features and associated elevations for use during the detailed engineering of the line. The soil analysis is performed by an experienced geotechnical testing laboratory.

During the evaluation process, the location of the proposed transmission line or substation facility may be staked with permission of the property owner. This means that the survey crew locates each structure or pole on the ground and places a surveyor's stake to mark the structures or substation 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, the Company is able to work with the landowners to address their concerns and an agreement is reached for the Company'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.

To start the 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 approves the Petition, the court then appoints a three-person condemnation "commission." The three people must be knowledgeable of applicable real estate issues.

Once appointed, the commissioners schedule a viewing of the substation location or 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 TRANSMISSION CONSTRUCTION PROCEDURES

Construction will begin after federal, state and local approvals are obtained, property and rights-of-way 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.

The actual construction will follow standard construction and mitigation practices that have been developed from experience with past projects. These best 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.

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. Wood or steel poles are transported on tractor-trailers.

The Company proposes to use steel, double circuit 115/69 kV poles with davit arms for a majority of the proposed route. The Company proposes to use direct embedded galvanized steel or weathering steel poles with davit arms for the tangent structures if soil conditions warrant. Rock-filled culvert or concrete drilled pier foundations may be required in areas with poor soils. This method typically 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. Culvert foundations involve auguring a hole for each pole, installing a galvanized steel culvert, filling the annular space outside the culvert with hole spoils, filling the culvert partially with crushed rock and then setting the pole on top of the rock base. The annular space between the pole and culvert is filled with crushed rock.

Long span, angle and dead end structures along the route will require concrete foundations. In those cases, holes will need to be drilled in preparation for the concrete foundations. Drilled pier foundations may vary from six to eight feet in

diameter and 20 to 30 feet deep, depending on soil conditions. Steel reinforcing bars and anchor bolts are installed in the drilled holes prior to concrete placement. Concrete trucks are required to bring the concrete in from a local concrete batch plant. Steel pole structures are hauled unassembled on pole trailers to the staked location and placed within the right-of-way until the pole sections are assembled and the arms attached. Insulators and other hardware are attached while the steel pole is on the ground. The pole is then lifted, placed and secured on the foundation using a crane.

Construction staging areas are usually established for transmission projects. Staging involves delivering the equipment and materials necessary to construct the new transmission line facilities. Construction of the project will likely include one or two staging areas. Structures are delivered to staging areas and materials are stored until they are needed for the project. The materials are stored until they are needed for the project and then sorted and loaded onto structure trailers for delivery to the staked location.

In some cases, additional space (temporary lay down areas) may be required. These areas will be selected for their location, access, security and ability to efficiently and safely warehouse supplies. The areas are chosen to minimize excavation and grading. The temporary lay down areas outside of the transmission line right-of-way will be secured from affected landowners through rental agreements. Insulators and other hardware are attached to the structure while it is on the ground in the lay down area, and then a line truck lifts and places it either to embed it into the ground or secure on a foundation.

Typically, access to the transmission line right-of-way corridor is made directly from existing roads or trails that run parallel or perpendicular to the transmission line right-of-way. In some situations, private field roads or trails are used. Where easements exist, Xcel Energy notifies the property owner that it will access the easement area. Where necessary to accommodate the heavy equipment used in construction, including cranes, concrete trucks and foundation drilling equipment, existing access roads may be upgraded or new roads may be constructed. New access roads may also be constructed where no current access is available or the existing access is inadequate to cross roadway ditches.

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 all streams and rivers. In addition, Xcel Energy will not allow construction equipment to be driven across waterways except under special circumstances and only after discussion with the

appropriate resource agency. Where waterways must be crossed to pull in the new conductors and shield wires, workers may walk across, use boats, or drive equipment across ice in the winter. These construction practices help prevent soil erosion and ensure that equipment fueling and lubricating will occur at a distance from waterways.

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 the project.

If damage has occurred to crops, fences or the property, Xcel Energy will fairly reimburse the landowner for the damages sustained. In some cases, Xcel Energy 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 corridor 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 regularly used 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, high voltage transmission lines are seldom completely retired. Transmission infrastructure has very few mechanical elements and is built to withstand weather extremes that are normally encountered. With the exception of severe weather such as tornadoes and heavy ice storms, transmission lines rarely fail.

Transmission lines are automatically taken out of service by the operation of protective relaying equipment when a fault is sensed on the system. Such interruptions are usually only momentary. Scheduled maintenance outages are also infrequent. As a result, the average annual availability of transmission infrastructure 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 115 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

Electric and Magnetic Fields (“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 and the intensity of the magnetic field is related to the current flow through the conductors. Transmission lines operate at 60 hertz (cycles per second).

5.2.1 ELECTRIC FIELDS

Voltage on any wire (conductor) produces an electric field in the area surrounding the wire. The electric field associated with a high voltage transmission line extends from the energized conductors to other nearby objects such as the ground, towers, vegetation, buildings and vehicles. The electric field from a power line gets weaker as it moves away from the line. Nearby trees and building materials also greatly reduce the strength of power line electric fields.

The intensity of electric fields is associated with the voltage of the line and is measured in kilovolts per meter (kV/m). Power line electric fields near ground are designated by the difference in voltage between two points (usually one meter). **Figure 8** provides the electric fields at maximum conductor voltage for the proposed West New Ulm – Fort Ridgely 115 kV transmission line. Maximum conductor voltage is defined as the nominal voltage plus five percent.

FIGURE 8
CALCULATED ELECTRIC FIELDS (KV/M) FOR PROPOSED 115 KV
TRANSMISSION LINE DESIGNS
(ONE METER/3.28 FEET ABOVE GROUND)

Structure Type	Maximum Operating Voltage (kV)	Distance to Proposed Centerline										
		-300'	-200'	-100'	-50'	-37.5'	0'	37.5'	50'	100'	200'	300'
Davit arm 115 kV Steel Pole Single Circuit	121	0.01	0.02	0.12	0.55	0.89	1.17	0.72	0.4	0.08	0.02	0.01
Davit arm 115 kV/69 kV Steel Pole Double Circuit	121/72.5	0.01	0.01	0.03	0.06	0.11	1.35	0.30	0.06	0.06	0.02	0.01

The proposed davit arm 115 kV single circuit transmission line will have a maximum electric field density of approximately 1.17 kV per meter, 10 feet from centerline on the side of the structure with two phases, one meter above ground. The proposed davit arm 115 kV/69 kV double circuit transmission line will have a maximum electric field density of approximately 1.35 kV per meter, 10 feet from centerline on the side of the structure with two phases, one meter above ground. Both of these are significantly less than the maximum limit of 8 kV per meter that has been a permit condition previously imposed by the Minnesota Environmental Quality Board (“EQB”) in other high voltage transmission line applications. The EQB standard was designed to prevent serious hazard from shocks when touching large objects, such as tractors, parked under extra high voltage transmission lines of 500 kV or greater.

5.2.2 MAGNETIC FIELDS

Magnetic fields are present around any electrical device, and can occur indoors and outdoors. Magnetic fields are the result of the flow of electricity or current that travels along transmission lines, distribution (feeder) lines, substation transformers, house wiring and household electrical appliances.

The intensity of a magnetic field is related to the current flow through the conductors (wire). Considerable research has been conducted throughout the past three decades to determine whether exposure to power-frequency (60 hertz) electric and magnetic fields causes biological responses and health effects. Epidemiological and toxicological

studies have shown no statistically significant association or weak associations between EMF exposure and health risks.

In 1999, the National Institute of Environmental Health Sciences (“NIEHS”) issued its final report on “Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields” in response to the Energy Policy Act of 1992. NIEHS concluded that the scientific evidence linking EMF exposures with health risks is weak and that this finding does not warrant aggressive regulatory concern. However, because of the weak scientific evidence that supports some association between EMF 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.

Minnesota, California, and Wisconsin have all recently conducted literature reviews or research to examine this issue. In 2002, Minnesota formed an Interagency Working Group to evaluate the body of research and develop policy recommendations to protect the public health from potential problems resulting from high voltage transmission line EMF effects. The Working Group consisted of staff from various state agencies. The Working Group published its findings in a White Paper on EMF Policy and Mitigation Options in September 2002. (Minnesota Department of Health, 2002) The findings of the Working Group are summarized below.

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.

