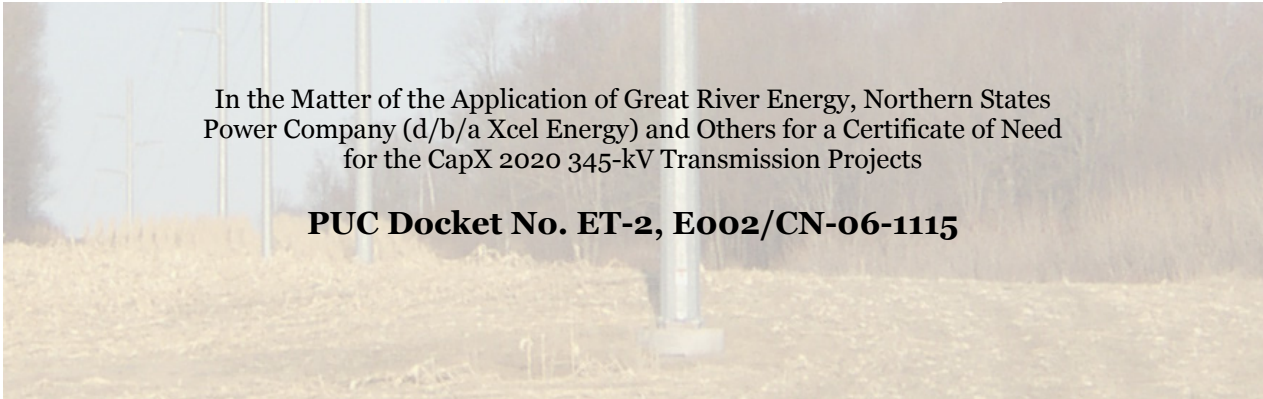


**Environmental Report:
CapX 2020 Group 1 Transmission Project**

March 31, 2008



In the Matter of the Application of Great River Energy, Northern States
Power Company (d/b/a Xcel Energy) and Others for a Certificate of Need
for the CapX 2020 345-kV Transmission Projects

PUC Docket No. ET-2, E002/CN-06-1115

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Abstract

On August 16, 2007, Xcel Energy and Great River Energy (the “Applicants” or “Proposers”) applied for a Certificate of Need (CON) from the Minnesota Public Utilities Commission (PUC) to build the proposed CapX 2020 Phase I (the “Project”) transmission line project. The Project comprises three separate 345,000 volt (345 kV) high voltage transmission lines (HVTL) with associated system connections and extends over 600 miles in length. The application was accepted as complete by the PUC on November 26, 2007.

The Project is a Large HVTL as defined by Minnesota Statute 216B.243 and requires a CON from the Minnesota Public Utilities Commission. The Project also will require designation of transmission line routes, which will be reviewed by the PUC in separate, future routing proceedings.

An Environmental Report (ER) is required for the CON. The Department of Commerce is responsible for the preparation of this report under Minnesota Rules 7849.7010-7110. On February 18, 2008, Commerce Commissioner Glenn Wilson issued the scoping decision determining alternatives and items to be addressed in the ER. The Scoping Order is available in Appendix A.

As set forth in the Administrative Law Judge’s (ALJ) First Prehearing Order, and in keeping with Minnesota Rule 7849.7050 subp. 9, The ER is being released on March 31, 2008. Since direct testimony is not due in the proceeding until April 30, 2008, some information on alternatives may not be available before the release date.

Public hearings will be held in the project areas from June 16-27, 2008, and an evidentiary hearing will be held in Saint Paul, Minnesota from July 7-August 1, 2008, by Administrative Law Judge Beverly Heydinger.

Persons interested in additional information regarding the environmental review in this matter can contact David Birkholz, Energy Facilities Permitting, 85 7th Place East, Suite 500, St. Paul, Minnesota 55101, (651) 296-2878 or david.birkholz@state.mn.us. Interested persons can also be added to the project mailing list by registering their names on the project docket webpage at <http://energyfacilities.puc.state.mn.us/Docket.html?Id=19120>. Documents in the record are available at eDockets at <https://www.edockets.state.mn.us/EFiling/search.jsp>; enter 06-1115 to search. For other information, please contact PUC staff person Bret Eknes, Public Utilities Commission, 121 7th Place East, Suite 350, St. Paul, MN 55101, (651) 201-2236 or bret.eknes@state.mn.us.

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Acronyms

AC	alternating current
ACSR	aluminum conductor steel reinforced
ACSS	aluminum conductor steel supported
BMP	Best Management Practice
BRIGO	Buffalo Ridge Incremental Generation Outlet
BWSR	Board of Water and Soil Resources
CFR	Code of Federal Regulations
CSAH	County State Aid Highway
dba	A-weighted sound level recorded in units of decibels
DOC	Department of Commerce
DG	Distributed Generation
DNR	Department of Natural Resources
DSM	Demand Side Management
ER	Environmental Report
EIS	Environmental Impact Statement
EFP	OES Energy Facilities Permitting
ERP	OES Energy Regulation & Planning
EMF	Electromagnetic Field
EPA	U.S. Environmental Protection Agency
EQB	Environmental Quality Board
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
G	Gauss (mG = milligauss)
GIS	Geographic Information Systems
GPS	Global Positioning System
GRE	Great River Energy
HAP	Hazardous Air Pollutant
HVTL	high voltage transmission line
Hz	Hertz
kV	kilovolt
kV/m	kilovolts per meter
kW	kilowatt
kWh	kilowatt hour
MBTA	Migratory Bird Treaty Act
MCBS	Minnesota County Biological Survey
MISO	Midwest Independent System Operator
MNDOT	Minnesota Department of Transportation
MSL	mean sea level
MW	megawatt
MWh	megawatt hour

MPCA	Minnesota Pollution Control Agency
NAC	Noise Area Classifications
NEPA	National Environmental Policy Act
NERC	National Electric Reliability Corporation
NESC	National Electrical Safety Code
NEV	neutral-to-earth voltage
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide River Inventory
NWI	Nation Wetlands Inventory
OES	Office of Energy Security (Department of Commerce)
ORV	Outstandingly Remarkable Value
PLS	Public Land Survey
PUC	Public Utilities Commission
PWI	Public Waters Inventory
RF	radio frequency
ROW	right-of-way
RUS	Rural Utilities Service
SHPO	State Historic Preservation Office
SNA	Scientific and Natural Area
SWPPP	Stormwater Pollution Prevention Plan
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WCA	Wetland Conservation Act
WPA	Waterfowl Production Area
WMA	Wildlife Management Area
Xcel Energy	Northern States Power dba Xcel Energy

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1.0 Introduction

On August 16, 2007, Xcel Energy Inc. and Great River Energy made a joint application to the Minnesota Public Utilities Commission for a Certificate of Need for three 345 kilovolt high-voltage transmission line projects pursuant to Minnesota Statute 216B.2425 (State Transmission Plan) and Minnesota Rule 7848 (Biennial Transmission Projects Reports). The three projects are considered Group 1 of the CapX 2020 Transmission Expansion Initiative (CapX 2020). A proposed 70-mile, 230 kV line between Bemidji and Grand Rapids, Minnesota is also included in Group 1, however this project is not part of this application; and permits for this project will be sought separately.

The Minnesota Department of Commerce (Department) performs environmental review on applications for certificate of need on large energy projects. The Minnesota Public Utilities Commission (Commission) is the final decision making body in these matters. This Environmental Report (ER) document covers the environmental review requirements for the large energy project certificate of need determination.

This ER addresses the issues identified in the scope in five different sections: Section I presents introductory discussions of the applicant and the project as proposed; Section II addresses general impacts and mitigations for environmental issues based on the size, type and timing of the proposed project; Section III addresses impacts and mitigations specific to the corridors within each of the three separate project areas; Section IV reviews system alternatives that may have the capability to alleviate the need for all or some of the proposed system; and finally, Section V reviews the regulatory framework under which the Certificate of Need application is proceeding.

1.1 Project Purpose

The CapX 2020 Initiative was started in 2004 as a joint planning effort between Xcel Energy, GRE, Minnesota Power, Missouri River Energy Services, and Otter Tail Power Company to address existing and emerging needs for the overall electric transmission system servicing Minnesota and surrounding states. The overall goal of the initiative is to develop and propose coordinated and long-term solutions to transmission system demands.

The CapX 2020 project is intended to alleviate community service reliability concerns and add load serving capacity in Alexandria, Saint Cloud, Rochester and other parts of southeastern Minnesota and the La Crosse, Wisconsin area; strengthen the existing transmission network to accommodate an anticipated system wide growth of 4,000 to 6,000 megawatts (MW) in parts of

Minnesota and surrounding states by the year 2020; and add generation outlet for the future development of renewable energy generation, as required by the 2007 legislation requiring electricity providers to supply 25 percent of retail energy in Minnesota from renewable energy resources by 2025.

1.2 Project Description

The following three 345 kV HVTL projects constitute the first group of projects that were determined to be necessary to maintain system reliability as the demand for power grows over the next two decades. The areas under review in this document are portrayed on Map 1. (See Appendix A.)

1.2.1 Twin Cities to La Crosse, Wisconsin 345 kV HVTL Project

The Minnesota portion of the Twin Cities to La Crosse, Wisconsin 345 kV Project would consist of a 345 kV transmission line circuit connected between the Twin Cities, Rochester, and La Crosse, Wisconsin. The specific location of the 345 kV line is dependent upon the final route that may include rights-of-way (ROW) through the following counties: Dakota, Dodge, Goodhue, Houston, Olmsted, Rice, Wabasha, and Winona. The Minnesota portion of this line is estimated to be 85 to 140 miles long again would depend upon final route selection.

In addition, the proposal includes the construction of two new substations in the southeastern part of the Twin Cities identified in the application as Hampton Corner and North Rochester. The Hampton Corner Substation would allow connection of the proposed 345 kV transmission line to the existing Prairie Island – Blue Lake 345 kV transmission line in the vicinity of Hampton, Minnesota. The North Rochester would receive the proposed 345 kV line from the Hampton Corner Substation and would allow for connection to the existing Prairie Island – Byron 345 kV line. This portion of the Twin Cities to La Crosse segment is estimated to be 40 to 50 miles long and would pass through the following Minnesota counties: Dakota, Dodge, Goodhue, Olmsted, and Rice, depending on the final chosen route.

The proposal for this section of the project also includes two new 161 kV transmission lines that would connect the new North Rochester Substation and 345 kV transmission line to the existing Chester and Northern Hills Substations. The North Rochester Substation to Northern Hills and Chester Substation 161 kV lines would be routed through Olmsted County and a section of the city of Rochester and are estimated to be 10 to 15 miles and 20 to 30 miles in length respectively, and would ultimately depend upon final route selection.

The last segment of the proposed 345 kV transmission line would connect the new North Rochester Substation to a substation in La Crosse, Wisconsin. The proposal suggests the 345 kV

would be double-circuited with the North Rochester Substation to Chester Substation 161 kV for the first few miles from the North Rochester Substation in an attempt to minimize the amount of new transmission right-of-way required. The length of this segment would be approximately 45 to 90 miles in length and must span the Mississippi River at some point along the route. Four proposed river crossing points have been identified at this time. Section III of this report describes the Mississippi River crossing in greater detail.

1.2.2 Monticello to Fargo, North Dakota 345 kV HVTL Project

The second portion of the CapX 2020 Group 1 projects consists of a series of new 345 kV transmission line segments routed from Monticello to St. Cloud, on to Alexandria and ending in Fargo, North Dakota. The route selection study area for this segment of the project includes portions of the following counties: Clay, Douglas, Grant, Otter Tail, Pope, Stearns, Stevens, Todd, Traverse, Wilkin, and Wright. The overall length of the transmission line is estimated to be 210 to 270 miles depending on the final route selection.

The first segment of this project would consist of a new 345 kV transmission line exiting the existing Monticello Substation located at the Monticello Power Plant site connecting to a newly constructed Quarry Substation located on the west side of the city of St. Cloud. This new circuit would connect the new 345 kV line to the 115 kV transmission system that currently serves the greater St. Cloud area. The proposed section would be approximately 30 to 40 miles long and pass through Stearns and Wright Counties depending on final route selection.

The second segment of the project is a proposed 345 kV transmission line starting at a newly constructed unnamed substation to be located on the west side of St. Cloud and connecting to an existing substation near Alexandria, thereby connecting the new 345 kV line with the existing 115 kV transmission system serving west central Minnesota and the city of Alexandria. This portion of the route is expected to be 60 to 80 miles long and may pass through the following counties depending on final route selection: Douglas, Pope, Stearns, and Todd.

The last segment of this proposed project is a 345 kV transmission line starting at the Alexandria substation and terminating at the Maple River Substation located in Fargo, North Dakota. The Alexandria to Fargo circuit would be approximately 120 to 150 miles long and may run through the following counties depending on final route selection: Clay, Douglas, Grant, Otter Tail, Pope, Stevens, Traverse, and Wilkin.

1.2.3 Brookings, North Dakota to Twin Cities 345 kV HVTL Project

The third portion of the CapX 2020, Group 1 projects is a proposed series of 345 kV transmission lines connecting Brookings County Substation in Brookings County, South Dakota

to a newly constructed Hampton Corner Substation located in the southeast corner of the Twin Cities. The overall length of the proposed project is estimated at 165 to 200 miles. This part of the project also includes a proposed 25 mile segment of 345 kV transmission line from Lyon County to Granite Falls and an approximate 8 to 10 mile segment of 230 kV line in the Granite Falls area.

The first segment of this proposed project is for a 345 kV transmission line starting at the existing Brookings County Substation near White, South Dakota and ending at the existing Lyon County Substation near Marshall, Minnesota. The estimated length of this segment is 50 to 55 miles and would pass through Lincoln and Lyon Counties depending on final route selection.

The proposal also calls for construction of the Hazel Creek Substation to be located southwest of Granite Falls, Minnesota. A proposed 345 kV line would replace an existing 115 kV transmission line and connect the existing Lyon County Substation to the new Hazel Creek Substation allowing connection to the existing transmission line system near Granite Falls. The proposed transmission line would be approximately 30 miles in length. Also proposed is a new 230 kV transmission line between the proposed Hazel Creek Substation and the existing Minnesota Valley Substation to replace a portion of the existing Lyon County Substation to Minnesota Substation 115 kV circuit. This new line would be approximately 8 to 10 miles in length. This entire portion of the Lyon County to Granite Falls (Hazel Creek Substation) segment would pass through the following counties depending on final route selection: Chippewa, Lyon, and Yellow Medicine.

The next portion of the proposed project consists of a new 345 kV double-circuit transmission line between the Lyon County Substation and the Franklin, Minnesota area. Depending on siting and final route selection, the line would terminate at a newly constructed substation or the existing Franklin Substation and would be approximately 45 miles long and pass through Lyon and Redwood Counties.

A double-circuit 345 kV transmission line is proposed between the Franklin Substation and a newly constructed substation identified as the Helena Substation to be located in the general vicinity of the city of New Prague. The proposed Helena Substation would connect the new double-circuit 345 kV line to the existing Blue Lake to Wilmarth 345 kV line. Depending on siting and final route selection this segment of the project would be approximately 45 miles long and pass through Redwood, Renville, Scott, and Sibley Counties.

The final portion of the proposed project consists of two 345 kV single circuit segments located in the southern part of the Twin Cities. One of the 345 kV transmission lines would run from the proposed Helena Substation to the existing Lake Marion Substation in Lakeville, Minnesota. The second of the two proposed 345 kV lines would exit the Lake Marion Substation and would continue to the proposed Hampton Corner Substation (previously described in the Twin Cities to La Crosse proposal). Depending on final route selection the Helena Substation to Lake Marion

Substation line would be approximately 20 to 30 miles long and the Lake Marion Substation to Hampton Corner Substation line would be approximately 25 miles long. The two circuits would pass through Dakota and Scott Counties.

1.3 Project Design

High voltage transmission line circuits generally consist of three phases, each at the end of a separate insulator string, and physically supported by structures. A phase consists of one or more conductors. When more than one conductor is used to make a phase, the term “bundled conductor” is used.

A conductor is a cable typically less than one inch in diameter consisting of multiple strands of steel and aluminum wire wound together. There are also two shield wires strung above the phases to prevent damage from potential lightning strikes. The shield wire may also include a fiber optic cable that allows for substation protection equipment to communicate with other terminals on the line. A double-circuit transmission line thereby carries two circuits or six phases and typically two shield wires.

There are a number of different types of structures used to support transmission lines including single steel pole structures and H-frame structures. The transmission lines are constructed on a right-of-way. The width of a right-of-way depends on the structure design, the height of the structure, the span length between structures and the amount of voltage associated with the transmission line.

The selection of preliminary corridors is based on opportunities to:

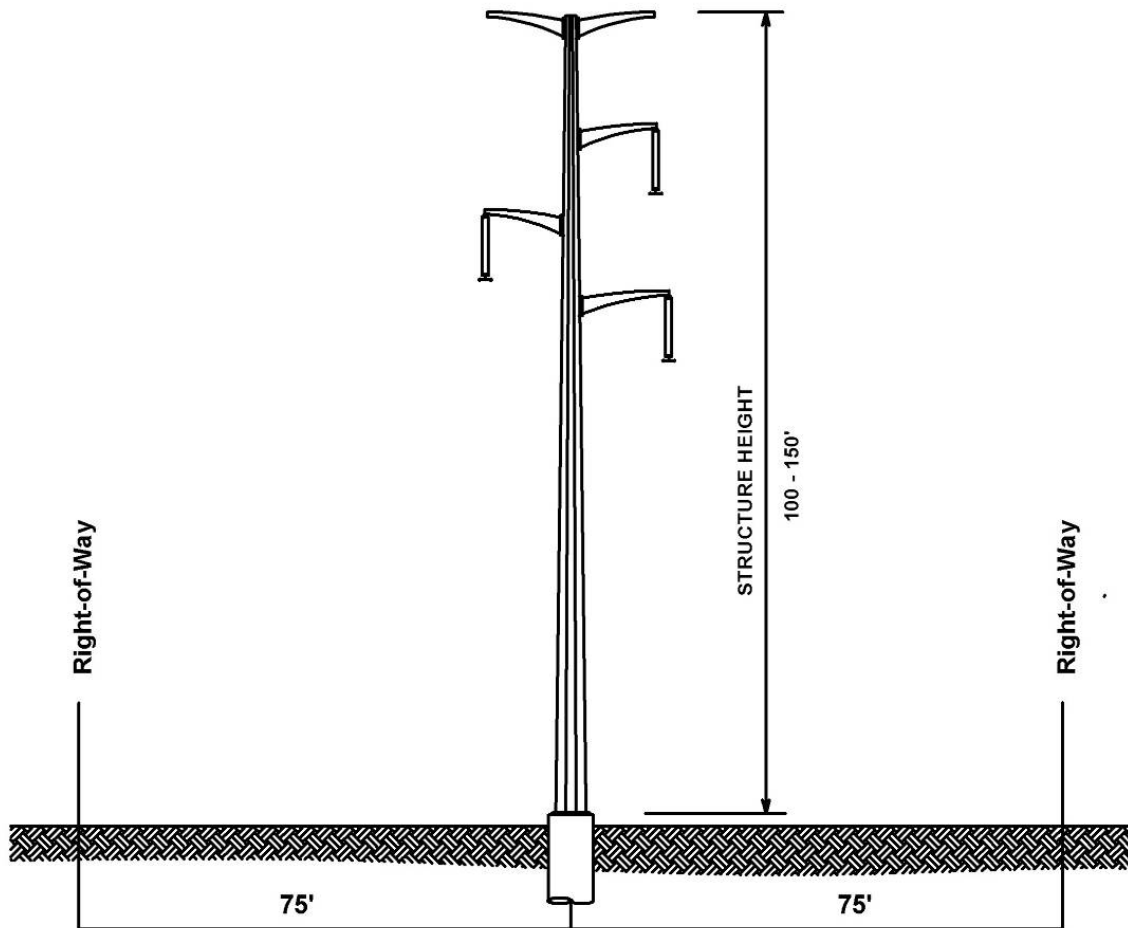
- share right-of-way with existing transmission lines by double-circuiting where practical or paralleling an existing line;
- minimize impacts to system reliability;
- parallel roads to help decrease the amount of right-of-way required;
- parallel field lines, property lines or railroads, where access is adequate and the transmission line would cause minimal conflicts; and
- minimize the length of the transmission line to reduce the impact area and costs for the project.

If the PUC should certify the HVTL project, the Applicants would seek approval for a specific route within the project corridor through the HVTL Routing Permit process. Through this process specific routes will be identified that avoid, to the extent possible, areas where a high voltage transmission line could create significant impacts. These areas include:

- high density residential areas;
- areas where clearances are limited because of trees or nearby structures;
- environmentally sensitive sites, such as wetlands, archaeologically significant sites, areas with threatened, endangered and species of special concern, areas of significant biological or cultural significance, and state and federal lands.

1.3.1 345 Kilovolt Transmission Lines

Figure 1-1 Steel 345 kV Single-circuit Pole



345 kV Line Typical Span -- 800' - 1100'
150' Typical Total Right-of-Way Width (Cross-Country)

Conductors

The phases would consist of bundled conductors comprised of two aluminum conductor steel supported (ACSS) cables or similar, made of seven steel wires in the center, surrounded by 54 aluminum strands. The separate conductors are 954,000 circular mils or approximately 1.2 inches in diameter. The application indicates that all 345 kV conductors would be bundled conductor, single or doubled-circuit configurations for the entirety of the proposed project.

Structures

The proposal is to use primarily steel single pole structures for the 345 kV transmission lines. The single circuit steel poles structures vary in height from 105 to 150 feet depending on the span length between structures, and vary in base width from 30-42 inches (see Table 2-3). Double-circuit structures (345 kV/345 kV or 345 kV/161 kV) vary in height from 130 to 175 feet in height with spans that can vary from 800 to 1,100 feet.

Right-of-Way

The standard right-of-way width requirement for a 345 kV single or double-circuit transmission line and a 345 kV/116 kV double-circuit transmission line is typically 150 feet wide. A narrower right-of-way may be acceptable should the new transmission line follow a pre-existing pipeline corridor, road, or transmission line.

1.3.2 230 Kilovolt Transmission Lines***Conductors***

Phases would consist of single conductors comprised of 795 ACSS cables or similar. The conductors are 795,000 circular mils or approximately 1.1 inches in diameter.

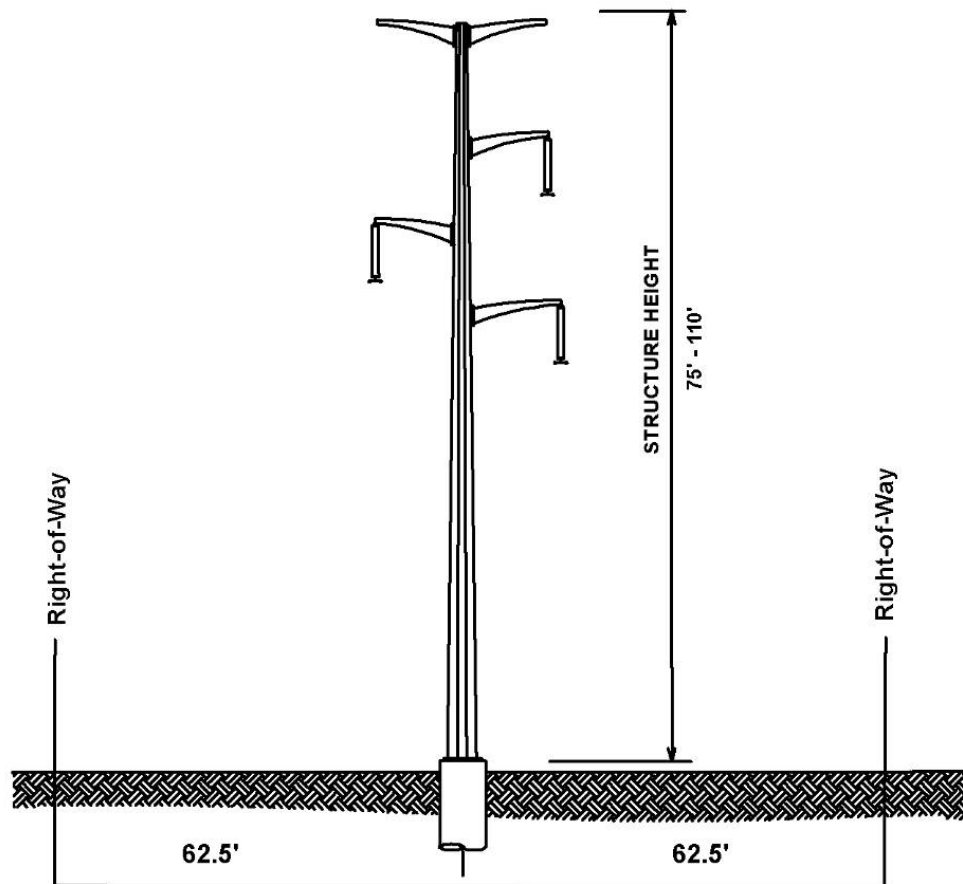
Structures

There is only one proposed segment in the project that will be a 230 kV circuit. This circuit is designated as the line running between the Hazel Creek Substation and the Minnesota Valley Substation. The proposal calls for this segment to be constructed with single-circuit steel pole structures. The single steel pole structures would vary in height from 75 to 110 feet with 600 to 900 foot spans between the structures, and vary in base width from 30-42 inches (see Table 2-3).

Right-of-Way

The right-of-way proposed for the 230 kV transmission line would be approximately 125 feet wide.

Figure 1-2 Steel 230 kV Single-circuit Pole



230 kV Line Typical Span -- 600' - 900'
125' Typical Total Right-of-Way Width (Cross-Country)

1.3.3 161 Kilovolt Transmission Lines

Conductors

The two 161 kV single circuit phases proposed to serve the Rochester area would be 795 ACSS cable or similar. The conductors are 795,000 circular mils or approximately 1.1 inches in diameter.

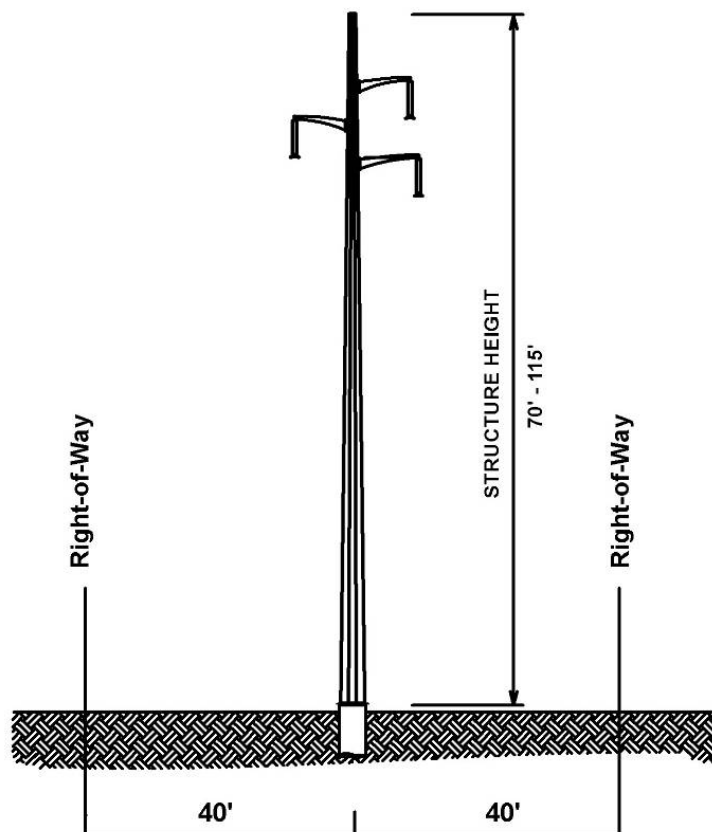
Structures

Single steel pole structures would be used for the 161 kV line originating from the Rochester Substation. The structures would be approximately 70 to 105 feet in height with spans from 600 to 900 feet, and vary in base width from 24-42 inches (see Table 2-3).

Right-of-Way

The right-of-way proposed for the 161 kV transmission line would be approximately 80 feet wide.

Figure 1-3 Steel 161 kV Single-circuit Pole



161 kV Line Typical Span -- 600' - 900'
80' Typical Total Right-of-Way Width (Cross-Country)

1.4 Project Construction and Maintenance

The engineering, construction and maintenance of a transmission line usually begins with the Applicant working with landowners to secure easements for the right-of-way and the actual construction of the line. Typical measures to mitigate the impacts of transmission line construction are also identified at this time.

The Applicant would need to contact the selected landowners and work with them closely during all phases of the construction phase of the project. The Applicant would contact the landowner to obtain permission for geological surveys and testing, securing property rights necessary to build and operate/maintain the transmission line. In addition, arrangements are made to coordinate the placement of gates or other access needs. Finally agreements are made during and after construction to address and compensate for any potential damage that may have occurred.

The construction process consists of multiple distinct steps performed in an orderly sequence to ensure efficient, safe, and timely completion. Surveying is performed to determine structure foundations and trees/vegetation that may need to be cleared. Structure foundations are drilled with large drill rigs. Depending on the engineering and geology structures that may be encountered, a concrete foundation may be buried directly in the soil. Large cranes are used to erect the transmission line structures. Transmission line stringing equipment is typically set up at each end of the segment in two mile increments. Upon completion of the construction process the designated right-of-way is restored.

Transmission lines are typically inspected from the air on a monthly basis and on the ground annually. Depending on the type of trees and vegetation present, the vegetation management schedule is usually conducted in five to ten year cycles.

1.5 Project Schedule and Cost

The final route chosen will ultimately dictate the cost and timing of the proposed project. A summary of the Applicants estimated lengths, costs, and in-service dates for all three segments are depicted in Table 1-1 below.

The Applicant estimates that approximately \$70 to \$100 million will be required for associated upgrades to various lower voltage parts of the existing system.

Table 1-1 Approximate Segment Costs and Schedules

Segment	Total Length	Cost (2007 dollars)	In-Service Dates
Twin Cities to La Crosse	150 miles	\$330 to \$360 million	North Rochester to Northern Hills – 2011 North Rochester to La Crosse – 2014 Remainder – 2015
Monticello to Fargo	250 miles	\$390 to \$560 million	Monticello to St. Cloud – 2011 St. Cloud to Alexandria – 2013 Remainder – 2015
Brookings to Twin Cities	200 miles	\$600 to \$665 million	Brookings to Helena – 2013 Helena to Hampton Corner – 2014

2.0 Project Impacts and Mitigations

This section addresses general impacts and mitigations for the following issues, based on the size, type and timing of the project. This includes all analysis that relates to any of the proposed lines based on the stated size and description of those lines. The proposed CapX 2020 projects cover a large area of the state, crossing through a number of ecological regions. A discussion of the environmental setting of each of the proposal areas is included in Section 3.

Minnesota Rule 7849.7060 defines the areas which must be included in the environmental report; these include an analysis of the human and environmental impacts of the proposed project and an analysis of the mitigative measures that could reasonably be implemented to reduce or eliminate the identified impacts. This section will examine those potential impacts and mitigations for issues affecting:

- Human Settlement: analyzing the impacts that might affect the people living alongside a transmission installation;
- Land-based Economies: examining possible effects of a high voltage transmission line on agriculture, businesses and economic development in the areas of interest; and
- Natural Environments: reviewing issues that might affect air quality, water, wildlife and areas of special environment concern.

2.1 Potential Impacts on Human Settlement

This section looks at how an HVTL project would interact with the existing population in the proposed project areas. In this case, population density along most of the project corridors is low, but portions of all three corridors do pass through more densely settled areas.

Major population centers located within individual project corridors include:

- Twin Cities–La Crosse: Cannon Falls, Zumbrota, Red Wing, Rochester, Winona, La Crescent–La Crosse
- Twin Cities–Fargo: Fargo–Moorhead, Fergus Falls, Alexandria, St. Cloud
- Twin Cities–Brookings County: Lakeville, New Prague, Redwood Falls, Granite Falls, Marshall

2.1.1 Socioeconomics

The direct socioeconomic impacts of transmission lines generally fall into construction phase and long term operational impacts.

Construction

During the construction phase, impacts to social and economic resources are expected to be short-term in nature. Construction phase spending in the host communities may increase revenue for some local businesses. Hotels, restaurants, gas stations and grocery stores will likely cater to crews working on the transmission lines. Other local businesses, such as excavation contractors, ready-mix concrete and gravel suppliers, hardware stores, welding and machine shops, packaging and postal services and heavy equipment repair and maintenance service providers may benefit by supplying materials and services during the construction phase. Impacts to social services would likely be minimal due to the short-term nature of construction activities. Construction crews are estimated to be approximately 200-250 personnel in total for the proposed Projects. Workers would be spread across a number of worksites for each Project.

The Applicants do not anticipate that any new permanent jobs will be created as a result of the proposed Projects. Long-term beneficial impacts from the proposed transmission lines, new substations and upgrades to existing substations include increased local tax base resulting from the incremental increase in revenues from utility property taxes.

Property Values

One of the first concerns of many residents near existing or proposed transmission lines is how that proximity to the line could affect the value of their property. Research on this issue does not identify a clear cause and effect relationship the two. Instead, the presence of a transmission line becomes one of several factors that interact to affect the value of a particular property.