The Minnesota EQB addressed the matter of EMF with respect to new transmission lines in a number of separate dockets from 2003 to 2005. See Docket Nos. 03-64-TR-XCEL (161 kV Lakefield Junction to Fox Lake Substation line); 03-73-TR XCEL (345 kV Split Rock Substation to Lakefield Junction Substation line) and; 04-84-TR-XCEL (115 kV Buffalo Ridge Substation to White Substation line). The findings of the EQB and the discussion in the environmental review documents prepared on each of those projects are pertinent to this issue with respect to the proposed projects.

Documents from those matters are available on the Commission webpage:
www.energyfacilities.puc.state.mn.us.

The Commission has also addressed the issue of EMF. In August 2008, for example, in Docket No. E002/TL-07-1626 for the 115 kV line connecting the Brookings County and Yankee substations, the Commission made the following finding with regard to EMF:

A number of national and international health agencies (The Minnesota Department of Health, The World Health Organization, The National Institute of Environmental Health Sciences) have generally concluded in their research that there is insufficient evidence to prove a connection between electric and magnetic fields exposure and health effects. Research has not been able to establish a cause and effect relationship between exposure to magnetic fields and human disease, nor a plausible biological mechanism by which exposure to electric and magnetic fields could cause disease.

Minnesota Public Utilities Commission Findings of Fact, Conclusions of Law and Order Issuing a Route Permit to Xcel Energy For the Yankee Substation to Brookings County Substation 115 kV High Voltage Transmission Project at 8 (August 12, 2008).

Figure 9 provides the estimated magnetic fields based on the proposed line and structure design. The expected magnetic field for the proposed structure type and phase current has been calculated at various distances from the center of the pole in milligauss. The gauss is a unit of measurement of the magnetic flux density in a magnetic field.

FIGURE 9
CALCULATED MAGNETIC FIELDS (MILLIGAUSS) FOR PROPOSED 115
KV TRANSMISSION LINE DESIGNS
(ONE METER /3.28 FEET ABOVE GROUND)

Structure Type	System Condition	Current (Amps)	Distance to Proposed Centerline										
			-300'	-200'	-100'	-50'	-37.5'	0'	37.5'	50'	100'	200'	300'
Davit Arm 115kV Steel Pole Single Circuit	Peak	326	0.49	1.07	5.04	13	19.58	55.13	20.86	13.51	3.87	0.97	0.42
	Average	196	0.30	0.64	2.38	7.81	11.77	33.15	12.54	8.12	2.33	0.58	0.25
Davit Arm 115kV/69kV Steel Pole Double Circuit	Peak	201/335	0.23	0.54	2.35	9.12	14.40	35.36	5.77	3.11	0.86	0.31	0.16
	Average	121/201	0.13	0.31	1.39	5.44	8.61	21.25	3.45	1.83	0.49	0.17	0.09

5.2.3 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. Appropriate measures will be taken to prevent stray voltage problems when the transmission line proposed in this Application is parallel to or crosses distribution lines.

5.2.4 FARMING OPERATIONS, VEHICLE USE AND METAL BUILDINGS NEAR POWER LINES

Insulated electric fences used in livestock operations can pick up an induced charge from transmission lines. Usually, the induced charge will drain off when the charger unit is connected to the fence. When the charger is disconnected either for maintenance or when the fence is being built, shocks may result. Potential shocks can be prevented by using a couple of methods, including: (i) one or more of the fence insulators can be shorted out to ground with a wire when the charger is disconnected or (ii) an electric filter can be installed 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 with respect to 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 high voltage transmission lines to build up an electric charge. If this occurs, the vehicle can be grounded by attaching a grounding strap to the vehicle long enough to touch the earth. Such buildup is a rare event because generally vehicles are effectively grounded through tires. Modern tires provide an electrical path to ground because carbon black, a good conductor of electricity, is added when they are produced. Metal parts of farming equipment are frequently in contact with the ground when plowing or engaging in various other activities. Therefore, vehicles will not normally build up a charge unless they have unusually old tires or are parked on dry rock, plastic, or other surfaces that insulate them from the ground.

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

6.0 ENVIRONMENTAL INFORMATION

This section provides a description of the environmental setting, potential impacts and mitigative measures Xcel Energy has proposed, where appropriate, to minimize the impacts of siting, constructing and operating the Project. If the transmission line and the substation 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 at Xcel Energy. Unless otherwise identified in the following text, the costs of the mitigative measures proposed are considered nominal.

6.1 DESCRIPTION OF ENVIRONMENTAL SETTING

The proposed transmission line rebuild and the construction of the new substation are located in Brown and Nicollet counties near the City of New Ulm. The proposed New West Ulm Substation will be located in Milford Township, Brown County. The rebuild area extends north along existing right-of-way from the proposed substation location and then east/northeast crossing the Minnesota River into Lafayette Township, Nicollet County to the existing Fort Ridgely Substation.

The new substation Project area and most of the existing transmission line area are located in primarily agricultural areas. A small portion of Project area is located in the City of New Ulm, classified as urban, and another portion is located in the Minnesota River basin.

The Project area is located within the North Central Glaciated Plains Section (251B), a section within the biogeographic province known as the Prairie Parkland Province under the Ecological Classification System (“ECS”) developed by the MnDNR and the U.S. Forest Service. The Project is further located within the Minnesota River Prairie, a subsection of the North Central Glaciated Plains.

The Minnesota River Prairie subsection is characterized by loamy ground moraine (till plain) and is the dominant landform with topography being level to gently rolling. The steepest topography of the subsection is along the Minnesota River and on the Big Stone Moraine, which has steep kames and broad slopes. Except for the Minnesota River valley, the area is relatively level land ranging in elevation between 750 to 1,000 feet above mean sea level.

The pre-settlement vegetation was primarily tallgrass prairie, with many islands of wet prairie. Forests of silver maple, elm, cottonwood, and willow grew on floodplains along the Minnesota River and other streams.

The dominant present-day land use is agriculture, with very few remnants of pre-settlement vegetation (*e.g.*, tallgrass prairie) left. The major crops in the area are corn and soybeans.

6.2 HUMAN SETTLEMENT

6.2.1 PUBLIC HEALTH AND SAFETY

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

6.2.1.1 MITIGATIVE MEASURES

The proposed transmission lines 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.

6.2.2 COMMERCIAL, INDUSTRIAL, RESIDENTIAL LAND USE

Based on the GAP Land Cover data set (MnDNR DataDeli), the area where the new 115 kV line and the new West New Ulm Substation will be located are coded as mainly agriculture with limited urban, grass/shrub/wetland and water (Minnesota River). Lands can be generally be characterized as farmsteads in a rural residential setting, with a limited urban and water section. Land use in the City of New Ulm is indicated on the attached **Appendix B.6**.

The closest urban residence to the new 115/69 kV line is approximately 40 feet, where the line runs along 23rd Street North within the City of New Ulm. The closest rural residence is approximately located 35 feet from the proposed 115/69 kV line at a residence in Milford Township at the north end of the Project area. The closest farmstead residence to the new 115/69 kV line is approximately 165 feet, where the line runs along the east side County Highway 12 at the south end of the Project area in Milford Township.

Except for near the proposed substation location and the existing Fort Ridgely Substation, a majority of the proposed 115/69 kV transmission line rebuild will be located within existing transmission line right-of-ways. Existing lines are located between 35 and over 500 feet from existing structures, such as farmsteads, urban and rural residences and dwellings, and commercial buildings along County Highway 12, U. S. Highway 14, the Chicago and Northwestern Railroad, 23rd Street North, North Broadway Street, Riverside Avenue, County Route 21 and County Route 7/Township Road 142.

The closest residence to the proposed West New Ulm Substation is located 1,400 feet to the north, north of the existing Brown County REA Substation. Two farmsteads are located approximately 1,600 feet from the new substation site; one to the southwest across U.S. Highway 12 and the other to the northeast across County Highway 12.

6.2.2.1 MITIGATIVE MEASURES

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

6.2.3 DISPLACEMENT

No displacement of residential homes or businesses is anticipated to occur as a result of this Project.

6.2.3.1 MITIGATIVE MEASURES

Since no displacement is anticipated to occur, no mitigative measures are proposed.

6.2.4 NOISE

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

Noise 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.