The Wisconsin Public Service Commission (WPSC) addressed the issue of changes in property value associated with high voltage transmission lines in their Final Environmental Impact Statement on the Arrowhead – Weston Electric Transmission Line Project. Their analysis of the relationship between property values and transmission lines looked at approximately 30 papers, articles and court cases covering the period from 1987 through 1999.

The WPSC analysis identified two types of property value impacts that property owners may experience: potential economic impact associated with the amount paid by a utility for a ROW easement, and potential economic impact regarding the future marketability of the property.

The Final EIS provides six general observations from the studies it evaluated. These are:

- The potential reduction in sale price for single family homes may range from 0 to 14 percent.
- Adverse effects on the sale price of smaller properties could be greater than effects on the sale price of larger properties.
- Other amenities, such as proximity to schools or jobs, lot size, square footage of a house and neighborhood characteristics, tend to have a much greater effect on sale price than the presence of a power line.
- The adverse effects appear to diminish over time.
- Effects on sale price are most often observed for property crossed by or immediately adjacent to a power line, but effects have also been observed for properties farther away from the line.
- The value of agricultural property is likely to decrease if the power line poles are placed in an area that inhibits farm operations.

Electric Reliability

The proposed Project is intended to allow utilities to meet the growing demand for electric power in several regions in Minnesota. Portions of the proposed project are also intended to improve local reliability in the communities of Rochester, La Crosse, St. Cloud, Fargo and Alexandria. Potential impacts to electric reliability on a regional and local basis are anticipated to be positive.

Mitigations

Socioeconomic impacts resulting from construction of the Project would be primarily positive with an influx of wages and expenditures made at local businesses during the Project construction.

In the matter of property values, potential impacts would typically be negotiated in an easement agreement between the Applicants and the landowner.

2.1.2 Displacement

In the event that a structure is located within the right-of-way required for a new transmission facility, that structure would be displaced; meaning the property would need to be purchased by the utility and removed from the area.

The National Electric Safety Code (NESC) requires certain clearances between transmission line facilities and buildings for safe operation of the transmission line. The applicants would acquire

rights-of-way for each project sufficient to maintain clearances required to safely operate the transmission lines.

Identification of specific locations where displacement may occur and analysis of specific impacts resulting from the displacement will occur within the route permitting process.

Mitigations

Displacement resulting from a transmission project in Minnesota is quite rare. Instances requiring displacement have been minimized by routing transmission to avoid structures, especially homes and businesses. In the event that a particular route would require the removal of a structure, payment for the value of the lost property would be negotiated between the property holder and the utility.

2.1.3 Noise

Transmission conductors and transformers at substations produce audible noise under certain conditions. The level of noise or its loudness depends on conductor conditions, voltage level, and weather conditions. In foggy, damp, or rainy weather conditions, power lines can create a subtle crackling sound due to the small amount of the electricity ionizing the moist air near the wires. During heavy rain the general background noise level is usually greater than the noise from a transmission line. During light rain, dense fog, snow, and other times when there is moisture in the air, the proposed transmission lines will produce audible noise higher than rural background levels but similar to household background levels. During dry weather, audible noise from transmission lines is a nearly imperceptible, sporadic crackling sound. Transformers are the primary producers of noise at substations.

The Minnesota Pollution Control Agency (MPCA) noise regulations, Minnesota Rule 7030.0050, list various activity categories by Noise Area Classification (NAC).¹ Table 2-1 below identifies the established noise standards for daytime and nighttime by NAC. The standards are expressed as a range of dBA (decibel – A weighted) within a one hour period; L_{50} is the dBA that is exceeded 50 percent of the time within an hour, while L_{10} is the dBA that is exceeded ten percent of the time within the hour.

¹ <http://www.pca.state.mn.us/programs/pubs/noise.pdf>

Table 2-1 MPCA Noise Standards (dBA – Decibel, A-weighted)

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

An estimate of expected noise measurement at the edge of ROW for different structure types provided by the Applicants is shown in Table 2-2:

Table 2-2 Transmission Lines - Expected Noise Calculations

Voltage	Structure Type	Noise at Edge of ROW (dBA)	
		L5	L50
345 kV	Single Pole Davit Arm	53.7	44.1
	H-Frame	52.9	44.1
345 kV / 345 kV Double-circuit	Single Pole Davit Arm	57.7	49.9
345 kV/ 161 kV Double-circuit	Single Pole Davit Arm	54.7	46.6
230 kV	Single Pole Davit Arm	50.6	41
	H-Frame	49.5	39.5
161 kV	Single Pole Davit Arm	37.0	21.5

Additional analysis of noise impacts and mitigation measures will be addressed in routing proceedings.

Mitigations

HVTL permits issued by the PUC typically include a condition that requires the Project to meet Minnesota noise standards. Specific mitigation measures can be addressed during the routing process, once impacts are better known.

Noise impacts associated with construction can be mitigated by limiting the hours of work to daytime hours. Heavy equipment used in construction can be equipped with sound attenuation devices such as mufflers to minimize the daytime noise levels.

The primary noise mitigation strategy for reducing noise from HVTLs is by routing the lines away from sensitive noise receptors to the extent possible.

Noise impacts from substations can be mitigated through substation design. In some cases, additional land beyond that required for the footprint of the substation may be acquired to ensure sufficient setbacks from sensitive noise receptors. Other design measures include layout and landscaping to increase noise attenuation to nearby receptors. Low noise transformers can be used to reduce noise generation from substation equipment.

2.1.4 Aesthetics

The most typical landscape for all three proposed projects is level, or moderately rolling agricultural lands, broken by field tree lines, roads and water features (i.e. wetland, lakes and rivers). There are also large blocks of forested areas and areas of residential settlement. Transmission lines ranging in size from 69 kV to 345 kV in size are present, and in some cases under construction, in each of the proposed project corridors. In addition, several hundred utility scale wind turbines are present within in and near the Brookings–Twin Cities project corridor.

The CapX Project transmission lines and structures will contrast with existing land uses in each of the project areas, causing an incremental visual impact. Each of the proposed projects would require a river crossing. In some cases state scenic rivers would need to be crossed that would be visually impacted by the projects.

Several types of transmission structures are under consideration for the proposed projects due to the various voltages under consideration and the variety of topographies expected to be encountered. (They are described in Table 2-3 below.)

The proposed lines and ROW will likely be visible to many residents located near the transmission lines as well as those traveling on highways, county and township roads. Additionally, the Project will be visible to those living near or traveling across the river crossings at the Red River, Cannon River, Mississippi River, and Minnesota River. Areas of high visual sensitivity are identified and discussed in Section 3 and include:

- Twin Cities–La Crosse: Crossings at the Cannon and Mississippi rivers, the White Water River area, bluffs along the Mississippi, and the Great River Road Scenic Byway (Highway 61) and the Wisconsin Great River Road (Highway 65).

- Twin Cities–Fargo: Otter Trail, King of Trails, and Glacial ridge scenic byways and the Mississippi River.
- Twin Cities–Brookings: Blue Devil SNA, Camden State Park, Gneiss Outcrops SNA, Upper Sioux Agency State Park, the Minnesota River Valley Scenic Byway, and the Minnesota River Crossing

Table 2-3 CapX Projects Proposed Structure Types

Line Type	Structure Type	Structure Material	ROW Width (feet)	Structure Height (feet)	Structure Base (inches)	Distance Between H-Frame Poles (feet)	Span Between Structures (feet)
345 kV Single-Circuit	Single Pole Davit Arm	Steel	150	105-150	30 – 42 (tangent) 42 – 72 (angle)	N/A	750 – 1,100
	H-Frame	Wood	150	100 - 125	24 – 42	27	750 – 1,100
345 /345 kV Double-Circuit	Single Pole Davit Arm	Steel	150	130 -175	36 – 48 (tangent) 48 – 72 (angle)	N/A	750 – 1,100
345 /161 kV Double-Circuit	Single Pole Davit Arm	Steel	150	130 - 175	30 – 48 (tangent) 48 – 72 (angle)	N/A	750 – 1,100
230 kV Single-Circuit	Single Pole Davit Arm	Steel	125	75 - 110	30 – 42 (tangent) 42 – 72 (angle)	N/A	600 – 900
	H-Frame	Wood	125	75 - 110	24 – 42	21- 24	600 – 1,000
161 kV Single-Circuit	Single Pole Davit Arm	Steel	80	70 – 105	24 – 42 (tangent) 36 – 72 (angle)	N/A	600 – 900

(Note: *Tangent* structures are those structures that are used when there is no change in the direction of the line and make up the majority of structures used in transmission projects. In situations where the line changes direction, more substantial *angle* structures or guyed poles are used to provide the necessary support. For this project the Applicants propose to use un-guyed *angle* structures where the line would change direction.)

In addition to the visual impacts resulting directly from the installation of transmission lines, a possible secondary impact of the proposed Projects would be the inducement of wind farms as a result of the increased transmission capability. Locations of possible future wind development are unknown at this time.

The public will have an additional opportunity to identify concerns related to the transmission line aesthetics and minimizing impacts during the route permitting process and ROW easement negotiations with individual landowners.

Mitigations

Minnesota Rule 7849.5930 generally prohibits transmission line routing within several types of protected lands including, national parks, state parks, wilderness areas, and Scientific and Natural Areas. These land uses are generally associated with scenic areas worthy of protection. These issues would be revisited in any transmission line routing proceeding.

In general and where practicable, new HVTLs are routed parallel to existing transmission, road or distribution ROWs which helps to minimize new visual disruptions to the landscape. Practices such as placing two transmission lines on a common structure (“double-circuit”) or placing distribution lines on a common transmission structure (“underbuild”) can limit or reduce the amount of total ROW needed and visual impact of the proposed transmission lines. Locating river crossings near existing transmission lines, highways or other infrastructure can minimize visual intrusion from the proposed Project.

The type of structures selected can help reduce the aesthetic impact from the proposed project, either by reducing the number of transmission structures required or by using structure types that reduce the contrast between the project setting and the transmission line.

Aesthetic impacts can be mitigated through minimizing tree clearing. In many cases low-growing shrubs or other vegetation can be planted in the ROW to blend the difference between the ROW and adjacent wooded areas. In some instances, planting or maintaining a vegetated screen between the substation or transmission line and sensitive features such as homes or scenic areas may also minimize the visual intrusion from the proposed Projects.

2.1.5 Radio and Television Interference

“Radio Noise” is a term used to refer to any unwanted interference of an electromagnetic nature with any signal or communication channels throughout the radio frequency band of operation, 3 kilohertz (kHz) to 30,000 kHz.

Corona-generated radio noise could cause interference with virtually any type of radio reception. (Corona consists of the ionization of air within a few centimeters immediately surrounding conductors.) However, in practice it has been found that the bands principally affected are the amplitude-modulated (AM) broadcast band, 535 to 1,605 kHz and in particular those stations broadcasting below approximately 1,000 kHz. Frequency-modulated (FM) stations are seldom impacted by electric transmission facilities. Cellular phones are unlikely to be affected due to the high frequencies used.

The radio noise generated from transmission lines is a function of conductor size and geometry, conductor height above ground, phase spacing, and ground resistance. Because radio noise is due to corona discharges, it also depends on the line's operating voltage and weather conditions.

The Federal Communications Commission (FCC) considers transmission lines inadvertent emitters and therefore they are not covered directly by FCC regulations. However, in the past, the FCC and the State of Minnesota have suggested that transmission line radio noise should not result in interference within a licensed broadcast station's primary coverage area for non-mobile receivers outside the line's right of way. The proposed HVTLS are not expected to impact reception of commercial AM radio stations with non-mobile receivers.

Corona generated noise could cause interference with TV picture reception similarly as in the case with AM radio interference since the picture is broadcast as an AM signal. The level of interference depends on the TV signal strength for a particular channel. TV audio is an FM signal that it is typically not affected by transmission line radio frequency noise.

Due to the higher frequencies of the TV broadcast signal (54 megahertz and above), transmission lines seldom result in reception problems within a station's primary coverage area. In the rare situation that the proposed transmission line would cause TV interference, Xcel Energy would work with the affected party to correct the problem.

Mitigations

Usually any reception problem can be corrected with the addition or modification of an outdoor antenna. TV picture reception interference can also be the result of a transmission structure blocking the signal to homes in close proximity to a structure. Measurements can be made to verify whether a structure is the cause of reception problems. Reception problems can usually be corrected with the addition of an outside antenna, an amplifier or both. Route permits typically include a condition requiring the permittee(s) to correct any interference to communications facilities it causes or creates.

2.1.6 Archaeological and Historic Resources

In Minnesota, archaeological resources tend to be located near rivers, lakes and prominent landforms. Preliminary record searches have identified the locations of known archaeological and historic resources. Historic structures are located throughout the three project corridors. Many of the structures are scattered farmsteads with concentrations of identified structures clustered in towns and urban centers.

Impacts to archaeological resources are generally associated with direct physical impacts from project construction. While project construction may directly impact historic structures, the construction of a project may also produce indirect impacts such as visual impacts that may affect the structure's eligibility for listing on the National Register for Historic Places (NRHP) or the isolation of the structure from their historic context

Potential impacts to specific archaeological and historic resources and identification of specific mitigation measures would be addressed in the route permitting process.

Mitigations

As the major impacts to archaeological resources are associated with direct physical impacts from construction of the project, the primary mitigation strategy is to identify archaeological resources and then avoid them during the construction of the project.

If human remains are encountered during construction, a permittee is required by the Minnesota Private Cemeteries Act (Minnesota Statute 307.08) to immediately halt construction at that location and promptly notify local law enforcement authorities and the State Archaeologist. Construction at the human remains location may not proceed until authorized by local law enforcement authorities or the State Archaeologist.

Avoidance of historic structures through the routing project is the primary means of minimizing impacts to these resources.

2.1.7 Human Health and Safety

Generally human health and safety issues related to transmission projects can be grouped into issues associated with construction and those associated with the operation and maintenance of the Project.

As with any construction project, particularly large projects employing many people, heavy equipment, and high-voltage electrical facilities, there are safety issues during construction. Potential health and safety impacts, injuries related to worker falls, falling equipment and electrocution.

Potential health and safety impacts associated with the operation phase of the proposed Projects include: electrocution or injury from equipment failure, injuries associated with unauthorized access to energized transmission equipment, health impacts from electric or magnetic fields associated with operation of the Projects, and stray voltage.

Equipment failure and unauthorized access to transmission equipment

Electric transmission lines, and their associated facilities, carry electricity at a very high voltage. This high voltage is transformed at distribution substations down to the voltage that is used by most customers at their homes

Under certain conditions, high voltage transmission lines or high voltage substation equipment may fail. These failures are most commonly a result of extreme weather or electric circuit overloading. If equipment fails injury or death may occur as a result.

Unauthorized access to transmission equipment by persons who are not trained to work with high voltage equipment can result in serious injury or death.

Electric and magnetic Fields (EMF)

Electric and magnetic fields are created when electricity flows through any conductor. Although they are calculated and measured differently, the two are often collectively referred to as EMF.

Many years of research on the biological effects of electromagnetic fields have been conducted on animals and humans. No association has been found between exposure to EMF and human disease. While the consensus is that EMF poses no risk to humans, the question of whether exposure to EMF can cause biological responses or even health effects continues to be the subject of medical research and public debate.

In 2002, Minnesota formed an Interagency Working Group to evaluate the body of research and develop policy recommendations to protect the public health from any potential problems resulting from HVTL EMF effects. The Working Group consisted of staff from the Department of Health, the Department of Commerce, the Public Utilities Commission, the Pollution Control Agency, and the Environmental Quality Board (EQB). The Department of Health coordinated the activities of the Working Group.

In September 2002, the Working Group published its findings in a *White Paper on Electric and Magnetic Field (EMF) Policy and Mitigation Options* (hereinafter “White Paper”). The

Minnesota Department of Health made the following statement on EMF exposure in the White Paper:

“The Minnesota Department of Health concludes that the current body of evidence is insufficient to establish a cause and effect relationship between EMF and adverse health effects. However, as with many other environmental health issues, the possibility of a health risk from EMF cannot be completely dismissed. The uncertainty surrounding EMF health effects presents a difficult context in which to make regulatory decisions. This approach suggests that one should avoid any activity or exposure about which there are questions of safety or health, at least to the extent that an activity can be avoided easily or cheaply.”