During light rain, dense fog, snow, and other times when there is moisture in the air, transmission lines can produce noise. Noise levels produced by a 115 kV transmission line are generally less than outdoor background levels and are therefore not usually audible. Additionally, noise levels from the proposed 115/69 kV double circuit transmission lines are expected to be only slightly than the existing 69 kV transmission lines in the Project area. Therefore, noise levels from the new line should not be noticeably greater than existing levels.

At substations, the source for noise is primarily the transformers, which can create a humming noise. The nearest occupied home to the proposed West New Ulm Substation is located 1,400 feet north of the new substation site. It would be very unlikely that substation noise would be audible at this home.

The substations will be designed and constructed to comply with state noise standards established by the Minnesota Pollution Control Agency (“MPCA”). 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. **Figure 10** below shows noise levels associated with common, everyday sources.

**FIGURE 10
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 (1999).

In Minnesota, statistical sound levels (L Level Descriptors) are used to evaluate noise levels and identify noise impacts. The L_5 is defined as the noise level exceeded 5% of the time, or for three minutes in an hour. The L_{50} is the noise level exceeded 50% of the time, or for 30 minutes in 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”) is listed in the MPCA noise regulations to distinguish the categories.

Figure 11 identifies the established daytime and nighttime noise standards by NAC. 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} is the dBA that may be exceeded 10 percent of the time within the hour.

**FIGURE 11
NOISE STANDARDS BY NOISE AREA CLASSIFICATION**

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 36 residences are located within 200 feet of the proposed transmission line rebuild route and there are 8 residences between 200 and 400 feet of the proposed transmission line rebuild route. Along 23rd Street North, approximately 11 residences are within 50 feet of the existing transmission line and one rural residence in Milford Township is located within approximately 35 feet of the line. All the residences fall within NAC 1. The noise generated from the transmission line is not expected to exceed approximately 30 dB, which is below typical background noise

levels and, therefore, would not be audible at any receptor location. In addition, noise levels would be well below the noise standards established for NAC 1, as shown in **Figure 11** above.

6.2.4.1 MITIGATIVE MEASURES

No mitigative measures are proposed since no impacts are anticipated.

6.2.5 TELEVISION AND RADIO INTERFERENCE

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

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

FM radio receivers 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 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, Xcel Energy 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.

6.2.5.2 MITIGATIVE MEASURES

No impacts are anticipated and therefore no mitigative measures are proposed. If radio or television interference occurs because of the transmission line, Xcel Energy will work with the affected landowner to restore reception to pre-project quality.

6.2.6 AESTHETICS

Because the proposed transmission line will follow the existing Fort Ridgely 69 kV transmission line location, the Project will have minimal effects on the visual and aesthetic character of the area. The proposed structures for the 115/69 kV double circuit line from the new West New Ulm Substation to the existing Fort Ridgely Substation are proposed to be a single pole construction similar to the other 115/69 kV transmission lines used on the Xcel Energy system. In comparison to the existing 69 kV transmission line single pole structures, the proposed transmission line structures will be slightly taller and they will be spaced somewhat closer together. The structures will be about 80 to 90 feet tall and will have a maximum span of 400 feet between the structures. Average spans will be approximately 325 feet. The usual 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 50 feet) where reasonably possible.

The finish of the proposed poles will be galvanized or self-weathering steel. The existing transmission line structures in this area are single pole and H-frame wood structures. The proposed steel poles will give the new transmission line a more modern appearance. Xcel Energy proposes to use self-weathering steel poles in rural areas and galvanized steel in urban areas.

Similar to the existing 69 kV transmission line, the new 115/69 kV transmission line will be visible to residents of New Ulm and travelers using Nicollet County Road 21 (the Minnesota River Valley Scenic Byway), U.S. Highway 14 and Brown County Highway 12. The majority of the landscape in the Project area is open and agricultural. The Minnesota River and the sloping terraces near the river add visual variety to the landscape. Similar to the existing transmission line, the transmission line structures will add visual contrast to the open agricultural landscape. The visual

effect will depend largely on the perceptions of the observers. The visual contrast added by the transmission structures, lines, and substation may be perceived as a visual disruption or as points of visual interest. The transmission lines and substations that already exist in the Project area will limit the extent to which the new line and substation are viewed as a disruption of the area's scenic integrity.

6.2.6.1 MITIGATIVE MEASURES

Although the proposed line and substation will contrast with views of surrounding land uses, Xcel Energy has identified the route that follows existing transmission line corridors and avoids homes to the greatest extent practicable. Xcel Energy will work with landowners to identify concerns related to the transmission line and/or substation aesthetics.

6.2.7 SOCIOECONOMIC

Population and economic characteristics based on the 2000 U.S. Census are presented in **Figure 12**.

**FIGURE 12
POPULATION AND ECONOMIC CHARACTERISTICS**

Location	Population	Minority Population (Percent)	Caucasian Population (Percent)	Per Capita Income	Percentage of Individuals Below Poverty Level
State of Minnesota	4,919,479	10.7	89.3 (2006)	\$23,198	8.1 (2004)
City of New Ulm	13,594	1.9	98.1	\$20,308	6.2
Brown County	26,911	1.4	98.6 (2006)	\$19,535 (1999)	7.3 (2004)
Milford Township	793	0.6	99.4	\$20,417	3.2
Nicollet County	29,771	4.0	96.0 (2006)	\$20,517 (1999)	7.5 (2004)
Lafayette Township	724	0.4	99.6	\$23,397	7.1

Source: 2000 U.S. Census: General Demographic Characteristics

According to 2000 Census data, Brown County is 98.6 percent Caucasian, while Nicollet County is 96.0 percent Caucasian. In the townships within the Project Area, minority groups in the area constitute a very small percentage of the total population, less than 1.0 percent.

Per capita incomes within the townships in the Project Area are higher when compared to Brown and Nicollet counties on a whole. The proposed route does not contain disproportionately high minority populations or low-income populations.

Approximately 8 to 12 workers will be required by Xcel Energy for transmission line construction and 6 to 10 workers will be needed, on average, for the substation construction. The transmission crews are expected to spend approximately 6 months constructing the project

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 various projects 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 Project will be primarily positive with an influx of wages and expenditures made at local businesses during the Project, increased tax revenue.

6.2.7.1 MITIGATIVE MEASURES

No mitigative measures are proposed since no impacts are anticipated.

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 greater New Ulm area, including Milford Township in Brown County and Lafayette Township in Nicollet

County, has cultural values tied to the area's strong German heritage, the agricultural and industrial economy. Local community ties relate to the work, worship, celebration, and recreation. Examples of area culture and industry include the annual Oktoberfest Festival, Polka Days, the Minnesota Music Hall of Fame and the Schell Brewing Company (Wikimedia Foundation, Inc. 2008; New Ulm Oktoberfest 2008).

The vast majority of lands outside of the City boundaries remain in agricultural use (Brown County Historical Society and Nicollet County Historical Society). Agriculture and farm-related business remain central to the regional economy. The area has a diversified agricultural mix of crops and livestock including corn, soybeans, alfalfa as well as hogs and beef cattle.

Construction of the proposed substation and the transmission line rebuild are not expected to conflict with the cultural values along the route. No impacts to cultural values are anticipated.

6.2.8.1 MITIGATIVE MEASURES

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

6.2.9 RECREATION

Recreational opportunities near the proposed West New Ulm Substation include the Somsen WMA which is located across and adjacent to County Highway 12 east of the proposed West New Ulm substation site. The Project will not directly impact this resource but the substation will likely be visible from the Somsen WMA.

The transmission line rebuild portion of the Project passes just north of the Fritsche Creek WMA located on the north side of the Minnesota River. The Minnesota River is also a State Canoe Route. The City of New Ulm's bike trail crosses beneath the existing 69 kV transmission line near the intersection of North Broadway Street and 23rd Street North. The Project will not directly impact these resources, except the bike trail may need to be rerouted at certain times during construction of the double circuit transmission line rebuild work along 23rd Street North and at the intersection of North Broadway Street and 23rd Street North. The transmission line will likely be visible to those using these recreational resources when in the vicinity of the line.

Except for possible limited impacts to the bike path, there should be no impacts to recreational opportunities near the West New Ulm Substation site or along the proposed transmission line rebuild route.

6.2.9.1 MITIGATIVE MEASURES

During construction of the transmission line rebuild in the vicinity of the City of New Ulm bike trail, Xcel Energy will work with City personnel to reroute the bike trail at specific times required for the work.