Electric Fields

The intensity of the electric field is related to the voltage of the line. Estimates of the anticipated electric fields by structure type are shown in Table 2-4:

Table 2-4 Estimated Electric Fields (kV/meter)

Structure type	Typical Right-of-Way Width (feet)	Edge of Right-of-Way (kV/m)	Maximum Overall (kV/m)
345 kV single-circuit single pole, davit arm	150	1.1	4.4
345 kV single-circuit H-frame	150	1.9	4.4
345 kV double-circuit single pole, davit arm	150	0.4	3.5
345 kV/161 kV double-circuit single pole davit arm	150	0.4	3.9
230 kV single-circuit single pole, davit arm	125	0.6	2.3
230 kV single-circuit H-frame	125	1.4	2.8
161 kV single-circuit, single pole davit arm	80	0.9	1.9

If the electric field from a transmission line couples with a conductive object, such as a vehicle or metal fence located in close proximity to the line, a voltage will be induced on the conductive object. The magnitude of the induced voltage is dependent upon a variety of factors including the shape, size and orientation of the object, as well as weather conditions. If a person touches an object carrying the induced voltage, and that object is insulated or semi-insulated from the ground, then a small current would pass through the person's body to the ground. This might be

accompanied by a spark discharge and mild shock – similar to what can occur when a person walks across a carpet and touches another grounded person or object.

High intensity electric fields also have the potential to interfere with the operation of pacemakers and implantable cardioverter/defibrillators (ICD). Interference with implanted cardiac devices can occur if the electric field intensity is high enough to induce sufficient body currents to cause interaction. Modern bipolar devices are much less susceptible to interactions with electric fields. Medtronic and Guidant, manufacturers of pacemakers and ICDs, have indicated that electric fields below 6 kV/meter are unlikely to cause interactions affecting operation of most of their devices.

Older unipolar designs are more susceptible to interference from electric fields. Research has indicated that the earliest evidence of interference was in electric fields ranging from 1.2 to 1.7 kV/meter. For older style unipolar designs, the electric field for some proposed structure types do exceed levels that may produce interference. In the unlikely event a pacemaker is impacted, the effect is typically a temporary asynchronous pacing (commonly referred to as reversion mode or fixed rate pacing). The pacemaker would return to its normal operation when the person moves away from the source of the interference.

Magnetic Fields

The intensity of a magnetic field is related to the current flow through the wires and is measured in either Gauss or Teslas. For the purpose of measuring magnetic fields commonly found in the environment, milliGauss (mG) or micro Teslas (μ T) are commonly used (one milliGauss = 10 micro Teslas). Project proposers estimated the anticipated magnetic fields for the structures being considered for the proposed Projects, as shown in Table 2-5:

Table 2-5 Estimated Magnetic Fields (milligauss)

Segment	Structure Type	Typical ROW (feet)	Peak Magnetic Field (mG)	Peak Magnetic Field at ROW Edge (mG)
Twin Cities – La Crosse Proposed Configuration				
Hampton Corner–North Rochester 345 kV	Single Pole, Davit Arm	150	58	18
	H-Frame	150	93	27
North Rochester–La Crosse Area, via Alma 345 kV/161 kV/ 345 kV	Single Pole, Davit Arm	150	54	17
	H-Frame	150	87	25
North Rochester–La Crosse Area, via Winona, Trempealeau or La Crescent 345 kV	Single Pole, Davit Arm	150	47	15
	H-Frame	150	77	22

North Rochester–Chester 161 kV	Single Pole, Davitt Arm	80	25	13
North Rochester– Northern Hills 161 kV	Single Pole, Davitt Arm	80	49	24
Twin Cities – La Crosse Alternative Configuration				
Prairie Island– North Rochester 345 kV	Single Pole, Davitt Arm	150	57	18
	H-Frame	150	92	27
Twin Cities – Fargo Proposed Configuration				
Fargo–Alexandria 345 kV	Single Pole, Davitt Arm	150	70	22
	H-Frame	150	113	33
Alexandria Area– Western St. Cloud Area 345 kV	Single Pole, Davitt Arm	150	51	16
	H-Frame	150	82	24
Western St. Cloud Area–Monticello 345 kV	Single Pole, Davitt Arm	150	6.1	1.9
	H-Frame	150	10	2.9
Twin Cities – Fargo Alternatives				
Western St. Cloud Area– Sherburne County 345 kV	Single Pole, Davitt Arm	150	1.2	0.4
	H-Frame	150	2	0.6
Western St. Cloud Area– Benton County 345 kV	Single Pole, Davitt Arm	150	7.5	2.4
	H-Frame	150	12	3.6
Twin Cities – Brookings Proposed Configuration				
Brookings–Lyon County 345 kV	Single Pole Davitt Arm	150	100	32
	H-Frame	150	162	47
Lyon County–Hazel Creek 345 kV	Single Pole, Davitt Arm	150	78	25
	H-Frame	150	126	37
Hazel Creek– Minnesota Valley 230 kV	Single Pole, Davitt Arm	150	37	12
	H-Frame	150	62	21
Lyon County– Franklin Double-circuit 345 kV	Single Pole, Davitt Arm	150	96	20
Franklin– Helena Double-circuit 345 kV	Single, Pole, Davitt Arm	150	88	18

Helena– Lake Marion 345 kV	Single Pole, Davit Arm	150	121	39
	H-Frame	150	197	58
Lake Marion– Hampton Corner 345 kV	Single Pole, Davit Arm	150	43	14
	H-Frame	150	69	20
Twin Cities – Brookings Alternative Configuration				
Minnesota Valley– West Waconia 345 kV	Single Pole, Davit Arm	150	194	62
	H-Frame	150	315	92
West Waconia–Helena 345 kV	Single Pole, Davit Arm	150	54	17
	H-Frame	150	87	26

It should be noted that magnetic fields are not singularly associated with power lines. Every person has exposure to these fields to a greater or lesser extent throughout each day, whether at home or in schools and offices. The following table (2-6) contains field readings for a number of selected, commonly encountered items. These reading represent median readings, meaning one might expect to find an equal number of readings above and below these levels.

Table 2-6 Magnetic Fields (milligauss) From Common Home and Business Appliances

Type	Distance From Source in Feet			
	0.5	1	2	4
Computer Display	14	5	2	-
Fluorescent Lights	40	6	2	-
Hairdryer	300	1	-	-
Vacuum Cleaners	300	60	10	1
Microwave Oven	200	40	10	2
Conventional Electric Blanket	39.4 peak 21.8 average			
Low EMF Electric Blanket	2.7 peak .09 average			

Source: EMF In Your Environment, EPA 1992

Past decisions have reflected that the scientific data does not show any significant risk of health effects due to exposure to magnetic fields. Policy decisions have continued to support the construction of electric infrastructure, taking into consideration the most recent information available on the issue.

The World Health Organization (WHO) recently concluded a review of the health implications of electromagnetic fields. WHO's conclusions and recommendations are summarized in WHO Fact Sheet N°322, *Electromagnetic fields and public health: Exposure to extremely low frequency fields (June, 2007)*. The fact sheet noted that much of the scientific research on long-term health effects of electromagnetic fields focused on magnetic fields and childhood leukemia. This focus is the result of many previous studies on potential health effects of electromagnetic fields that noted a weak, statistical link between exposure to EMF and incidence of childhood leukemia. Additionally, some epidemiologic studies making a regression analysis of leukemia cases have found a statistical association. A similar link has not been noted with other types of cancer. In its report, after reviewing recent studies, WHO concludes that laboratory evidence does not support these findings:

“In 2002, IARC published a monograph classifying ELF magnetic fields as “possibly carcinogenic to humans”. This classification is used to denote an agent for which there is limited evidence of carcinogenicity in humans and less than sufficient evidence for carcinogenicity in experimental animals (other examples include coffee and welding fumes). This classification was based on pooled analyses of epidemiological studies demonstrating a consistent pattern of a two-fold increase in childhood leukaemia associated with average exposure to residential power-frequency magnetic field above 0.3 to 0.4 μ T. The Task Group concluded that additional studies since then do not alter the status of this classification.

“However, the epidemiological evidence is weakened by methodological problems, such as potential selection bias. In addition, there are no accepted biophysical mechanisms that would suggest that low-level exposures are involved in cancer development. Thus, if there were any effects from exposures to these low-level fields, it would have to be through a biological mechanism that is as yet unknown. Additionally, animal studies have been largely negative. Thus, on balance, the evidence related to childhood leukaemia is not strong enough to be considered causal.”

WHO's guidance regarding long-term exposure to magnetic fields concludes that:

“Regarding long-term effects, given the weakness of the evidence for a link between exposure to ELF magnetic fields and childhood leukaemia, the benefits of exposure reduction on health are unclear.”

Stray Voltage

Stray voltage is defined as a natural phenomenon that can be found at low levels between two contact points in any animal confinement area where electricity is grounded. As required by code, electrical systems, including farm systems and utility distribution systems, must be grounded to earth 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, ground currents, EMF or earth currents.

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 and immediately under the transmission line. Stray voltage has been raised as a concern on some dairy farms because it may impact operations and milk production. Problems are usually related to the distribution and service lines directly serving the farm or the wiring on a farm. In those instances when transmission lines have been shown to contribute to stray voltage, the electric distribution system directly serving the farm or the wiring on a farm was directly under and parallel to the transmission line.

Mitigations

The National Electric Safety Code (NESC) provides standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, strength of materials, and ROW widths.

The United States Occupational Safety and Health Administration (OSHA) regulates worker safety in both construction and industrial settings. OSHA has developed and enforces regulations that are designed to protect workers from potential accidents.

Industry design standards minimize potential impacts that may occur if accidents, such as structure failure or the disconnection of a conductor, occur. Breakers and relays located at substations will de-energize a transmission line if an accident occurs. Substations are typically fenced and access is limited to authorized personnel. Proper signage warning the public of the risk of coming into contact with the energized equipment also help to avoid contact with energized electric equipment.

To ensure that any electric discharge does not reach unsafe levels, the NESC requires that any discharge be less than 5 milliamperes (“ma”). There are currently no state or federal standards for transmission line electric fields. However, in previous transmission line permits, the EQB and PUC have imposed a maximum electric field limit of eight (8) kV/meter measured one meter above the ground. The restriction was designed to prevent serious hazard from shocks when touching large objects like a bus or combine parked under high voltage transmission lines.

Minnesota does not have an exposure standard for magnetic fields. At least two other states have established standards for magnetic fields, e.g., Florida (150 milligauss limit) and New York (200 milligauss limit).

Minimizing the length of transmission line parallel to or co-located (through the use of structures that allow underbuilding of distribution lines) with distribution or local service conductors would minimize the potential for a transmission line to contribute to stray voltage. However, co-locating or paralleling existing distribution or local serving electric lines may be advantageous for minimizing other potential effects from the proposed transmission project

The primary mitigation strategy to minimize electric and magnetic fields are in the design and location of the transmission projects. Installations of HVTL of the size of these projects are generally placed well away from residences. Given that magnetic fields dissipate rapidly from the source, this provides significant mitigation from exposures.

Impacts from electric fields can be minimized by grounding metal buildings, fences or other large permanent conductive object in close proximity or parallel to the line to prevent excessive discharges. Vehicles which may be parked under or adjacent to transmission lines are generally grounded adequately through their tires. In some instances, such as vehicles with unusually old tires or those are parked on dry rock, plastic or other surfaces that insulate them from the ground, the vehicle can be grounded by attaching a grounding strap to the vehicle to the vehicle long enough to touch the earth.

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 shorting out one or more of the fence insulators to ground with a wire when the charger is disconnected or installing an electric filter to ground charges induced from a power line while still allowing the charger to be effective.

2.2 Potential Impacts on Land-based Economies

The majority of lands within the proposed CapX Project corridors are rural and agricultural in nature. Proposed corridor endpoints are suburban in nature. Additional land uses include rural residences and farmsteads, lands protected for conservation or wildlife purposes, wetlands, and lakes. The Project corridors also include small towns and small commercial districts.

The proposed CapX Project is expected to have minimal impacts on existing land uses. New transmission lines are often co-located with existing roads, utility rights-of-way (including existing transmission lines), or similar linear corridors such as underground pipelines or railroads.

While temporary impacts associated with construction are expected, no significant long term impacts or conversion of land to other uses are expected.

2.2.1 Recreation

Recreational opportunities in the proposed project corridors include boating, biking, fishing, hunting, camping, equestrian riding, snowmobiling and cross-country skiing. There are numerous natural resource focused recreational sites located in these areas, including state wildlife management areas (WMAs), state scientific and natural areas (SNAs), public lakes and streams, U.S. Fish and Wildlife Service national wildlife refuges (NWRs), state parks, federal wetland easements, and county parks.

The Twin Cities to La Crosse project corridor has recreational resources that reflect its river and forest resources, and the unglaciated bluffslands of Southeast Minnesota. Recreational resources along the Twin Cities to Fargo project corridor include Wildlife Management Areas (WMA), Scientific and Natural Areas (SNA), state parks, streams, and lakes. The Twin Cities to Brookings project corridor includes WMAs, waterfowl protection areas (WPA), state parks, county parks, rivers, and streams. Section 3 has detailed descriptions of these resources in the individual corridors

Mitigations

Construction and operation of the proposed CapX Project could have a visual impact on recreational resources depending on the route permitted. Potential impacts include aesthetic impacts to scenic riverways and citizens utilizing these riverways. They also include impacts to nature observation opportunities, particularly in the Minnesota and Mississippi River Valley flyways. However, impacts are not expected to significantly reduce the availability or quality of recreational uses in the corridors. It is assumed that the specific routes and alignments will be located near existing transmission line corridors and/or other corridors such as county and township road and railroad ROWs. This will minimize or mitigate the visual and physical impacts to the surrounding areas and avoid new impacts in undisturbed areas.

The route permitting process would provide additional opportunity to identify specific impacts and mitigation measures that may minimize these impacts to recreational resources.

2.2.2 Agriculture

The CapX Project corridors are primarily active farmland. Taken as a whole, approximately half of the farmland within the CapX project area is considered prime farmland.² Farming activities within the corridors vary with climate and geography.

Impacts to farmlands are usually highest during the construction phase. During construction, utility construction equipment may damage crops, compact soil, require grading, require temporary relocation of livestock fencing, and temporarily interrupt some farming activities. In general, or by permit, utilities contact the landowners prior to construction to discuss transmission line construction schedules, potential crop damages, negotiate payments and additional mitigation measures for damage, soil compaction and other impacts.

Mitigations

In those areas where there is potential to cross agricultural fields, efforts are made to place transmission line structures placed in a manner to minimize interference with agricultural operations, especially maneuvering equipment around transmission structures. To reduce or mitigate against interference with farm operations, transmission lines are typically placed along existing road ROW, along section lines, or along existing transmission lines to reduce, mitigate, or prevent impacts on agricultural operations.

No long term impacts are anticipated to the agricultural economy as a result of the CapX Project. The proposed transmission lines will not cause a significant degradation or loss of farmland. Additional information and analysis on farmland impacts would be addressed in the routing process.

2.2.3 Transportation

The CapX project corridors cross major public waterways, including the Mississippi, Minnesota, Red, Redwood, Cannon, and Zumbro rivers. However, the proposed transmission lines are not expected to have an impact on navigation or shipping. Minor impacts may occur during construction of river crossings and during stringing of wire. Utilities are required to obtain permits from federal, state, and local jurisdictions for work related to river crossings.

² Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods. *See*, <http://soils.usda.gov/technical/handbook/contents/part622.html>.

There are public airports, private airfields, and heliports in the project corridors. Larger public airports are near population centers.

The Rochester International Airport is located southwest of Rochester; Winona Municipal Airport is two miles northwest of Winona. The West Fargo Municipal Airport and Hector International Airport are approximately two miles from Maple River Substation, the proposed western terminus of the transmission line. Chandler Field Airport in Alexandria is located approximately two miles from proposed sites for the Alexandria Area Substation. There are four municipal airports – Southwest Regional Minnesota Airport near Marshall, Tyler Municipal Airport northwest of Tyler, Granite Falls Municipal Airport south of Granite Falls, and Redwood Falls Municipal Airport northeast of Redwood Falls.

Further detail is contained in Section 3.

Mitigations

CapX project partners may need to secure a flight hazard determination from the Federal Aviation Administration (FAA) if transmission line structures exceed the 100:1 glide slope within a 20,000-foot airport runway buffer zone. To meet this standard, a 100 foot tall transmission line structure would need to be located at least 4,000 feet of a primary airport runway, 2,000 feet of a secondary runway, or 1,200 feet on either side of a runway. This process involves providing the FAA with the general configuration of the structures along with elevations and height.³

New transmission lines generally do not affect surface transportation systems except for minor impacts during the construction period. These impacts are typically found at the edge of the road ROW well off the road surface and away from traffic. Utilities are required to obtain permits from federal, state, or local road management jurisdictions if a transmission line crosses a road or when the line is to occupy any part of a road ROW.

The proposed transmission lines are not expected to have an impact on aviation. Transportation impacts and mitigation measures would be examined in greater detail during the route permitting process.

2.2.4 Mining and Forestry

Mining

There are no metallic mining operations in the project corridors. There are numerous active and inactive industrial mineral (sand, clay, gravel) operations and deposits in the project corridors.