6.2.10 PUBLIC SERVICES

Within the city limits of New Ulm, the City provides water, sewer and electric service. Outside the city limits, along the transmission route, private wells and septic systems are used. The City of New Ulm has emergency fire service.

Within the Project area, New Ulm Public Utilities electrical distribution system is connected to the Xcel Energy transmission line at a switch located on a structure which is located in the southwest corner of the intersection of 23rd Street North and North Broadway Street. The Project involves removing this structure and building a new structure at a new site located on the east side of North Broadway Street on City-owned land currently in use as a passive park. This will require the New Ulm Public Utilities to reroute its line and switch to the new structure location east of North Broadway Street.

No public utility or road improvements projects are planned for the area near the existing Xcel Energy transmission line located along 23rd Street North during 2008. Over the next five years, the City of New Ulm plans to pave the gravel portion of Broadway Street/23rd Street North located north of the existing transmission line near the west end of 23rd Street North. The City may extend a natural gas pipeline tap to a future industrial area to be located east of County Highway 12 and north of U.S. Highway 14, depending on the date this area becomes developed.

6.2.10.1 MITIGATIVE MEASURES

Xcel Energy has conferred with New Ulm Public Utilities regarding the new switch and will work with New Ulm Public Utilities to ensure that its transmission line is connected to the new structure and switch location east of North Broadway Street. Xcel Energy will coordinate its work and crossing City streets, with City work during this phase of the Project.

6.3 LAND-BASED ECONOMIES

6.3.1 AGRICULTURE

Brown and Nicollet counties have strong economic ties to agriculture. Brown County ranks among the top 8 counties in the state in hogs and pigs, cattle and calves and harvested vegetables. Top crops in Brown County include corn, soybeans, forage and

sweet corn. According to the 2002 Census of Agriculture, United States Department of Agriculture, Minnesota Agricultural Statistics Service, approximately \$165 million was generated in both crop and livestock sales in 2002.

Nicollet County ranks among the top 5 counties in the state in hogs and pigs. Top crops in Nicollet County include corn and soybeans. According to the 2002 Census of Agriculture, United States Department of Agriculture, Minnesota Agricultural Statistics Service, approximately \$148 million was generated in both crop and livestock sales in 2002.

National Gap Analysis Program (“GAP”) data was used for the potential impacts to agricultural land. The West New Ulm Substation site is approximately 11.5 acres. Almost all of the 11.5 acres (499,500 ft²) of agricultural land will be permanently impacted by the installation of the substation at the West New Ulm Substation site including the fenced-in area of the substation footprint. It is estimated there will be approximately two acres (87,120 ft²) of temporary impacts to agriculture due to construction of the West New Ulm Substation. An additional 530 ft² of agricultural land will be permanently impacted by the installation of new structures within the route.

Construction activities associated with the transmission line rebuild portion of the Project will also temporarily impact an area of agricultural land estimated at 4.6 acres (199,500 ft²). Construction of the new transmission structures and removal of existing structures will require repeated access to structure locations to install foundations, structures and conductors. Equipment used in this process includes drill rigs, concrete trucks, backhoes, cranes, boom trucks and assorted small vehicles. Operation of these vehicles on adjoining farm fields can cause rutting and compaction, particularly during springtime and otherwise wet conditions.

6.3.1.1 MITIGATIVE MEASURES

Landowners will be compensated for the use of their land through easement payments. Additionally, to minimize loss of farmland and rural properties and to ensure reasonable access to the land near the poles, Xcel Energy intends to place the poles near the edge of the road right-of-way, approximately five to 10 feet onto private property, and overhang the roadway right-of-way.

When possible Xcel Energy will rebuild the transmission lines before crops are planted or following harvest 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 Xcel Energy construction team will work with the property owner, right of way agent, and engineer to minimize the impact on property through use of the owner's knowledge of the property.

Xcel Energy will compensate landowners for the easements acquired and for any crop damage and soil compaction that occurs as a result of the Project.

6.3.2 FORESTRY

There are no forested areas where species are harvested along the proposed transmission line rebuild route or at the proposed substation site. The Project will be located on what was historically the prairie grassland region of Minnesota. The primary tree cover in the area is associated with waterways and homesteads. No economically important forestry resources are located along the proposed transmission line rebuild route or at the proposed substation site.

6.3.2.1 MITIGATIVE MEASURES

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

6.3.3 TOURISM

Lafayette Township, Nicollet County, is primarily an agricultural area while Milford Township, Brown County is more urban, falling partially within the city limits of New Ulm. Visitors to the area are most likely to visit the City of New Ulm for activities related to tourism.

6.3.3.1 MITIGATIVE MEASURES

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

6.3.4 MINING

Surficial features consist of gently rolling ground moraine about 60 miles wide, and the Minnesota River occupies a broad valley that was created by Glacial River Warren, which drained Glacial Lake Agassiz. Loamy ground moraine (till plain) are the predominant landform, but end moraines and lake plains also occupy significant areas. Most of this subsection area is covered by 100 to 400 feet of glacial drift. Gray cretaceous shales, sandstones, and clays are the most common kinds of bedrock. Ordovician dolomite underlies the extreme southeastern edge of the subsection area.

Some soils are clayey and sandy and gravelly soils are present locally, but these account for only a small percentage of soils in the subsection.

According to MnDOT county pit maps for Brown and Nicollet counties, there are no inactive or active gravel pits located near the proposed route or the proposed substation site. However, based on visual inspection of the transmission line route in July 2008, Xcel Energy observed a private active sand and gravel mining operation located north and adjacent to the existing line northwest of 23rd Street North in the City of New Ulm. A mining operation located east and adjacent to the active sand and gravel operation is also indicated on the USGS topographic map. The mining operation is being conducted by M.R. Paving & Excavating, Inc., of New Ulm. Xcel Energy has met with M.R. Paving and Excavating and determined that the mining operation will not interfere with the proposed transmission line rebuild work, and the proposed line rebuild area should not impact mining operations.

6.3.4.1 MITIGATIVE MEASURES

While no impacts to the M.R. Paving & Excavating mining operation are anticipated, Xcel Energy will coordinate transmission line rebuild construction work with the operator to ensure there will be no impacts to the mining operation or line work.

6.4 ARCHAEOLOGICAL AND HISTORICAL RESOURCES

In July 2008, a review of records at the Minnesota State Historic Preservation Office (“SHPO”) and Office of the State Archaeologist (“OSA”) was conducted for the Project area and industry standard one mile buffer. The background literature search identified three historic architectural properties and four archaeological sites located within one mile of the proposed route and the proposed West New Ulm Substation.

Inventoried historic architectural properties include: two farmhouses and a school. None of these properties have been evaluated for National Register eligibility. Previously identified archaeological properties include: the Runck Site (21BW0005), the Runck Burial Site (21BW0007), the Fritsche Creek I Site (21NL0062) and the Fritsche Creek Bison Kill Site (21NL0063).

Of these archaeological sites, two, the Fritsche Creek I Site (21NL0062) and the Fritsche Creek Bison Kill Site (21NL0063) have been evaluated and found eligible for the National Register of Historic Places (NRHP). Previous survey in the Project area has been limited to linear highway surveys and specific locale bridge replacement surveys. The Project area has not been adequately surveyed for cultural resources.

FIGURE 13
PREVIOUSLY IDENTIFIED HISTORIC PROPERTIES
NEAR THE PROJECT

Type of Historic Property	Property Name and Inventory Number	Description	NRHP Status
Architectural	BW-MIL-002	Mack Farmhouse	Unevaluated
Architectural	BW-MIL-004	House	Unevaluated
Architectural	BW-MIL-007	School District #14	Unevaluated
Archaeological	Runck Site (21BW0005)	Archaic, Woodland, Mississippian Habitation/Mound Site	Unevaluated
Archaeological	Runck Burial Site (21BW0007)	Archaic Burial Site	Unevaluated
Archaeological	Fritsche Creek I Site (21NL0062)	Middle Woodland Artifact Scatter	NRHP Eligible
Archaeological	Fritsche Creek Bison Kill Site (21NL0063)	Paleoindian, Middle Woodland Bison Kill Site	NRHP Eligible

6.4.1.1 MITIGATIVE MEASURES

Given the proximity of historic properties (*i.e.*, Historic Architectural Properties and Archaeological Sites) and the lack of formal survey previously undertaken within the proposed Project area unidentified historic properties may exist within the Project area. Prior to construction, a field survey should be conducted to identify cultural resource concerns. The proposed route should avoid impacts to identified archaeological and historic resources to the extent possible. Should an impact be identified, consultation with SHPO on whether the resource is eligible for listing in the NRHP will be necessary. While avoidance would be a preferred action, mitigation for Project-related impacts on NRHP-eligible archaeological and historic resources may include resource and/or additional documentation through data recovery.