³ Title 14 of the Code of Federal Regulations CFR Part 77 (<http://ecfr.gpoaccess.gov>)

Sand, clay, and gravel mining operations are found throughout the Minnesota River Valley, especially around Redwood Falls, Morton, and Franklin. Granite is mined near Morton. Gravel pits are the predominant mining operation within the Twin Cities to Fargo corridor. Within the Twin Cities to La Crosse corridor there are numerous sand and gravel deposits, including deposits near the cities of Randolph, Cannon Falls, Mantorville, and Zumbrota. Gravel pits and rock quarries are found along the Mississippi River, especially in the Winona area.

Forestry

The majority of forest resources in Minnesota are located in north central and northeastern regions of the state. However, there are forest resources in each of the proposed project corridors, and impact areas are described in Section 3. Generally, transmission lines would be an inconsistent use with forest harvesting areas.

Mitigations

Possible impacts of the CapX project include loss of mineral and forest resources and interference with operations resulting from transmission line construction. No long term impacts are anticipated to mineral or forest resources in Minnesota as a result of the CapX Project. The route permitting process would ensure minimal impact to active mining operations. For forest areas of most concern – forests upland and within the Mississippi River Valley – avoidance and mitigation measures would be employed in the route permitting process.

2.2.5 Economic Development

The CapX Project is proposed to meet three categories of need: community energy reliability, generation outlet for renewable energy, and energy demand from anticipated community growth. All of these needs, if unmet, have the potential to retard economic development. Conversely, meeting these needs provides resources necessary for economic growth.

Economic growth is occurring in population centers within the project corridors. Rochester, La Crosse, Alexandria, St. Cloud, Fargo, and the Twin Cities are all experiencing population growth and substantial suburban development. As an example, the Rochester area experienced a 34 percent increase in population between 1985 and 2003, with an increase in peak electric power use of 88 percent. Plentiful, reliable energy service is a necessary, though not sufficient, condition for economic development. Unreliable energy service can result in the unavailability or under use of other economic resources (labor, capital) and the need to invest in redundant power supplies.

A plentiful energy supply – one that is fairly matched to anticipated growth and affordable – ensures economic stability, fosters investments, and guides the allocation of resources to best advantage. The CapX partners project growth in regional energy demand of at least 4000 MW

between 2009 and 2020. Leaving this demand unmet will likely retard economic growth. The Minnesota Department of Employment and Economic Development (DEED) cites access to affordable energy resources as an economic advantage for Minnesota businesses.⁴

DEED also notes economic growth opportunities in Minnesota in renewable energy. Minnesota is a national leader in wind energy development. In 2007, the Minnesota Legislature affirmed this leadership role with passage of a Renewable Energy Standard (RES), requiring that 25 percent of the state's electricity come from renewable sources by 2025. The CapX project, particularly the proposed transmission line linking to the Buffalo Ridge in Southwestern Minnesota, would help ensure that renewable energy can be transmitted to businesses and communities throughout the state. It would also foster economic growth in communities that hope to develop wind or other renewable energy resources.

Mitigations

The proposed CapX transmission lines may have negative impacts on economic growth in specific circumstances. Transmission lines and their construction can have a detrimental effect on ecosystem services and related human endeavors. As noted elsewhere in this section, transmission lines can impact agricultural production, forestry, and recreation. Many of these impacts can be mitigated, particularly where the physical footprint of the transmission line can be removed from land-based economic activities and placed in existing ROW. Similar measures can also mitigate, though perhaps to a lesser extent, the visual or aesthetic footprint of a transmission line.

For businesses that depend, directly and indirectly, on a pastoral setting to thrive (e.g. canoeing, cycling, hiking, nature observation), transmission lines may retard economic growth. Again, mitigation through proper routing can minimize potential negative economic effects.

2.3 Potential Impacts on Natural Environments

The proposed CapX project corridors, taken as a whole, are extensive. They touch the western and eastern borders of the state of Minnesota and range approximately 300 miles from north to south. As a result, though the corridors share the natural environment of Minnesota, their specific settings and their potential impacts are often distinct. Accordingly, most discussion of natural resources in this report is more appropriately addressed in the analysis of each of the corridors in Section 3. This section will address those potential impacts and possible mitigations that would be relevant to the project overall.

⁴ Foundations of Commerce, www.deed.state.mn.us/whymn/foundations.htm

2.3.1 Air Quality

During transmission line construction, there are emissions from vehicles and construction equipment and fugitive dust from ROW clearing. Temporary air quality impacts caused by the construction-related emissions are expected to occur. Exhaust emissions from diesel equipment will vary during construction, but will be minimal and temporary. Fugitive dust may result from ROW clearing. The magnitude of these emissions is influenced heavily by weather conditions and the specific construction activity taking place.

The only potential air emissions from a 345 kV transmission line result from corona and are limited. Corona can produce ozone and oxides of nitrogen in the air surrounding the conductor, especially in humid conditions. Corona consists of the ionization of air within a few centimeters immediately surrounding conductors. 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. Ozone has the potential to be an air pollutant in regions where emissions of volatile organic compounds (VOCs) and nitrous oxides (NO_x) are relatively high (typically urban areas). Ozone produced by transmission lines has a negligible impact on air quality.

2.3.2 Water Quality

Surface Waters

Transmission construction may disturb surface water. The project corridors are replete with watercourses – rivers, streams, creeks, and lakes. Many are categorized as public waters and listed in the Minnesota DNR Public Water Inventory (PWI). Minnesota Public Waters are water basins and watercourses of significant recreational or natural resource value in Minnesota as defined in Minnesota Statute 103G.005. The DNR has regulatory jurisdiction over these waters.

Mitigations

Reflecting their importance to ecosystems, wildlife, and human endeavors, water resources are regulated by several different agencies in Minnesota, including the United States Army Corps of Engineers (USACE), the Minnesota Board of Water and Soil Resources (BWSR), the DNR and the Minnesota Pollution Control Agency (PCA).

During transmission line construction there is the possibility of sediment reaching surface waters when the ground is disturbed by excavation, grading, and construction traffic. CapX project partners would be required to obtain a National Pollution Discharge Elimination System (NPDES) storm water permit and follow standard erosion control measures identified in the Minnesota Pollution Control Agency's Stormwater Best Management Practices Manual. These measures include for example, using silt fencing to prevent impacts to adjacent water resources.

The CapX project proposes several major river crossings, including crossings of the Red, Minnesota, Redwood, Cannon, Zumbro, and Mississippi Rivers. Project partners will be required to obtain permits for these crossings from the Minnesota DNR, the US Army Corps of Engineers, or the local unit of government. In general, spanning watercourses is an excellent way to avoid impacting them. Decisions on how best to span waters are often complicated by topography, natural areas, and existing settlements, infrastructure, and uses. These considerations would be taken up in the route permitting process.

Once the proposed CapX transmission lines were complete they would not be expected to have ongoing impacts on surface water quality.

Groundwater and Wetlands

Although many pre-settlement wetlands in the state have been drained for cropland, there are still numerous wetland areas across the project areas. Many of these occur in conjunction with riparian areas. There are also wetlands of various types including unconsolidated bottom, emergent, scrub-shrub, and forest palustrine.

Wetlands, lakes, rivers, and floodplains perform important functions within a landscape, including flood attenuation, ground water recharge, water quality protection, and wildlife habitat production. Possible impacts of the CapX project include interference with these functions by disruption or displacement of wetlands. Impacts on groundwater and fens are possible in areas where groundwater quality is closely linked with surface water quality, e.g., the karst topography of Southeast Minnesota.

Mitigations

Mitigation of impacts to groundwater and wetlands is accomplished primarily through avoidance. As many wetlands within the CapX corridors are relatively small, proposed transmission lines would likely be able to avoid them by spanning them. In practice, utility companies attempt to avoid placing poles in wetlands.

2.3.3 Soils and Geology

Minimal impacts to soils outside of the direct impact of the transmission line structures are anticipated. Soil erosion control measures would be followed to minimize loss of top soil; areas disturbed would be returned to their pre-construction condition. Route permits generally require that soils compacted by construction are restored by the utility after construction is complete.

No permanent impacts to the subsoil or geology within the proposed corridors are anticipated.

2.3.4 Flora and Fauna

The CapX project corridors stretch across ecosystems – from the prairie grasslands of Western Minnesota, across the rolling moraines and woodlands of Central Minnesota, to the unglaciated blufflands of the Mississippi River Valley in Southeast Minnesota. Over the past 200 years, these ecosystems have been extensively changed by agricultural cultivation and human settlement, urban and suburban. Nonetheless, these ecosystems remain host to a wide variety of flora and fauna.

Some species have adapted to a growing human impact or are a direct result of human settlement. Other species are concentrated in protected or uncultivated lands, e.g., WMA, SNAs, WPAs, remnant prairies and woodlands, streams, lakes, and wetlands. The protected areas provide habitat for deer, pheasants, opossum, wild turkey, migratory waterfowl, and small mammals such as rabbits and fox. Fish, reptiles and amphibians, such as snakes, turtles, toads and frogs are likely be found near the streams, wetlands and open waters within the project corridors. Numerous species of birds and waterfowl inhabit rivers, river valleys, and associated wildlife refuges, e.g., Upper Mississippi River National Wildlife and Fish Refuge.

Impacts to flora and fauna may occur during construction of the proposed transmission lines. Impacts to vegetation are primarily due to ROW clearing. In general, utilities prohibit tall growing tree species within a transmission line ROW. However, row crops such as corn, soybeans and wheat are appropriate. Vegetation clearing may be necessary along the ROW, but the extent of clearing and possible mitigation strategies are dependent upon the final route and alignment of the line.

Mitigations

Wildlife may be displaced during ROW clearing and transmission line construction. However, the potential for permanent displacement of wildlife and loss of habitat from construction is low. Animals have the ability to temporarily move out of construction areas. The distance that animals will be displaced will depend on the species. Some habitat loss may occur in ROW clearing; however, most habitats (excepting tall growing trees) will recover from construction activities. The impacts to wildlife should be short-term and limited assuming that routes selected would follow existing ROW, would avoid protected lands, and would use best management practices in limiting construction disturbance.

Post-construction impacts are limited primarily to birds and waterfowl – they have the possibility of colliding with transmission lines and towers. Avian collisions are relatively rare. Waterfowl are typically more susceptible to transmission line collisions, especially if the line is placed near agricultural fields that serve as feeding areas or near wetlands and open water, which serve as resting areas. Impacts to birds and waterfowl can be mitigated by design and routing decisions.

2.3.5 Natural Resources of Special Concern

Natural resources of special concern within the proposed project corridors include unique or high value ecological communities, e.g., pre-settlement prairie or woodland remnants, and the rare, threatened, and endangered species that are present within them. The CN Application can be referenced for a complete list of threatened and endangered species. The next section describes specific incidences of these areas and species.

Possible impacts of the CapX project include loss or fragmentation of high value ecological communities. This includes the possible loss of habitat for threatened and endangered species within the corridors.

Mitigations

The primary means of mitigating these potential impacts is to avoid them in routing and to implement best management practices during construction to ensure avoidance is effective. There is the possibility of post-construction impacts for avian species – namely, collisions with transmission lines and towers. Proper design and routing can mitigate these impacts.

3.0 Assessments of the Project Segments

Where the previous section concentrated on issues that are of fairly general impact to the project, this section pursues a more focused study of the individual project areas. These are specific environmental conditions that may have an impact on eventual need decisions and route planning. (The general project areas for these segments are shown in Map 1 in Appendix A.) This section will review important impact areas for each segment, including:

- Archeologically rich areas and recorded archeological sites, including burial mounds and earth works.
- State and federally managed lands (WMAs, SNAs, State Parks, WMDs, WPAs, etc.)
- Potential conflicts with avian species, natural vegetation, wetlands, and wildlife.
- Impacts to individual residences, populated areas, and dissection of farmland.
- A number of small airports found within the proposed corridors.
- The river crossings which may be among the primary issues associated with each alternative.

Environmental factors will ultimately influence the location of the facilities and would be mitigated through the routing and siting process. Following are a few general methods that would be considered:

- Sharing rights-of-way with existing transmission lines (i.e., especially along the Mississippi, Red and Minnesota River crossings).
- Sharing rights-of-way with existing highways and county roads.
- Design and construction methods, including special structures, seasonal construction and avian avoidance means.
- Consider future planned development and zoning as well as the current density of homes and planned development.

3.1 The Twin Cities to La Crosse, Wisconsin Project Area

This section describes the especial environmental setting of the proposed Twin Cities to Rochester to La Crosse, Wisconsin 345 kV and 161 kV Project, analyzing areas and issues that are unique within that corridor. (The general project area is shown in Map 1) The proposed project includes a transmission line between the southern Twin Cities area (at the new Hampton Corner Substation) to the Rochester area (at the new North Rochester Substation) then extending to the La Crosse, Wisconsin area via one of four potential crossings of the Mississippi River.

The first segment of the Twin Cities to La Crosse portion of the project is a proposed 345 kV line between the proposed Hampton Corner Substation (near Farmington, Minnesota) and the proposed North Rochester Substation (near Rochester, Ortonville or Pine Island). Two 161 kV new transmission lines are proposed to begin at the North Rochester Substation. One of the 161 kV lines is proposed to terminate at the existing Northern Hills Substation on the north side of Rochester, the second 161 kV line is proposed to terminate at the existing Chester Substation on the east side of Rochester. A portion of the North Rochester to Chester line may share the same structures (called a double-circuit) as the 345 kV line.

The final segment is a new 345 kV transmission line between the North Rochester Substation and the Minnesota-Wisconsin border which would cross the Mississippi River at one of the following crossing areas: Alma, Winona, Trempealeau, or La Crosse crossing areas. This segment will terminate at either the existing La Crosse Substation or the existing North La Crosse Substation in Wisconsin.

3.1.1 Twin Cities to Rochester

The environmental setting of the segment between the proposed Hampton Corner Substation and proposed North Rochester Substation is represented in Map2. This segment is approximately 40 miles long and passes through portions of Dakota, Dodge, Goodhue, Rice, Steele, and Olmsted counties in Southeastern Minnesota.

This segment is located in the Rochester Plateau and the Blufflands Subsections of the Paleozoic Plateau, and the Oak Savannah Subsection of the Morainal Section of the Ecological Classification System (DNR (b), 2006). The topography of the area is gently to moderately sloping.

Human Settlement

Population density and human settlement varies across this segment. The area near the Hampton Corner Station is at the outer fringe of the Twin Cities suburban development. The area near the proposed North Rochester Substation is at the outer fringe of Rochester's suburban development, and some lands in the area are zoned as urban fringe. Cities in the segment are primarily located

along U.S. Highway 52, which runs generally Northwest – Southeast through the segment. The cities include Hampton, Cannon Falls, Zumbrota, Pine Island, Oronoco, and Rochester. Several cities are along Minnesota Highway 56 in the western portion of the project corridor, including Randolph, Kenyon, West Concord, and Dodge Center. Additionally, the cities of Mantorville and Kasson are located in the southern portion of the project corridor.

The lands within this segment are primarily zoned for agricultural production, reflecting the dominant land use in the area. Smaller areas of land near cities are zoned for future urban expansion and development. Significant urban and suburban growth is expected along the southern fringe of the Twin Cities and between Rochester and Oronoco. In general, the percentage of poverty in the segment is similar to county and statewide poverty levels.

Archeological sites are scattered throughout this segment, which is located within the Southeast Riverine archeological region of Minnesota. Most sites are located near lakes, rivers or streams. The majority of the sites located near this segment have not been evaluated for listing on the National Registry of Historic Places (NRHP). Groups or clusters of archeological sites include a concentration of archeological sites located along the South Branch Middle Fork Zumbro River, and a group of sites near Lake Byllesby.

Inventoried architectural sites have been identified in sparse scatters throughout the segment and in and are concentrated around the communities of Vermillion, Hampton, Randolph, Dennison, Nerstrand, Kenyon, and West Concordia. Properties listed on the NRHP are located near New Trier, and Kenyon. A high density of inventoried architectural properties is located east of the Town of Nerstrand.

Land-based Economies

One public and several private airports are within the Twin Cities to Rochester segment. The Rochester International Airport is located southwest of Rochester. There are private airfields near Rochester, Plainview, and Red Wing. There is also a MNDOT heliport just north of Rochester.

Agricultural production is the dominant land use within this segment. Corn and soybeans are the most common cultivated crops. Prevention and mitigation of negative impacts to agricultural lands such as soil compaction, drain tile damage, and crop damage and loss would be addressed during the route permitting process through an Agricultural Mitigation Plan developed by the Minnesota Department of Agriculture.

There are numerous recreational opportunities along this corridor. Wildlife Management Areas (WMA), Scientific and Natural Areas (SNAs), State Parks, Federal Lands, municipal lands, streams and lakes all contribute to the abundance of recreational opportunities in this segment. There are SNAs located east of Cannon Falls on the Cannon River, west of Wanamingo, and southwest of Oronoco.

Locations of high visual sensitivity include the Cannon River, which is a designated scenic river downstream of Cannon Falls and a designated recreational river upstream of Cannon Falls.

The DNR manages several parcels of land in the segment for timber production. The harvest areas are relatively small in size and are concentrated east of Highway 52, Cannon Falls, Zumbrota, and Pine Island.

Natural Environments

There are numerous water bodies within this segment that are listed on Minnesota Public Waters Inventory (PWI) maps and National Wetlands Inventory (NWI) maps. The majority of the listed public waters are scattered throughout this segment. Wetlands are concentrated near Kenyon, Pine Island, and Oronoco, including a rare fen in Holden Township Section 6. If the proposed transmission line was to cross or impact any watercourse listed on the PWI, a license to cross permit must be obtained from the DNR under Minnesota Statute 84.415.

The native and riparian vegetation in this area is generally associated with the riparian areas along the Cannon and Zumbro river valleys.

The Twin Cities to Rochester segment contains wildlife habitat suitable for a wide variety of waterfowl and migratory birds and includes portions of the Mississippi River flyway. Threatened and endangered species are present within this segment. At least nine species of plants (flora) and at least ten species of animals (fauna) in the segment are listed as endangered or threatened by the US Fish and Wildlife Service and the DNR. Threatened and endangered species (and natural communities) are concentrated in the northwestern portion of the segment, specifically in Hampton Township, Dakota County and Stanton Township, Goodhue County, and scattered broadly in the southern portion of the segment.

In addition, there are several designated trout streams which require special consideration during routing and construction to protect the stream's water quality, aquatic species, and cold waters (Minnesota Rule 6264.0050).

3.1.2 Rochester to Mississippi River

The environmental setting of the segment between the Rochester and the Mississippi River is represented in Maps 3 and 4. The proposed 345 kV HVTL project would begin at the North Rochester Substation, run via one of several corridors to one of four potential Mississippi River crossings which will be determined in subsequent route permit proceedings by the respective utility regulatory commissions in Minnesota and Wisconsin. The Mississippi River crossings proposed by the Applicants are at Kellogg, MN (Alma, Wisconsin), Winona, Minnesota, (Trempeleau, Wisconsin), and La Crescent, Minnesota (La Crosse, WI).

This segment passes through portions of Olmsted, Winona, Wabasha, and Houston counties in Southeastern Minnesota. This segment crosses the Blufflands and the Rochester Plateau of the Paleozoic Plateau Section of the Minnesota Ecological Classification System. The topography of the area includes a major transition from gently rolling agricultural lands in the west to ridges and valleys leading to the broad Mississippi River valley in the east.

Human Settlement

Rochester, and its suburbs, Winona and La Crescent are the major cities in the segment. There are numerous smaller cities between Rochester and the Mississippi River. The number of people living at or below the poverty level is similar to county and statewide rates.

There are two public airports within the segment and a least one airport in La Crosse Wisconsin near the proposed Mississippi River crossing at La Crescent. In addition, there are a number of private airstrips and helipads in or near the segment, including helipads at the Mayo Clinic in Rochester and at the Community Memorial Hospital in Winona.

The segment is located within the Southeast Riverine archeological region of Minnesota. Most of the archeological sites that fall within this area are located near lakes, rivers or streams. Groups or clusters of archeological sites pertinent to this segment include areas along the Middle Fork of the Whitewater River, near Chester, along Rush Creek, near the city of Oronoco, near the city of Kellogg, along or near West Burns Valley Creek, near the confluence of Garvin Brook and Stockton Valley Creek and along the Mississippi River near Winona, Dakota and great River Bluffs State Park. In addition, the communities of Eyota, Dover, St. Charles, Utica, Elba and Lewiston all contain archeological resources.

Archeological sites that have been listed or certified as eligible for listing on the NRHP are located near the Mississippi River Valley north and south of Alma and near the Whitewater River northwest of the city of Minneiska.

Inventoried architectural properties have been identified in sparse scatters throughout the rural areas and in and around the communities of Rochester, Oronoco, Lewiston, Stockton, Winona, Goodview, Minnesota City, Plainview, Kellogg and Elgin, Minnesota. The cities of Oronoco, Dover, Eyota, Rochester, St. Charles, Stockton, Winona and Utica have properties listed or eligible for listing on the NRHP. Whitewater State Park contains a group of inventoried architectural properties of which 26 are listed on the NRHP.

Archeological sites are normally evaluated for significance only if there is potential for direct physical effects. If impacts to any recorded site cannot be avoided, that recorded site would require formal significance evaluation to determine if it meets the eligibility requirements of the NRHP. If any finds are significant, mitigation strategies would be required.

If properties are listed on the NRHP, or if they are considered eligible for listing, they may be afforded protection under federal and state regulations. Indirect effects (e.g., visual, noise) to the properties can be avoided by proper siting of the transmission line. Effects to any historic property considered significant can typically be mitigated by avoidance.

Land-based Economies

Agriculture is the dominant land use in the western portion of the segment. Near the Mississippi River, the land use changes to deciduous forest and cultivated agricultural lands. Prevention and mitigation of negative impacts to agricultural lands such as soil compaction, drain tile damage, and crop damage and loss will be addressed during the route permitting process through an Agricultural Mitigation Plan developed by the Minnesota Department of Agriculture.

Recreational opportunities include numerous WMAs, state forest, Waterfowl Protection Areas (WPAs), lakes, rivers, trout streams and SNAs. Recreational opportunities abound within the segment including many WMAs, the Whitewater State Park, Oronoco Prairie, McCarthy Lake WMA and Kellogg-Weaver Dunes SNA. In addition, major and diverse recreational opportunities are present on and near the Mississippi River. These facilities and recreation areas include the Upper Mississippi River Wildlife and Fish Refuge, the Trempealeau National Wildlife Refuge, Great River Bluff State park, Queens Bluff SNA, the RJD Memorial Hardwood Forest, designated trout streams and Lake Winona. The Whitewater State Park is the primary recreation area away from the Mississippi River, has steep terrain and contains numerous trout streams.

Locations of high visual sensitivity within this segment include the Whitewater River area, the Great River Road Scenic Byway (Highway 61) and the Mississippi River area where a crossing would be located.

Areas of timber harvest are scattered throughout the eastern portions of the segment.

Natural Environments

Many of the wetlands, rivers and streams are listed on the Minnesota PWI maps and require a DNR issued license to cross the public water should a transmission line cross the a public water body. In addition, a permit will be required for the US Army Corps of Engineers to cross the Mississippi River.

There are numerous wetlands identified in the NWI maps scattered throughout the western and central portions of the segment. Multiple wetlands complexes are concentrated along the Mississippi River in the eastern portion of the segment. Wetland areas can often be avoided by routing the line away from wetland areas. It is anticipated that the proposed HVTL project would be able to avoid most wetland areas and surface water features, such as rivers and streams, by spanning the transmission line over the water bodies.

Native vegetation is concentrated near Lake Zumbro, the Whitewater State Park and WMA, and along the Mississippi River bluffs and floodplain. In addition, there are prairie remnants along the Dakota Minnesota and Eastern (DM&E) railroad corridor near Chester and Dover.

Threatened and endangered plant (flora) species have been documented by the DNR within this segment. Typically these species are associated with high quality or unique habitat communities, such as remnant prairie, wetland/surface water features, rock outcroppings, grasslands, oak savanna, woodlands or streams. The species are concentrated along the Zumbro River, south of Lewiston and along the Mississippi River valley and bluffs.

Most of the state threatened and endangered animal species within the segment occur near the Mississippi, Zumbro and Whitewater river bluffs or valleys and include a variety of avian and terrestrial species associated with remnant prairie, wetland/surface water features, grassland, oak savanna, woodland, highland areas along the river, or streams..

There are large tracts of forested land owned by the state including the RJD Memorial Hardwood Forest located in the northeastern portion of this segment on the bluff above the Mississippi River, of which the state owns approximately 45,000 acres. There are several privately owned forested tracts which are managed for conservation, such as Evergreen Acres, which is north of Rochester in this segment.

3.1.3 Evaluation of Mississippi River Crossings

If approved, the proposed Twin Cities to La Crosse 345 kV transmission line project will need to cross the Mississippi River in order to connect the transmission line to the La Crosse or North La Crosse high voltage substation. In this section, the ER will generally describe the four potential crossing locations as proposed by the Applicants, as well as, potential environmental impacts and mitigation measures for crossing the river. Further detailed analysis of and a determination of approaches and a crossing of the Mississippi River will be conducted by the PUC under the Power Plant Siting Act (Minnesota Statute Chapter 216F) and the Commission's rules governing the transmission line routing process.

Each of the Applicants' proposed Mississippi River crossings share a number of significant issues. First, the river way is wide enough between the Red Wing and La Crescent areas to limit the number of locations where an overhead transmission line be engineered to span the river. Second, the steep and heavily wooded bluff lands on both sides of the river make approaching the river way difficult. Third, the Mississippi and its surrounding backwaters and bluff lands host significant natural resources including many threatened and endangered species, areas of high biological significance, state and federal natural resource protection areas, and presence of important cultural or historic resources.

A number of threatened and endangered plant and wildlife species and rare plant communities are present within the proposed crossing areas. These include, but are not limited to, the osprey, bald eagle, peregrine falcon, rare floodplain forest types, calcareous fens, davis' sedge, rough-seeded fameflower, sweet-smelling Indian plantain, snow trillium and Small White lady's-slipper have all been identified in the areas.

In addition to being an area rich in natural resources, the Mississippi River and the lands surrounding it between Red Wing and La Crescent are a major industrial and commercial artery. Numerous towns and cities, full time and seasonal homes are present throughout the area. Power plants, barge operations, locks and dams, grain elevators, river dredging and other industrial facilities are found on or along the river in this area. Finally, tourism and recreational industries have built up along the river and include a wide variety of developed opportunities from pleasure boating, marinas and boat storage, campgrounds, parks, wildlife viewing areas, parks, hunting and fishing, and many other facilities supporting tourism and recreation.

Alma Crossing

The Alma Crossing of the Mississippi River is located just east of Kellogg, Winona County, Minnesota and south of Alma, Buffalo County, Wisconsin (see Map 5). The Alma Crossing is near the confluence of the Zumbro and Mississippi rivers. Dairyland Power Cooperative's (DPC) Alma Power Plant (approximately 625 MW), substation and fly ash processing facility are present on the Wisconsin side of the river at or near the proposed crossing. Other existing electrical infrastructure in the area include a number of 69 kV and 161 kV high voltage transmission lines on both sides of the river and a DPC owned double circuit 161/69 kV HVTL which crosses the river at the power plant site and near the Zumbro River confluence. Finally, Lock and Dam #4 is present within the vicinity of the proposed crossing.

The land uses on the Minnesota side of the river include the Upper Mississippi River National Wildlife Refuge (NWR), rural agricultural and residential development on the fringe of Kellogg. Also near the existing transmission line crossing are two Minnesota SNAs, the McCarthy Lake WMA, the RJ Dorer State Forest and two designated trout streams. Portions of the area near the existing crossing are classified by the Minnesota County Biological Survey as areas of high and outstanding biological significance (see CN Application, Appendix E1, Map 5).

The land uses on the Wisconsin side of the river are primarily industrial at and surrounding the DPC Alma power plant. Residential land uses are found within the northern portion of the proposed crossing area, north of the power plant. The land uses within the southern portion of the proposed crossing area include forests, undeveloped floodplain, and agricultural uses.

Areas of high visual sensitivity include Minnesota Highway 61 (Great River Road), a major highway which runs generally north-south along the western edge of the crossing area on the Minnesota side and Wisconsin Highway 35, a major highway on the Wisconsin side of the river.

The crossing is in the Southeast Riverine archeological region of Minnesota. Archeological sites in the crossing area are usually found within river lowlands or on major topographical features such as bluffs, cliffs or other features which provide views of the river valley. Most of the known archeological sites near the crossing area are located near lakes, rivers or streams. Most of the sites have not been evaluated for listing on the NRHP. Concentrations of archeological sites are found near the Zumbro River, its tributaries, near Kellogg, and a group of sites about two miles southwest of Alma crossing. Several archeological sites have been listed or certified as eligible for listing on the NRHP include.

Winona Crossing

The Winona Crossing of the Mississippi River is located at Winona and Goodview, Winona County, Minnesota and in Buffalo County, Wisconsin (see Map 6). The confluence of the Trempealeau and Mississippi rivers is present on the Wisconsin side of the river in the eastern portion of the crossing area.

The terrain within the Winona crossing area features sharp elevation changes between the top of the river bluffs and the Mississippi River basin lands. The elevation at the top of the bluffs is approximately 1,200 feet and approximately 650 feet at the river. In addition, the floodplain is quite wide, approximately four miles within the crossing area.

There are a number of existing linear facilities crossing the Mississippi River within the Winona crossing area. Several 69 kV HVTLs cross the Mississippi River in Winona and Goodview. In addition, Minnesota Highway 43 (Wisconsin Highway 54) crosses the Mississippi River connecting Winona to the Wisconsin side of the river.

The Winona Municipal Airport is located near the western side of the crossing and a heliport is located within the crossing area at the Winona Community Memorial Hospital.

The Mississippi River, its tributaries including the Trempealeau River, its backwaters and associated wetlands create a wide, braided floodplain throughout the Winona crossing area. The cities of Winona and Goodview are located on a peninsula surrounded on three sides by the river, its backwaters and wetland complexes.

Areas of high visual sensitivity include the Minnesota Highway 61 (Great River Road), a major highway which runs through the crossing area, urban and residential areas throughout nearly the entire crossing area, and the bluffs overlooking both sides of the Mississippi River valley.

There are several groups or concentrations of historic or archeological sites within the Winona crossing area. Several of the sites have been inventoried, and several are listed on the National Registry of historic places.

Trempealeau Crossing

The Trempealeau crossing area is located south of Winona in Winona County, Minnesota (see Map 7). The city of Trempealeau is located on the Wisconsin side of the border at this crossing area. Lock and Dam No. 6 is the only existing facility which crosses the river in the area.

The Mississippi River valley and the Black River valley are the prominent feature throughout the area. The Black River confluence is found in the eastern portion of the crossing area and creates an approximately three-mile wide floodplain where the rivers become braided with many smaller channels separating small, wooded islands. In addition, a number of large lakes and wetlands are found within the eastern portion of this crossing area. Most of the area is classified as high or outstanding biological significance by the Minnesota County Biological Survey.

There are many recreational areas in the crossing area including the Upper Mississippi National Wildlife Refuge, Wildlife management areas, the Great River Bluffs State Park, the Perot State Park, a state forest, wildlife areas, a Scientific and Natural Area, several designated trout streams, and a state trail on the Wisconsin side of the river.

Areas of high visual sensitivity include the Minnesota Highway 61 (Great River Road), a major highway which runs through the crossing area, residential areas, and bluff lands.

Archeological sites in this region are most often situated within river lowlands and on high or prominent topographical features that afford views of the surrounding area. None of the sites or groups of sites located within this segment are listed on the NRHP.

La Crescent /La Crosse Crossing

The La Crescent/La Crosse crossing is located in and near La Crescent in the counties of Winona and Houston and in and near La Crosse, Wisconsin, in La Crosse County (see Map 8).

Several existing linear facilities cross the Mississippi River in the area and include Interstate 90 and Highways 14, 16 and 61. The Canadian Pacific Railway (Soo Line) crosses the river near the middle of crossing study area. Lock and Dam No. 7 crosses the river in the northern portion of the area and creates Lake Onalaska. Finally, a 69 kV HVTL crosses the river near the railroad bridge and connects to the Xcel Energy French Island power plant located on French Island in the Mississippi River.

Most of the developed lands within the crossing area are urban areas associated with the cities of La Crescent and La Crosse. The undeveloped lands in the area is predominantly open water, wetlands and deciduous forest lands either in the floodplain or located on the bluff lands in the western portion of the crossing area.

The La Crosse Municipal Airport, located on French Island, is the only public airport within the crossing area and private heliports are located at the St. Francis Medical Center and the Lutheran Hospital.

Recreational facilities include a number of private boat marinas, and other recreation facilities associated with the Mississippi River and the Upper Mississippi River National Wildlife Refuge.

Areas of high visual sensitivity include residential areas, several public highways and scenic byways, and bluff lands on the western portions of the area.

Archeological sites in the area are located near rivers and streams on both on the north and south sides of La Crescent.

Consultation with the Ho-Chunk Nation and the Winnebago Indian Reservation will be necessary to identify areas of cultural sensitivity in the crossing area.