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.

State and federal governments currently regulate permissible concentrations of ozone (O₃) 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 0.08 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.

Ozone and nitrogen oxides can be produced during transmission line operation when the electrical current ionizes the molecules in air and water vapor around conductors in a process called corona discharge, which occurs within a few centimeters or less immediately surrounding conductors. This process is limited because the conductor gradient surface of a 115 kV transmission line is usually below 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 produced during such corona discharge and also forms naturally in the lower atmosphere from lightning discharges and 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 in the lower atmosphere. Ozone is a very 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 area near the proposed transmission line route presently meets federal air quality standards.

Minor temporary effects on air quality are anticipated during construction of the proposed transmission line and substation, as a result of exhaust emissions from construction equipment and other vehicles, and from fugitive dust that becomes airborne during dry periods of construction activity.

The magnitude of air emissions during construction is influenced by weather conditions and the type of construction activity. Exhaust emissions, primarily from diesel equipment, will vary with the phase of construction. Adverse effects on the surrounding environment are expected to be negligible because of the short and intermittent nature of the emission and dust-producing construction phases.

6.5.1.1 MITIGATIVE MEASURES

Xcel Energy will employ Best Management Practices (“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. anticipates nominal impacts to air quality. Therefore, no mitigative measures are proposed.

6.5.2 WATER QUALITY

The proposed substation and transmission line rebuild will have minor, mostly short term effects on surface water resources. Most potential effects on surface waters will be related to reconstruction of the transmission line across the Minnesota River. The Project could require wetland and water resource approvals from the U.S. Army Corps of Engineers (“USACE”), MnDNR, Brown County, and Nicollet County. These agencies administer regulatory programs of the federal Clean Water Act and Rivers and Harbors Act, the Minnesota Public Water Resources Act and Utility Crossing Licenses, and locally administer the Minnesota Wetland Conservation Act (“WCA”).

The wetlands identified in and near the Project corridor are listed in **Figure 14** and shown in **Appendix B.8**. Surface water resources in the vicinity of the proposed substation and transmission line rebuild include a few relatively small wetlands regulated under the WCA, MnDNR Public Waters and Water Courses, and USACE jurisdictional wetlands. WCA jurisdictional wetlands include farmed or partially farmed wetlands, Type 2 wet meadows, and Type 3 shallow marshes. The transmission route also runs past a recently constructed aggregate mine pond that may or may not be regulated as wetland. MnDNR jurisdictional waters include Public Water 08-18P, the Minnesota River, and Huelskamp Creek. Public Water 08-18P is a marsh encompassing approximately 33 acres and located within the Somsen Wildlife Management Area near the proposed substation. The Minnesota River and Huelskamp Creek are both Public Watercourses. Huelskamp Creek flows under the northeastern portion of the transmission line route and is tributary to the Minnesota River. Although most of these waters fall under USACE jurisdiction, the small, isolated wetlands may lack USACE jurisdiction.

**FIGURE 14
WETLANDS IDENTIFIED NEAR THE PROJECT ROUTE**

County	No. (See Appx. B.8)	Name	Cowardin Type	MnDNR PWI	Adjacent to Minn. River	Approx. Area (Acres)
Nicollet	1	Fritche Creek	R3UBF	Watercourse	Yes	NA
Nicollet	2	Huelskamp Creek	R3UBF	Watercourse	Yes	NA
Nicollet	3	Floodplain Wetland	PFO/EMCd	No	Yes	> 20
Nicollet & Brown	4	Minnesota River	R2UBH	Watercourse	Yes	NA

County	No. (See Appx. B.8)	Name	Cowardin Type	MnDNR PWI	Adjacent to Minn. River	Approx. Area (Acres)
Brown	5	Floodplain Wetland	PEMB/FOCd	No	Yes	> 20
Brown	6	Gravel Pit Pond	PUBGx	No	No	13
Brown	7	Intermittent Creek	R4UBC	No	Yes	NA
Brown	8	Railroad Ditch	PEMB/C	No	No	0.2
Brown	9	Railroad Ditch	PEMB	No	No	0.2
Brown	10	Railroad Ditch	PEMB	No	No	0.8
Brown	11	Crop Stress Area	PEMA/Bf	No	No	0.9
Brown	12	Co. Rd. 12 Ditch	PEMB	No	No	0.5
Brown	13	Somsen WMA	L2UBG/PEMF	PW 08-18P	No	33
Brown	14	Crop Area	PUBF/PEMC	No	No	12.5

The reach of the Minnesota River that flows through the Project area is listed as impaired by the Minnesota Pollution Control Agency (“MPCA”). The Minnesota River segment from Eightmile Creek to the Cottonwood River has turbidity levels that affect aquatic consumption and aquatic life, and is inhabited by fish containing mercury and PCBs. There are no trout streams listed by the MnDNR in the Project area.

The route crosses the 100-year and 500-year floodplains of the Minnesota River. According to the Federal Emergency Management Agency Flood Insurance Rate Map 27015C0205 C and USGS topographic mapping, the 100-year base flood elevation at the transmission route location is 811 feet mean sea level (“MSL”) and the floodplain wetland surface elevation is about 793 to 794 feet MSL. The transmission lines structures will be 80 to 90 feet tall, and the electrical components will be well above the 100-year flood elevation. It is not anticipated that floodplain development permits will be necessary.

Although there are no surface waters, limited wetlands, or floodplains associated with the proposed substation location, there are some subsurface drain tile lines in this area. It is anticipated that substation construction will avoid direct wetland impacts. If needed drain tile lines will be located in the field and the drainage functions provided by these lines will be perpetuated.

The substation construction and transmission line rebuild may require waters and wetlands permits, letters of no jurisdiction, or exemptions from the USACE, MnDNR Division of Waters, or Brown or Nicollet Counties. Wetland and surface water impacts will be avoided and minimized to the extent practicable. After coordination and application, authorization from the USACE would likely fall under a Letter of Permission (LOP-05-MN) or the utility line discharge provision of a Regional General

Permit (RGP-3-MN). The USACE could also require that the Project be authorized under Section 10 of the Rivers and Harbors Act, which requires a USACE permit to do work in, over or under Navigable Waters such as the Minnesota River.

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. Brown and Nicollet Counties administer the WCA in the Project area. It is likely that wetland impact minimization will allow the Project to be eligible for a WCA utilities exemption.

Minnesota Statutes Section 84.415 requires Xcel Energy to obtain a license from the MnDNR Division of Lands and Minerals for the passage of any utility over, under, or across any state land or public waters. The existing 69 kV line spans the Minnesota River, and one its tributaries, Huelskamp Creek, both of which are MnDNR Public Watercourses. Therefore, Xcel Energy will either confirm the applicability of existing licenses for these crossings for the line upgrade or obtain new utility crossing licenses prior to construction.

The MPCA regulates construction activities that may impact storm water under the Clean Water Act. In the event that a National Pollutant Discharge Elimination System (“NPDES”) construction storm water permit and Stormwater Pollution Prevention Plan (“SWPPP”) is required for the Project, Xcel Energy will obtain the permit. 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.

6.5.2.1 MITIGATIVE MEASURES

Xcel Energy will design the Project to avoid and minimize wetland impacts, and will apply erosion control measures identified in the MPCA Stormwater Best Management Practices Manual, such as using silt fence to minimize impacts to adjacent water resources. During construction, the Xcel 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.

During construction there is the possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading, and construction traffic. Disturbed surface soils will be stabilized at the completion of the construction process to minimize the potential for subsequent effects on surface water quality. Xcel Energy

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. Additionally, Xcel Energy will obtain required permits to conduct Project work.

6.5.3 FLORA

Land cover in the Project area consists of cropland, grassland, wetland, and small areas of woodland and residential/industrial development. Cropland consists of primarily corn and soybeans. Grasslands are dominated primarily by smooth brome, Kentucky bluegrass, red clover, alfalfa, and goldenrod. Reed canary grass, cattail, cottonwood, sandbar willow, and sedges are the primary species in wetlands. Upland woodlands near the Minnesota River are composed primarily of green ash, elm, sugar maple, cottonwood, and box elder. Native grassland is relatively scarce in the Project area. Native prairie species are discussed in subsequent sections of this Application. For a discussion on impacts to agriculture, please see Section 6.3.1. Transmission line construction impacts to trees and woodlands will be minimized because the transmission line rebuild will follow existing right-of-way.

6.5.3.1 MITIGATIVE MEASURES

To minimize impacts to trees in the Project corridor, Xcel Energy will limit tree clearing and removal to the transmission line right-of-way, areas that limit construction access to the corridor, and areas that impact the safe operation of the facility.

6.5.4 FAUNA

Three MnDNR Wildlife Management Areas (“WMAs”) are located in the vicinity of the Project (Minnesota DNR 2008, **Appendix B.8**). The Somsen WMA is located east of the western end of the transmission line, across County Highway 12 from the proposed West New Ulm Substation location in Brown County. The Somsen WMA covers 49 acres and is composed primarily of wetland (DNR Public Water 08-18P) and grassland. Tract 10 of the Rosenau-Lambrecht WMA is located about one-third mile west of the proposed West New Ulm Substation in Brown County, covers 16 acres, and includes mostly grassland with a small amount of wetland. The Fritsche Creek WMA is located directly south of the transmission line corridor on the east bank of the Minnesota River in Nicollet County. The Fritsche Creek WMA covers 385 acres and consists primarily of bottomland hardwood and emergent wetland.

The croplands, grasslands, wetlands, and woodlands in the area provide habitat for a variety of wildlife. Wildlife and other organisms that inhabit the Project area include

small mammals such as mice, voles, and ground squirrels; large mammals such as white-tailed deer; waterfowl and other water birds like pelicans and egrets, songbirds, raptors, upland gamebirds, frogs, salamanders, snakes, and turtles. Lists of mammals, birds, amphibians, and reptiles that are representative of the habitats of the area are included in **Appendix C**. These lists were compiled from knowledge of the area, Hazard (1982), Janssen (1987), and LeClere (2008).

Wildlife that resides within the construction zone will be temporarily displaced to adjacent habitats during the construction process. Although most effects on wildlife will be short-term, development of the substation will have long-term effects on a habitat area that consists primarily of cultivated agricultural crops. It is anticipated that fish and mollusks that inhabit the Minnesota River will not be affected by transmission line reconstruction.

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 corridors that may be used during migration such as the Minnesota River.

Electrocution is commonly a concern with electrical facilities. 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 a conductor and a grounding device. Xcel Energy transmission and distribution line design standards provide adequate spacing to minimize the risk of raptor electrocution and minimize potential avian impacts of the proposed Project.

6.5.4.1 MITIGATIVE MEASURES

It is anticipated that most wildlife displacement and habitat impacts will be temporary. Long term adverse effects on wildlife populations will be minimized almost entirely to the substation construction location. Consequently, no wildlife population mitigation measures are proposed.

Xcel Energy has been working with various state and federal agencies for over 20 years to address avian issues as quickly and efficiently as possible. In 2002, Xcel Energy Operating Companies, including Xcel Energy, entered into a voluntary memorandum of understanding (“MOU”) with the U.S. Fish and Wildlife Service (“USFWS”) to work together to address avian issues throughout its service territories. The MOU sets forth standard reporting methods and the development of Avian Protection Plans (“APP”) for each state that Xcel Energy serves. APPs include

designs and other measures aimed at preventing avian electrocutions, as described in guidance provided by the Avian Power Line Interaction Committee (APLIC 2006) and the guidelines for developing APPs (APLIC and USFWS 2005). Work is currently underway on the Minnesota APP. Xcel Energy also addresses avian issues related to transmission projects by:

- Working with resource agencies such as the MnDNR and the USFWS to identify areas that may be appropriate for marking transmission line shield wires with bird diverters; and
- Attempting to avoid areas known as primary migration corridors or migratory resting areas.

The Project has been assessed for areas with potential avian issues. The section of the transmission line rebuild that will cross the Minnesota River adjacent to the Fritsche Creek WMA is the area with the highest risk of avian collisions and the most appropriate location for installation of bird diverters during reconstruction. Xcel Energy will coordinate with the MnDNR and the USFWS regarding the potential installation of bird diverters such as swan flight diverters (“SFD”) on the shield wire in the area of the Minnesota River crossing. Other areas where bird diverters might be warranted may also be identified in the future. 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 SFDs, which are pre-formed spiral shaped devices made of polyvinyl chloride that are wrapped around the shield wire.

6.6 RARE AND UNIQUE NATURAL RESOURCES

A request for a Natural Heritage Database Search and comments regarding rare species and natural communities was submitted to the MnDNR on July 9, 2008. The results of the MnDNR Natural Heritage Database Search are included in **Appendix D.4**. The following assessment is based on a the MnDNR results, a review of the Natural Heritage Database that is licensed to Xcel Energy by the MnDNR, and other state and federal rare species and natural community information.

There are 17 known occurrences of rare species and sensitive natural communities within 1.5 miles of the Project as indicated in **Figure 15** below. These occurrences include 11 mussels and one fish that are located in the Minnesota River, three natural plant communities, and two vascular plants. Most of these species and communities are too far outside the construction zone to be affected by the Project. Only four of the 17 records are located within 0.5 mile of the Project. Two of these records

correspond to mussels that are located in the Minnesota River. Because transmission line reconstruction will not disturb the river bottom, and because erosion control measures will be implemented to minimize surface water quality impacts, it is anticipated that mussel and fish populations will not be affected by the Project.

The other two records that occur within 0.5 mile of the Project include the Sullivant’s milkweed (*Asclepias sullivantii*), a state-threatened plant species that is restricted to mesic tallgrass prairies (Coffin and Pfanmuller 1988, Minnesota DNR 2008a), and a mesic prairie that was mapped by the Minnesota DNR County Biological Survey (Minnesota DNR 2008b). Both of these records are associated with the railroad right-of-way near the western end of the Project. The Project and construction process will be designed to avoid and minimize effects on railroad right-of-way prairie species to the extent practicable.

The MnDNR Database Search included two records that are not reported in **Figure 15**. One of these was the Paddlefish (*Polyodon spathula*), a state-threatened fish that has been recorded in various stretches of the Minnesota River as recently as 2004. The other was a freshwater mussel concentration area, which is represented by several of the species reported in **Figure 15**. Neither of these occurrences are expected to be affected by the Project.

There are no federally listed rare species known to occur in the vicinity of the Project. None of the species listed in **Figure 15** below have federal rare species status. The only federally listed species known to occur in Brown or Nicollet Counties is the prairie bush-clover (*Lespedeza leptostachya*) (U.S. Fish and Wildlife Service 2008). Prairie bush-clover is a federally threatened plant that occurs in dry to mesic prairies, but that has not been recorded in the Project vicinity.