3.1.4 Special Environmental Considerations

Public comments identified a 350 acre area on the north side of Rochester called “Evergreen Acres.” Residents of this area point out that Evergreen Acres contains some of the largest areas of undeveloped lands and habitat in Olmsted County, including several endangered species. The development rights of these lands are governed by a conservation easement granted to the Minnesota Land Trust, an organization which holds conservation easements on many tracts of private lands in Minnesota and manages lands for conservation purposes.

The consideration for linear routing is interrupting the contiguous natural features. Commenters described this area as “large, non-fragmented parcels with many microecosystems and extensive natural resources, including plants and animals,” adding, “(n)on-fragmented habitat is critical to provide sufficient contiguous habitat for plants and animals to flourish.”

3.2 The Fargo to Monticello Project Area

This section describes the especial environmental setting of the proposed Fargo, North Dakota to Monticello, Minnesota 345 kV Project, analyzing areas and issues that are unique within that corridor. The proposed project includes a transmission line between the Fargo area (at the Maple River Substation) and the Monticello area (either Monticello or Sherburne County substation), interconnecting with one of two substations in the Alexandria area (likely either Alexandria Switching Station or Alexandria Substation) and Western St. Cloud area (likely either a new Quarry Substation or Sauk River Substation).

3.2.1 Fargo to Alexandria

The environmental setting of the segment between the Maple River Substation and the Alexandria area is represented in Maps 9 and 10. The area segment is approximately 120 miles long and crosses Cass and Richland Counties in North Dakota, and Clay, Wilkin, Otter Tail, Traverse, Grant, Douglas and Pope Counties in Minnesota. This segment is located in the Red River Prairie Subsection of the Red River Valley in the Prairie Parkland Province of the Ecological Classification System. The topography of the area is extremely flat, indicative of the Red River Valley.

From the Red River Valley south and east towards the Alexandria Area, the area changes from the Red River Prairie Subsection on the western border of Grant County and eastern edge of Traverse County, to the gently rolling topography of the large till plains of the Hardwood Hills area and the Minnesota River Prairie. The northeastern border of this section, located along Otter Tail, Douglas, Stearns and Wright Counties, consists of end moraines starting with the Alexandria Moraine to the northeast and ending with end moraines associated with the Des Moines lobe. The Red River Valley stretches from Big Stone Lake on the North Dakota – South Dakota border into Canada.

Human Settlement

Population density varies across this segment. The Fargo- Moorhead is a relatively densely populated area that adds to the overall population density of the western portion. Heading east from North Dakota, the population density decreases and becomes relatively low. The population begins to increase as the project nears the cities of Fergus Falls and Alexandria. In general, the poverty level in this segment is slightly higher when compared to the statewide population. Concentrations of people at or below poverty are located in the most densely populated cities of Moorhead, Fergus Falls, and Alexandria.

Several of the cities have planned growth. The city of Fargo continues its steady, planned residential, industrial and commercial growth. The city of Moorhead has commercial expansion in the north and residential to the north, east and south. The south also includes a small amount of industrial growth. There is significant residential, commercial and industrial growth south and west of the city of Fergus Falls. There is planned expansion surrounding the city of Alexandria. To the west, north and east, there are planned single-family residential areas, and to the south of Interstate 94, there is commercial expansion. The smaller towns scattered throughout this segment also have small amounts of planned growth within Clay, Otter Tail, Traverse, Grant, and Douglas Counties.

Archeological sites in the Red River Valley South Archeological Region are most often situated along rivers and the beach ridges formed by Glacial Lake Agassiz. Mound sites are most often

found along the beach ridges. In all of the regions, most recorded archeological sites are found along rivers, lakes and streams.

Archeological properties become more frequent as one approaches Otter Tail, Grant and Douglas Counties. The abundance of recorded historic and archeological resources in these areas is related to the increased number of lakes, prominent landforms and a greater number of compliance-driven surveys in and around the Alexandria area. Important or sensitive archeological sites include Native American Indian burial mounds or earthworks. Earthwork sites in the region are most often found near or on the margins of larger lakes and on high terraces overlooking river valleys. Recorded earthworks are found in Grant, Otter Tail, Douglas, Stevens and Pope Counties.

In Clay and Wilkin Counties, historic-era resources are generally few in number and are scattered throughout the countryside. Many of these are isolated farmsteads. Concentrations of historic structures are found in established towns and villages and along rivers and streams. Recorded archeological sites are not found in great numbers in these counties. There is, however, a series of sites located along the Red River and its associated tributaries from northern Wilkin County to the city of Breckenridge. Inventoried architectural properties in the project vicinity have been identified in sparse scatters throughout the rural areas and concentrated in the urban centers. Most of the recorded archeological and historic resources have not been formally evaluated for significance.

Land-based Economies

Agricultural production is the dominant land use within this segment. The majority of farms raise a rotation of soybeans, wheat and sugar beets in the western portion, and a rotation of corn and soybeans in the eastern portion. Under current drainage conditions, about a quarter of the acreage in Otter Tail County; about half of Traverse, Grant, Douglas, and Pope Counties; and the majority of the acreage in Wilkin County, are considered prime farmland. Under current drainage conditions, about a quarter of the acreage in Clay County is considered prime farmland or farmland of statewide importance. Nearly half of the acreage can be considered prime farmland if it is drained and/or protected from flooding. In addition to the acreage considered prime farmland, about a quarter or less of Wilkin, Otter Tail, Douglas and Pope Counties, and about half or less of Traverse and of Grant Counties, can be considered prime farmland if it is drained and/or protected from flooding.

There are various municipal and private airports within the Fargo to Alexandria segment. The larger municipal airports are located near or in the populated cities. The Chandler Field Airport in Alexandria is located about two miles from either of the Alexandria Area Substation locations. There are also several airports and private airstrips in a line from Moorhead southeast to the Elbow Lake Area in Grant County.

There are numerous recreational opportunities along this corridor. WMAs, SNAs, State Parks, Federal Lands, municipal lands, streams and lakes all contribute to the abundance of recreational opportunities in this segment. There are six SNAs located east of Moorhead, northwest of Rothsay, west of Rothsay, south of Fergus Falls, south of Ashby and northwest of Morris. State parks within this segment include Buffalo River State Park, located east of Glyndon, MN, Lake Carlos State Park, located north of Alexandria and Glacial Lakes State Park located southwest of Alexandria. There are also a few trout streams within this segment.

Locations of high visual sensitivity include two scenic byways, Otter Trail and King of Trails. The segment is located in the Red River Valley South, Prairie Lake North, Central Lakes Deciduous West and Central Lakes Deciduous South Archeological Regions.

There are numerous DNR lands managed for timber production. The harvest areas are relatively small in size, typically containing only a few acres.

Throughout this segment, there are active and inactive gravel mines. Within the western portion, the gravel mines are mainly located near municipal areas including the cities of Sabin, Barnesville, Hawley, Kent, Rothsay, Breckenridge and Wheaton. Further east, there are active and inactive gravel pits located near the cities of Wendell, Elbow Lake, Norcross Herman, Pelican Rapids, Fergus Falls, Perham, Bluffton, Deer Creek, West Union, Osakis, Villard and Alexandria. There are six commercial aggregate locations. These facilities are located near Barnesville, Barrett, Alexandria and Forada. There is an active MNDOT gravel pit located approximately five miles north of Wheaton and approximately three miles west of Hoffman.

Natural Environments

In the western portion of this segment, the main hydrological features are the Red, Buffalo, and Otter Tail Rivers. The Buffalo and Otter Tail Rivers eventually flow into the Red River. The Red River flows north into Canada. The drainage network is minimally developed. Rivers and streams meander extensively. Flooding of large areas is common in early spring due to the level topography and frozen conditions to the north that can cause water to back-up. Few lakes are present as they are most common on a till plain in the southeast and characteristically are shallow and perched. As the project moves south and east towards the Alexandria area, there are several large water features, such as lakes, rivers, small chain lakes (sloughs) and wetlands. This difference in surface water hydrology is attributable to the Alexandria Moraine, which forms a high ridge that is the headwaters region of many rivers and streams flowing east and west.

Major rivers include Otter Tail, Mustinka, Pomme De Terre, Chippewa, Long Prairie, the Sauk and the North Fork of the Crow River. The subsection has numerous lakes, with more than 400 lakes greater than 160 acres in size.

There are numerous water bodies within this segment that are listed on Minnesota Public Waters Inventory maps and National Wetlands Inventory maps. The majority of the listed public waters

are scattered throughout this segment. They range from small tributaries, creeks, and small lakes to larger complexes, such as rivers and large lakes. In the Alexandria and Fergus Falls areas there are numerous lakes varying in sizes. If the proposed transmission line was to cross or impact a watercourse listed on the PWI, permits must be obtained from the DNR per Minnesota Statute 84.415.

There are few wetlands in the western and northern portion of the segment. Wetlands occur across the landscape and range from small depressional “pothole” areas to large wetland complexes. The eastern and southern portions contain a variety of wetlands. In the north and west areas, the wetlands are primarily emergent types. Toward the eastern and southern portions, the wetlands are more diverse and include riverine, lacustrine and palustrine wetlands. The majority of the wetlands are lacustrine. There are various MPCA listed calcareous fens including a concentration located approximately 25 miles northwest of the city of Alexandria. The native vegetation in this area is that generally associated with the Alexandria Moraine.

There are several biodiversity significance areas ranging from moderate to outstanding across the moraine, generally in a line from east of Glyndon southeast to near Rothsay. Other areas are scattered across the moraine. Riparian areas across this segment primarily occur in conjunction with the Red, Chippewa, Long Prairie, Sauk and Crow Wing rivers. Other habitats include mesic and wet prairie, lakes, agricultural field borders and grasslands.

Prairie remnants may be found in isolated locations, such as those areas inaccessible by farm equipment, railway corridors or in areas that have been preserved or restored. There are several remnant prairies along railway corridors. The two longest stretches of remnant prairie are parallel to railroads from Breckenridge south to Herman and from north of Barnesville south towards Rothsay.

The primary habitat of agriculture land intermixed with wetlands, riparian areas, windbreaks and upland grasslands support populations of common species. Due to the number of large wetland complexes a variety of migratory waterfowl have been recorded in this segment. Additionally, there are colonial water bird nesting sites northwest of the Alexandria area and at three locations within a few miles of the city of Fergus Falls.

Threatened and endangered species are present within this segment. Typically these species are associated with high quality or unique habitat communities, such as remnant prairie, wetland/surface water features, rock outcroppings, grasslands, oak savanna, woodlands or streams. These high quality or unique habitat communities are spread throughout this segment. There are very few threatened and endangered species between the North Dakota border and western edge of the Alexandria Moraine and Red River Valley. One threatened species, the Garita skipper, was found in the Red River Valley and prefers a mixed habitat of prairies, grasslands and river valleys.

The Alexandria Moraine area provides habitat for numerous endangered and threatened species due to the integration of diverse grassland, native prairie, wetland, stream and forest communities (or mixed communities) to the landscape. Rare prairie and grassland species found include the loggerhead shrike, Uhler's Arctic, Henslow's sparrow, western prairie fringed orchid, Dakota skipper, burrowing owl, Wilson's phalarope, hairy fimbristylis, chestnut-collared longspur, Sullivant's milkweed and Assiniboia skipper. Wetland and water body species include sterile sedge, trumpeter swan, hair-like beak-rush and whorled nut-rush. In addition to the listed species, there are unique habitats within this segment, such as rich fens and colonial nesting bird areas.

3.2.2 Alexandria to St. Cloud

The environmental setting of the segment between the Alexandria and St. Cloud areas is represented in Maps 11 and 12. The proposed 345 kV project includes connections at Western St. Cloud and in the Alexandria area. In Western St. Cloud, potential substation sites include a new Quarry Substation near Quarry, Minnesota, and the existing Sauk River Substation. In the Alexandria area, potential sites include the Alexandria Switching Station located on the south side of Interstate 94, southwest of Alexandria and the Alexandria Substation located on the north side of Interstate 94 on the eastern edge of Alexandria.

The Alexandria Area Substation to the Western St. Cloud Area Substation segment of the project is approximately 70 miles long and crosses Douglas, Pope, Todd and Stearns Counties. This segment begins in the Minnesota River Prairie Subsection of the Red River Valley within the Prairie Parkland Province of the Ecological Classification System. This segment is located on the Alexandria Moraine. The topography of this area is gently rolling hills and valleys. Further east of this section, this segment enters the Hardwood Hills Subsection of Minnesota and Northeast Iowa Moraine of the Eastern Broadleaf Province of the Ecological Classification System. The Western St. Cloud Area Substation Area is located at the south end of the Alexandria Moraine Complex on an end moraine area. The Western St. Cloud Area Substations are located on the west side of Waite Park, Minnesota in existing light industrial areas bordered by agriculture and rural residential areas.

Human Settlement

In general, moving east through this segment from Alexandria to St. Cloud, the population density increases. Alexandria in Douglas County is the population center within the western portion and St. Cloud is the population center within the eastern portion. In between Alexandria and St. Cloud the population density is generally very low due to the lack of densely populated cities. People living at or below the poverty level are concentrated in the Pope, Douglas, and Stearns Counties portion of this segment. The percentage of people living at or below poverty is similar to countywide data and higher than statewide data.

There are small amounts of urban and industrial expansion around the populated cities scattered throughout this segment. There is planned expansion surrounding the city of Alexandria with most of this expansion being located on the western side of the city. To the west, north and east, there are planned single family residential areas, and to the south of Interstate 94 there is commercial expansion. The smaller cities within this segment, such as Glenwood, Sauk Centre, Avon and St. Joseph, have small amounts of planned growth. Most of this planned growth is focused on residential construction around the area lakes. The greater St. Cloud area is expected to expand south of the existing city with residential and commercial, residential west along the Sauk River and commercial around the Highway 23 – Interstate 94 interchange.

Surrounding the Alexandria Switching Station and the Alexandria Substation, the area is classified mostly as transportation, agricultural, rural residential and wetland/water bodies.

Parts of this segment of the project fall within the Central Lakes Deciduous Archeological Region. Archeological sites in this region are most often situated on major lakes near stream inlets or outlets and along rivers and streams. Mound and earthwork sites are most often found on terraces or hills overlooking the sites near these bodies of water. Inventoried historic architectural properties have been identified in sparse scatters throughout the rural areas with concentrations in and around the larger communities.

In Douglas County, there are concentrations of archeological sites located around a cluster of lakes north and northwest of the city of Alexandria in La Grande Township, including several sites comprised of earthworks and prehistoric cemeteries. The part of the segment that passes through Todd County contains the fewest archeological sites and historic structures. In Pope County there are groups of archeological sites found along the shore and near the major lakes in the region. Inventoried architectural properties have been identified in sparse scatters throughout the rural areas in and around the communities of Villard, Glenwood, Sedan and Westport.

In Stearns County there are groups of archeological sites along the Sauk and Mississippi Rivers. A series of sites is located along the Mississippi River from St. Cloud down to the Clearwater River. Sites are also found along the shores of area lakes. Inventoried architectural properties have been identified in sparse scatters throughout the rural areas and, more commonly, concentrated in and around the area communities.

Land-based Economies

The Sauk Centre Municipal Airport is located south of Sauk Centre between the Alexandria Area and Western St. Cloud Area Substation. Airports are also located in the towns of Alexandria and St. Cloud, both located north of the substation areas.

Agriculture is the dominant land use. The majority of farms raise a rotation of corn and soybeans. Under current drainage conditions, about a third of the acreage in Douglas, Pope, Todd, and Stearns Counties is considered prime farmland. Additional acreage, less than a

quarter in Douglas, Pope, Todd, and Stearns Counties, can be considered prime farmland if it is drained and/or protected from flooding.

Recreational opportunities include numerous WMAs, state forest, WPAs, lakes, rivers, trout streams and SNAs. There are concentrations of WMAs located southeast of Alexandria and along Highway 55. The Birch Lake State Forest is north of Interstate 94 adjacent to Big Birch Lake. WPAs are located primarily in Pope County in a line from Osakis south to Lake Johanna. There are several SNAs, primarily located closer to St. Cloud.

Locations of high visual sensitivity include the Glacial Ridge Scenic Byway located in the western and southwestern portion of this segment.

There are no economically important forest stands within this segment.

The area around the city of Alexandria contains active and inactive gravel pits and a commercial aggregate location. As the project moves south and east towards St. Cloud there are a few inactive gravel pits located in the northern and northeastern portion of Pope County and a few active gravel pits across the southwestern portion of Todd County. As the project moves closer to St. Cloud and enters Stearns County, there are various active, inactive and MNDOT active gravel pits throughout the county.

Natural Environments

There are several lakes in this segment greater than 150 acres in size. However, many of these are shallow perched lakes. Most wetlands and wetland complexes have been drained for cropland. Several large lacustrine wetlands are located near Alexandria and St. Cloud, whereas palustrine and riverine wetlands are more common. There are numerous PWI-listed water bodies within this segment. Four DNR state listed fens are located near the cities of Spring Hill, Roscoe, St. Joseph and Richmond.