FIGURE 15
RARE AND UNIQUE RESOURCES

Common Name	Scientific Name	Type	MN Status	Last Obs.	Proximity (Miles)	Location
Monkeyface	<i>Quadrula metanevra</i>	Mussel	Threatened	1979	1.0-1.5	MN River
Rock Pocketbook	<i>Arvidens confragosus</i>	Mussel	Endangered	1989	0.0-0.5	MN River
Mucket	<i>Actinonaias ligamentina</i>	Mussel	Threatened	1989	0.5-1.0	MN River
Wartyback	<i>Quadrula nodulata</i>	Mussel	Endangered	1989	0.5-1.0	MN River
Yellow Sandshell	<i>Lampsilis teres</i>	Mussel	Endangered	1989	0.0-0.5	MN River

Common Name	Scientific Name	Type	MN Status	Last Obs.	Proximity (Miles)	Location
Black Sandshell	<i>Ligumia recta</i>	Mussel	Special Concern	1989	0.5-1.0	MN River
Sullivant's Milkweed	<i>Asclepias sullivantii</i>	Vascular Plant	Threatened	1998	0.0-0.5	Railroad ROW
Mesic Prairie	NA	Community	Not Listed	1987-2000	0.0-0.5	Railroad ROW
Oak-Basswood Forest	NA	Community	Not Listed	1999	0.5-1.0	Woodland
Oak-Basswood Forest	NA	Community	Not Listed	1999	0.5-1.0	Woodland
Low Milk-vetch	<i>Astragalus lotiflorus</i>	Vascular Plant	Not Listed	1999	1.0-1.5	Woodland
Elktoe	<i>Alasmidonta marginata</i>	Mussel	Threatened	1989	0.5-1.0	MN River
Spike	<i>Elliptio dilatata</i>	Mussel	Special Concern	1989	0.5-1.0	MN River
Round Pigtoe	<i>Pleurobema coccineum</i>	Mussel	Threatened	1989	0.5-1.0	MN River
Blue Sucker	<i>Cycleptus elongatus</i>	Fish	Special Concern	1998	1.0-1.5	MN River
Spike	<i>Elliptio dilatata</i>	Mussel	Special Concern	2006	1.0-1.5	MN River
Black Sandshell	<i>Ligumia recta</i>	Mussel	Special Concern	2006	1.0-1.5	MN River
Round Pigtoe	<i>Pleurobema coccineum</i>	Mussel	Threatened	2006	1.0-1.5	MN River

6.6.1.1 MITIGATIVE MEASURES

The Project and construction process will be designed to avoid encroachment and effects on rare railroad right-of-way prairie species to the extent practicable. If construction in the railroad right-of-way becomes necessary, the encroachment area will be surveyed for prairie species. If prairie will be affected, Xcel Energy will coordinate with the MnDNR and consider modifying either the construction footprint or the construction practices to minimize impacts. Sediment and erosion control practices will minimize the area affected by construction. Erosion control measures will also minimize surface water quality impacts and mitigate potential impacts on rare mussels and fish that reside in the Minnesota River.

7.0 AGENCY INVOLVEMENT, PUBLIC PARTICIPATION AND REQUIRED PERMITS AND APPROVALS

7.1 AGENCY CONTACTS

Xcel Energy sent letters to various regulatory and governmental authorities to request review of the Project area for applicable comments and concerns. A list of the agencies who received this letter is included in **Appendix D.1**. Xcel Energy also sent letters to LGUs within the Project area giving LGUs notice of the Project, requesting comments and allowing LGUs the opportunity to request a meeting to discuss the Project. A list of the LGUs who received this letter is included in **Appendix D.2**.

7.1.1 UNITED STATES FISH AND WILDLIFE SERVICE (“USFWS”)

Xcel Energy sent a letter to the USFWS on June 20, 2008, requesting a review of the Project area for federally listed threatened and endangered species. On June 23, 2008, Laurie Fairchild of the USFWS responded with questions regarding the Project. The USFWS requested clarification of Project details regarding the proposed new rebuild lines, a description of what is being rebuilt, appearance of the new line, number of lines, length of line, whether the new line will be buried and height of the structures. On August 13, 2008, Laurie Fairchild of the USFWS indicated that there did not appear to be any federally listed threatened and endangered species in the Project area. See **Appendix D.3** for communications with the USFWS.

7.1.2 UNITED STATES ARMY CORPS OF ENGINEERS (“USACE”)

Xcel Energy sent a letter to the United States Army Corps of Engineers (“USACE”) on June 20, 2008, requesting a review of the Project area for comments regarding the Project. On July 23, 2008, Eric Norton of the USACE responded that the USACE is concerned with the methods Xcel Energy proposes to use to cross wetlands and waterways, including the Minnesota River. See **Appendix D.4** for communications with the USACE. The USACE indicated that if Xcel Energy plans to cross wetlands, waterways or the Minnesota River by spanning or directional boring under them, then a permit would not likely be required. If Xcel Energy plans to place poles or discharge fill in wetlands or waterways, a permit will be required. Xcel Energy assessed possible impacts from the Project on water quality and the need for permits for the Project. See Section 6.5.2 for further discussion of the mitigative measures Xcel Energy will take regarding impacts to water quality.

7.1.3 MINNESOTA DEPARTMENT OF NATURAL RESOURCES ("MNDNR")

Xcel Energy sent letters to the MnDNR Natural Heritage and Nongame Research Program on July 10, 2008 requesting a review of the Project area for state threatened and endangered species and rare natural features. In the MnDNR's response dated August 11, 2008, Lisa Joyal identified certain rare species and features that might be affected by the proposed Project. Those species and features are addressed in Section 6.6 of this Application. See **Appendix D.5** for the comments from the MnDNR.

7.1.4 MINNESOTA STATE HISTORIC PRESERVATION OFFICER ("SHPO")

Xcel Energy sent a letter to the Minnesota State Historic Preservation Office ("SHPO") on August 7, 2008, to request comments regarding potential effects on known or suspected archaeological sites or historic standing structures in the Project area. As of the date of filing this Application, Xcel Energy has not received comments from SHPO regarding the Project. Xcel Energy will take SHPO's comments regarding the Project into account once they are received.

7.1.5 MINNESOTA DEPARTMENT OF TRANSPORTATION ("MNDOT")

Xcel Energy sent a letter to the Minnesota Department of Transportation ("MnDOT") on June 20, 2008 requesting comments on the proposed Project. On June 23, 2008 and August 11, 2008 Xcel Energy received comments from MnDOT related to the proposed Project (**Appendix D.6**). Steve Schoeb, a utility permits representative for MnDOT, indicated that a MnDOT permit will be required for work within MnDOT right-of-ways.

MnDOT right-of-ways within the Project area vary in width from 46 to 74 feet along the proposed route. Generally, if Xcel Energy is working in an area greater than 100 feet from the centerline of the roadways, no MnDOT permit will be required. Xcel Energy will work with MnDOT and determine which areas of the Project will require a MnDOT permit as the Project moves forward.

7.1.6 BROWN AND NICOLLET COUNTIES, TOWNSHIPS AND CITY OF NEW ULM

On June 20, 2008, Xcel Energy sent letters to representatives of Milford and Lafayette Townships, the City of New Ulm, Brown and Nicollet counties, and the Minnesota Board of Soil and Water Resources ("BWSR") requesting comments on the proposed

Project. The Counties, Townships, and City staffs were generally in favor of the need for the Project and requested to be updated on further Project developments and informed of any scope changes.

Nicollet County expressed concern over erosion and sediment control during construction of the Project along the hillside and bluff on the north side of the Minnesota River within the proposed route. As further discussed in Section 6.5.2, Xcel Energy will implement design the Project to avoid and minimize impacts and apply erosion control measures and storm water best management practices (“BMPs”).

Lafayette Township provided a written response on August 13, 2008, expressing concern over damage to township roads and requesting that Xcel Energy pay for repair if township roads are damaged from the proposed Project.

On August 15, 2008, a representative of Milford Township contacted Xcel Energy to request a meeting with Xcel Energy to further discuss the Project. Xcel Energy is planning to meet with Milford Township in early September 2008 and results of the meeting will be forwarded to OES staff

A representative from BWSR provided comments on June 23-24, 2008 concerning the Project. One CREP easement was identified along the proposed route. However, BWSR indicated that Xcel Energy has utility easement on this property that existed prior to the BWSR CREP easement, which allows Xcel Energy to conduct the Project. The BWSR representative recommended that Xcel Energy contact Nicollet Soil and Water Conservation District (“SWCD”) to work with them on erosion control measures and reseeding. BWSR also indicated that there were no other RIM easements affecting the Project area. As discussed in Section 6.5.2, Xcel Energy will design and implement the Project using erosion control and required BMPs.

A representative from Brown SWCD provided comments on June 24, 2008 concerning the Project, indicating that the proposed Project does not affect any RIM easement areas in Brown County. Brown SWCD recommended that Xcel Energy contact Desiree Hohenstein of Brown County regarding wetland matters regarding the Project.

Copies of the above responses are presented in **Appendix D.7**. Xcel Energy will continue conferring with local governments about the Project.

7.2 IDENTIFICATION OF LANDOWNERS

A list of the 77 landowners within and adjacent to the proposed rebuild route and the proposed substation is included in **Appendix E.1**. Addresses have been redacted from the landowner list and comment forms due to privacy concerns.

7.3 PUBLIC PARTICIPATION

Xcel Energy held a public informational meeting on July 15, 2008, prior to developing this Application. This meeting was held to inform landowners and public officials of the proposed Project and solicit input to be used in route and substation location selection. A notice for the public informational meeting was published in the New Ulm newspaper, “The Journal”, on Saturday July 12, 2008. A copy of the notice is included in **Appendix E.2**.

The July 25, 2008, public informational meeting was held from 4:30 p.m. to 7:00 p.m. at the Civic Center in New Ulm, Minnesota. Approximately 40 people attended the informational meeting, while 27 people signed the attendance form. A copy of the attendance form for the informational meeting is included in **Appendix E.3**.

Generally, public interest and comment focused primarily on the proposed transmission line rebuild route and alternatives to the proposed route. Several owners of land at and in the vicinity of the proposed location of the West New Ulm Substation expressed their belief that such location was not suitable for the planned substation. The landowners indicated that a number of drain tiles exist in the proposed West New Ulm Substation location, the area south of the existing Brown County REA Substation, which would need to be addressed if the site is used for the West New Ulm Substation. Alternative locations north and east of the Brown County REA Substation also contain drain tiles. Both areas are actively farmed with row crops.

One landowner expressed concerns over stray voltage and the safety of his dairy herd. A few landowners expressed concern over tree and vegetation management by Xcel Energy within transmission right-of-way areas.

Xcel Energy discussed with the public that location options for the new West New Ulm Substation were developed with the following primary objectives:

- Maximize use of existing transmission alignments;
- Minimize impacts to residences;

- Minimize use of new right-of-way;
- Minimize impacts to environmental and sensitive resources;
- Avoid a new Minnesota River crossing
- Minimize the length of the new transmission line to reduce the impact area and costs for the Project; and
- Locate substations near the intersection of existing transmission lines to minimize the need for new corridors.

Xcel Energy has worked with the public throughout the process. A summary of landowner comments received and the comment forms submitted throughout the route selection process is included in **Appendix E.4**.

7.4 REQUIRED PERMITS AND APPROVALS

Federal, state, and local permits that could potentially be required for the Project are identified below in **Figure 16**.

**FIGURE 16
POTENTIAL REQUIRED PERMITS**

Permit	Jurisdiction
Section 404 Jurisdictional Determination/Permit	U.S. Army Corps of Engineers
Section 10 Rivers and Harbors Permit	U.S. Army Corps of Engineers
License to Cross Public Waters	MnDNR Division of Lands and Minerals
Utility Permit	MnDOT
Construction Stormwater Permit	MPCA
Minnesota Wetland Conservation Act Certification	Brown and Nicollet Counties
County Road Access Permit	Brown County

7.4.1 FEDERAL PERMITS

7.4.1.1 U.S. ARMY CORPS OF ENGINEERS

USACE administers the regulatory programs of the federal Clean Water Act and the Rivers and Harbors Act. The USACE may require a Section 404 Letter of Permission (LOP-05-MN) or authorization of the project under the utility line discharge provision of a Regional General Permit (RGP-3-MN). The USACE could also require that the Project be authorized under Section 10 of the Rivers and Harbors Act, which requires a USACE permit to do work in, over or under Navigable Waters such as the Minnesota River.

7.4.2 STATE OF MINNESOTA PERMITS

7.4.2.1 MINNESOTA PUBLIC UTILITIES COMMISSION

Minnesota Statutes Section 216E.03, subd. 2. stipulates that no person may construct a high voltage transmission line without a route permit from the Commission.

7.4.2.2 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 Minnesota Statutes Section 84.415 and Minnesota Rules Chapter 6135. Xcel Energy works closely with the MnDNR on these permits and will file for them once 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.

7.4.2.3 MINNESOTA DEPARTMENT OF TRANSPORTATION

MnDOT requires the Application for Utility Permit on County Highways Right-of-Way form for the vast majority of utility placements and relocations. Utility owners use this form to request permission to place, construct, and reconstruct utilities within trunk highway right-of-way, whether longitudinal, oblique, or perpendicular to the centerline of the highway.

7.4.2.4 MINNESOTA POLLUTION CONTROL AGENCY

MPCA requires an NPDES construction storm water permit and Stormwater Pollution Prevention Plan (“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. Xcel Energy will determine if such permit is required, and, if so, obtain the permit from the MPCA.

7.4.3 LOCAL PERMITS

Once the Commission issues a route permit, zoning, building and land use regulations and rules are preempted per Minnesota Statutes Section 216E.10, subd. 1.

7.4.3.1 BROWN AND NICOLLET COUNTIES

Brown and Nicollet counties locally administer the Minnesota Wetland Conservation Act ("WCA"). It is likely that wetland impact minimization will allow the Project to be eligible for a WCA utilities exemption. If that is not the case, WCA certification of wetland replacement could be required. Brown County may also require a county road access permit before construction of the access to the West New Ulm Substation off of County Highway 12.

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9.0 DEFINITIONS

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.
Disconnects	A power switch that can be shut off and then locked in the “off” position.
Electric Field	The field of force that is produced as a result of a voltage charge on a conductor or antenna.
Electromagnetic	The term describing the relationship between electricity and magnetism; a quality that combines both magnetic and electric properties.
Electromagnetic Field	The combination of an electric field and a magnetic field.
Excavation	A cavity formed by cutting, digging, or scooping.
Fauna	The collective animals of any place or time that live in mutual association.
Flora	The collective plants of any place or time that live in mutual association.
Grading	To level off to a smooth horizontal or sloping surface.
Grounding	To connect electrically with a ground; to connect some point of an electrical circuit or some item of electrical equipment to earth or to the conducting medium used in lieu thereof.
Habitat	The place or environment where a plant or animal naturally or normally lives and grows.

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 115 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	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.
Oxide	A compound of oxygen with one other more positive element or radical.
Ozone	A very reactive form of oxygen that combines readily with other elements and compounds in the atmosphere.
Raptor	A member of the order Falconiformes, which contains the diurnal birds of prey, such as the hawks, harriers, eagles and falcons.
Sediment	Material deposited by water, wind, or glaciers.

Stray Voltage A natural phenomenon that can be found at low levels between two contact points in any animal confinement area where electricity is grounded. Electrical systems – including farm systems and utility distribution systems – must be grounded to the earth by code to ensure continuous safety and reliability. Inevitably, some current flows through the earth at each point where the electrical system is grounded and a small voltage develops. This voltage is called neutral-to-earth voltage (“NEV”). When a portion of this NEV is measured between two objects that may be simultaneously contacted by an animal, it is frequently called stray voltage. Stray voltage is not electrocution and is not DC, ground currents, EMFs or earth currents. It only refers to farm animals that are confined in areas of electrical use and not to humans.

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.

Voltage A unit of electrical pressure, electric potential or potential difference expressed in volts. The term used to signify electrical pressure. Voltage is a force that causes current to flow through an electrical conductor. The voltage of a circuit is the greatest effective difference of potential between any two conductors of the circuit.

Voltage Drop The difference in voltage between two points; it is the result of the loss of electrical pressure as a current flows through a resistance.

Waterfowl	A bird that frequents water; especially a swimming game bird (as a duck or goose) as distinguished from an upland game bird or shorebird.
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.

10.0 ACRONYM LIST

APP	Avian Protection Plans
BMPs	Best Management Practices
BWSR	Board of Soil and Water Resources
ECS	Ecological Classification System
EMF	Electric and Magnetic Fields
GAP	National Gap Analysis Program
HVTL	High voltage Transmission Line
kV	Kilovolt
LGU	Local Units of Government
MnDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MOU	Memorandum of Understanding
MPCA	Minnesota Pollution Control Agency
MPUC	Minnesota Public Utilities Commission
MSL	Mean Sea Level
NAC	Noise Area Classification
NESC	National Electric Safety Code
NIEHS	National Institute of Environmental Health Sciences
NITS	Network Integration Transmission Service
NO _x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSPM	Northern States Power Company
O ₃	Ozone
OSA	Office of the State Archaeologist
SFD	Swan Flight Diverters
SHPO	Minnesota State Historic Preservation Office
SWCD	Soil and Water Conservation District
SWPPP	Stormwater Pollution Prevention

TEMT	Transmission and Energy Markets Tariff
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WCA	Minnesota Wetland Conservation Act
WMA	Wildlife Management Area