Native vegetation is primarily associated with the moderate, high and outstanding biodiversity areas and recreational areas. There are several known locations of remnant prairies identified by the DNR Natural Heritage Database within this segment; in particular, small segments exist along the railway corridors adjacent to Highway 55. Riparian areas occur in conjunction with the Long Prairie, Chippewa, Crow and Sauk Rivers. The Quarry Park SNA contains Minnesota's largest population of the state-endangered tubercled rein-orchid.

The primary habitat of agriculture land intermixed with wetlands, riparian areas, windbreaks and upland grasslands supports populations of common species. There are a large number of wetland complexes and riparian corridors utilized by migratory waterfowl. There is a colonial water bird nesting site located in Lovell Lake Waterfowl Production Areas.

Threatened and endangered species have been documented by the DNR within this segment. Typically these species are associated with high quality or unique habitat communities, such as remnant prairie, wetland/surface water features, rock outcroppings, grasslands, oak savanna, woodlands or streams. These high quality or unique habitat communities are spread throughout this segment. Prairie and grassland species found include the loggerhead shrike, Henslow's sparrow, Dakota skipper, Wilson's phalarope, tubercled rein-orchid and ram's-head lady's-slipper. Wetland and water body species found include sterile sedge, hair-like beak-rush, Blanding's turtles, king rail and whorled nut-rush. Birds noted in this segment include the bald eagle and peregrine falcon.

3.2.3 St. Cloud to Monticello

The environmental setting of the segment between the St. Cloud and the Monticello areas is represented in Map 12. The area is approximately 30 miles long and crosses Stearns and Wright Counties, Minnesota. This segment starts in the Hardwood Hills Subsection of the Minnesota and Northeast Iowa Moraine of the Eastern Broadleaf Province of the Ecological Classification System. The Western St. Cloud Area Substation is located at the south end of the Alexandria Moraine Complex. In the southeast, towards the Monticello Substation, the segment crosses the Minnesota and Northeast Iowa Morainal Section of the Eastern Broadleaf Forest Province. The area contains a mixture of deciduous forests, woodlands and prairies. This segment is characterized by flat, sandy lake plain and terraces along the Mississippi River. The topography is level to gently rolling.

Human Settlement

This segment corridor is more densely populated than the other segment corridors. The population density is most concentrated in Western St. Cloud and then decreases as the segment moves south and east to the Monticello area. People living at or below the poverty level are concentrated in Stearns County and surrounding the city of St. Cloud. The percentage of population living at or below poverty is similar to county and statewide levels in the Wright County portion and higher in the Stearns County portion of this segment.

The land in the area is a mix of agricultural, urban, industrial, grassland, deciduous forest with some wetland, water, farmsteads and rural residences. The greater St. Cloud Area is anticipated to expand south of the existing city with residential and commercial, residential west along the Sauk River, and commercial around the Highway 23 – Interstate 94 interchange. The Monticello area's long range land use plans are to expand south and west of Interstate 94 with industrial uses adjacent to the interstate and residential offset from the industrial areas.

The smaller cities within this segment, such as Kimball, Annandale and Maple Lake, have planned growth. Most of this planned growth is focused on residential construction around the area lakes. The eastern side of this segment from Monticello south to Buffalo and the area east

towards Hennepin County is anticipated to experience rapid future growth as the Twin Cities metropolitan area expands west. The area surrounding the Monticello Substation is used for industrial and interstate travel purposes or is river and woodlands.

In Clearwater Township, Wright County there is an archeological site located along the Clearwater River, a site composed of earthworks near Fish Lake and sites near the confluence of Fish Creek and the Mississippi River. In Stearns County, there are groups of archeological sites located along the Sauk and Mississippi Rivers in the city of St. Cloud. A series of sites is located along the Mississippi River from St. Cloud down to the Clearwater River. A concentration of sites is located within a cluster of lakes in Lyndon Township. A couple of sites are located along the Clearwater River. Inventoried architectural properties have been identified in sparse scatters throughout the rural areas of this segment and in and around the community of Rockville. In Sherburne County, there are recorded archeological sites adjacent to the Mississippi River, but the majority of the archeological and architectural sites are located northwest of the substation vicinity.

Land-based Economies

Airports are located primarily north of this segment and the Mississippi River, with the exception of Seven Hills Airport, located near the Clearwater River.

Between the municipal areas of St. Cloud and Monticello, agriculture is the predominant land use. Corn and soybeans are the commonly cultivated crops. Under current drainage conditions, about a third of the acreage in Stearns and Wright Counties is considered prime farmland. Additional acreage, less than a quarter in Stearns and Wright Counties, can be considered prime farmland if it is drained and/or protected from flooding.

Recreation areas in this segment include WMAs, SNAs, trout streams, state parks, WPAs, the Mississippi River, lakes and rivers. WMAs are primarily located in Wright County. There are four SNAs located within the vicinity: Quarry Park, Clear Lake, Cater Homestead Prairie and Rice Lake Savanna. Lake Maria State Park is located west of the Monticello Substation. There is a trout stream that runs south through this segment from St. Cloud to Clearwater Lake.

Locations of high visual sensitivity include the Mississippi River. The river is designated as scenic from the CSAH No. 7 bridge at St. Cloud to the county line at the Clearwater River between Stearns and Wright Counties, and State Highway No. 24 in Sherburne County. The river is designated recreational from the county line at the Clearwater River between Stearns and Wright Counties, and State Highway No. 24 in Sherburne County, to the northwestern boundaries of the Cities of Anoka and Champlin.

There are no economically important forest stands within this segment.

There are active and inactive gravel mines in this segment. There is a concentration of active, inactive and MNDOT-dedicated active gravel pits located in the southwestern portion of Stearns County. Within the western portion of this segment the gravel mines are mainly located near municipal areas including the cities of St. Cloud, Melrose, Avon, Roscoe, St. Augusta and Kimball. South and east towards the city of Monticello, there are a few concentrations of active and inactive gravel pits located along U.S. Highway 94, near Hasty and Monticello. There is one commercial aggregate location near Buffalo. There is also an active MNDOT gravel pit located near Cold Spring.

Natural Environments

The Clearwater River traverses this segment and is the county border between Stearns and Wright Counties. The Mississippi River makes up the northern boundary of the substation vicinity. There are many large lakes greater than 150 acres in size. Most of these lakes are located in eastern Stearns County and northwestern Wright County.

Wetlands occur across the landscape and range from small depressional “pothole” areas to large wetland complexes. Many of these have been drained for cropland. Stearns County appears to have a higher density of wetlands than Wright County. Several large lacustrine wetlands are located in eastern Stearns County and northwestern Wright County surrounding the many lakes. However, most of the wetlands in this segment are associated with a palustrine- and/or riverine-type system. The palustrine wetlands are primarily emergent and shrub type basins. Numerous water bodies are listed on Minnesota PWI and NWI maps. The majority of the listed public waters range from small tributaries, creeks and small lakes to larger complexes, such as rivers and large lakes. In eastern Stearns and western Wright Counties there are numerous lakes varying in size.

Native vegetation is primarily associated with the moderate, high and outstanding biodiversity areas and recreational areas in this segment. Riparian areas primarily occur in conjunction with the Mississippi, Sauk, Elk and Clearwater Rivers. Typical tree species along these riparian areas include maple, cottonwood, elm and willow.

Common fauna species are readily found in this segment due to the large variety of habitats, including urban parks and landscaping, agricultural lands, wetlands, lakes, river and stream corridors, woodlots and upland grasslands. The Mississippi River is considered a major migratory flyway through North America and is utilized by a wide variety of migratory birds. There are two colonial water bird nesting sites.

The DNR has documented threatened and endangered species within this segment. Typically these species are associated with high quality or unique habitat communities, such as remnant prairie, wetland/surface water features, rock outcroppings, grasslands, oak savanna, woodlands or streams. These high quality or unique habitat communities are spread throughout this segment. Prairie and grassland species include the loggerhead shrike, Henslow’s sparrow,

Wilson's phalarope, tubercled rein-orchid and ram's-head lady's-slipper. Wetland and water body species include hair-like beak-rush, Blanding's turtles, horned grebe and tall nut-rush. Birds noted include the bald eagle, peregrine falcon and trumpeter swan. The pugnose shiner was documented approximately four miles northeast of the Monticello Substation.

3.2.4 Alternative Configuration: St. Cloud Area to Sherburne County

The environmental setting of the segment between the Western St. Cloud Area Substation and the Sherburne County Substation is represented in Map 12. The Sherburne County Substation and the Benton County Substation are the alternative termination points for the line. The segment is approximately 30 miles long and crosses Stearns, Wright and Sherburne Counties, Minnesota. This segment starts in the Hardwood Hills Subsection of the Minnesota and Northeast Iowa Moraine of the Eastern Broadleaf Province of the Ecological Classification System.

The Western St. Cloud Area Substations are located at the south end of the Alexandria Moraine Complex. The southeast portion of the segment towards the Sherburne County Substation crosses the Minnesota and Northeast Iowa Moraine Section of the Eastern Broadleaf Forest Province. The area contains a mixture of deciduous forests, woodlands and prairies. This segment is characterized by flat, sandy lake plain and terraces along the Mississippi River. The topography is level to gently rolling.

Human Settlement

This corridor is more densely populated than the other project corridors. The population density is most concentrated in western St. Cloud and then decreases to the south and east to the Sherburne County Area. People living at or below the poverty level are concentrated in Stearns County and surrounding the city of St. Cloud. The population living at or below poverty is similar to county and statewide data in the Wright County portion, and higher in the Stearns County portion of this segment.

The area between the Western St. Cloud Substation and the Sherburne County Substation has the most municipal land due to the need to traverse the greater St. Cloud Area. The St. Cloud Area is anticipated to expand south of the existing city with residential and commercial, west along the Sauk River with residential, and commercial around the Highway 23 – Interstate 94 interchange. The County identifies Becker Area's long-range land use plans to expand adjacent to Highway 10, including urban reserve areas north and east of the existing city limits. The area surrounding the Sherburne County Substation is industrial, agricultural, river or woodland.

In Clearwater Township, Wright County, there is an archeological site located along the Clearwater River, a site comprised of earthworks near Fish Lake and sites near the confluence of Fish Creek and the Mississippi River.

In Stearns County, there are groups of archeological sites located along the Sauk and Mississippi Rivers in the city of St. Cloud. A series of sites is located along the Mississippi River from St. Cloud down to the Clearwater River. A concentration of sites is located within a cluster of lakes in Lyndon Township. A couple of sites are located along the Clearwater River. Inventoried architectural properties have been identified in sparse scatters throughout the rural areas in this segment and in and around the community of Rockville.

Land-based Economies

Airports are located primarily north of this segment of the project and the Mississippi River, with the exception of Seven Hills Airport, located near the Clearwater River and the St. Cloud Airport southeast of St. Cloud.

In between the municipal areas of St. Cloud and Becker, agriculture is the predominant land use. Corn, soybeans and potatoes are the commonly cultivated crops. Under current drainage conditions, about a third of the acreage in Stearns and Wright Counties is considered prime farmland, whereas Sherburne County is less than 5 percent prime farmland or prime farmland when drained. Additional acreage, less than a quarter in Stearns and Wright Counties, can be considered prime farmland if it is drained and/or protected from flooding.

Recreation areas include WMAs, SNAs, trout streams, state parks, WPAs, the Mississippi River, lakes and rivers. WMAs are primarily located in Wright County. There are four SNAs, Quarry Park, Clear Lake, Cater Homestead Prairie and Rice Lake Savanna, located within this segment vicinity. Lake Maria State Park is located west of the Sherburne County Substation. There is a trout stream that runs south through this segment from St. Cloud to Clearwater Lake.

There are several locations of high visual sensitivity near the Mississippi River which is a state-designated recreational river at the Sherburne County Substation and a designated scenic river north of the Clearwater River.

There are no economically important forest stands within this segment.

There is a concentration of active, inactive and MNDOT-dedicated active gravel pits located in the southwestern portion of Stearns County. Within the western portion of this segment the gravel mines are mainly located near municipal areas including the cities of St. Cloud, Melrose, Avon, Roscoe, St. Augusta and Kimball. South and east towards Sherburne County, there are a few concentrations of active and inactive gravel pits located along Interstate 94, near Hasty and Sherburne County. There is one commercial aggregate location near Buffalo. There is an active MNDOT gravel pit located near Cold Spring.

Natural Environments

As in the previous section, the Clearwater River traverses this segment and is the county border between Stearns and Wright Counties. The Mississippi River makes up the southern boundary of the Sherburne Substation vicinity.

Wetlands occur across the landscape and range from small depressional “pothole” areas to large wetland complexes. Many of these have been drained for cropland. Stearns County appears to have a higher density of wetlands than Wright County. Several large lacustrine wetlands are located in eastern Stearns County and northwestern Wright County surrounding the many lakes. However, most of the wetlands in this segment are associated with a palustrine- and/or riverine-type system. The palustrine wetlands are primarily emergent and shrub type basins. Wetlands in Sherburne County are associated with the Mississippi River basin and include riverine, scrub-shrub and emergent wetlands. Numerous water bodies are listed on Minnesota PWI and NWI maps. The majority of the listed public waters range from small tributaries, creeks and small lakes to larger complexes such as rivers and large lakes. In eastern Stearns and western Wright and Sherburne Counties there are numerous lakes varying in size.

According to the DNR, the Mississippi River is designated as scenic from the CSAH No. 7 bridge at St. Cloud to the county line at the Clearwater River between Stearns and Wright Counties, and State Highway No. 24 in Sherburne County. However, from the county line at the Clearwater River between Stearns and Wright Counties, and State Highway No. 24 in Sherburne County, to the northwestern boundaries of the city of Anoka and the city of Champlin, the Mississippi River is designated as recreational.

Native vegetation is primarily associated with the moderate, high and outstanding biodiversity areas and recreational areas in this segment. Riparian areas primarily occur in conjunction with the Mississippi, Sauk, Elk and Clearwater Rivers. Typical tree species along these riparian areas include maple, cottonwood, elm and willow.

Common fauna species are readily found due to the large variety of habitats, including urban parks and landscaping, agricultural lands, wetlands, lakes, river and stream corridors, woodlots and upland grasslands. The Mississippi River is considered a major migratory flyway through North America and is utilized by a wide variety of migratory birds. There are two colonial water bird nesting sites located in this segment.

Threatened and endangered species have been documented by the DNR within this segment. Typically these species are associated with high quality or unique habitat communities, such as remnant prairie, wetland/surface water features, rock outcroppings, grasslands, oak savanna, woodlands or streams. These high quality or unique habitat communities are spread throughout this segment. Prairie and grassland species include the loggerhead shrike, Henslow’s sparrow, Wilson’s phalarope, tubercled rein-orchid and ram’s-head lady’s-slipper. Wetland and water body species found within this segment include hair-like beak-rush, Blanding’s turtles, horned

grebe and tall nut-rush. Birds noted include the bald eagle, peregrine falcon and trumpeter swan. The pugnose shiner was documented approximately six miles east southeast of the Sherburne County Substation.

3.2.5 Special Environmental Considerations

A special area of concern in this segment is the Avon Hills area near Collegeville (note the “biological area” on Map 12. Several people commented on their interest in the area through the public scoping process.

The Avon Hills area of Stearns County, including all of Avon and Collegeville Townships and parts of St. Joseph, St. Wendel, Farming, and Wakefield Townships and the campus of St. John’s University has been identified by the Audubon Society and its partners as an Important Bird Area. As part of an international effort, Important Bird Areas represent the most critical areas for the conservation of bird populations statewide. The Avon Hills area is important because of its extensive forested landscape and the populations of Red-shouldered Hawks, Blue-gray Gnatcatchers, Wood Ducks, Cerulean Warblers and other species that are found here. A number of WPAs managed by the U.S. Fish and Wildlife Service are within the Important Bird Area, as are two Minnesota DNR Scientific and Natural Areas, the St. Wendel Bog and the St. Johns Arboretum.

Audubon Minnesota is concerned about the loss of habitat from siting transmission structures and clearing the corridor for the line. There is also the potential for serious habitat fragmentation that can have serious impacts on many forest bird populations.

According to the Avon Hills Initiative, a community-based organization located in Central Minnesota committed to preserving the rural and natural character of the roughly 50,000 acres in Avon, Saint Joseph, Collegeville, and St. Wendel Township, the wooded hills, wetlands, and lakes of this area are a key component of the remaining natural vegetation of Stearns County. As identified by the MN County Biological Survey, a significant proportion of the remaining natural vegetation and rare plants and animals of the entire county lie within this relatively small geographic area.

3.3 The Brookings, South Dakota to the Twin Cities Project Area

This section describes the especial environmental setting of the proposed HVTL project section connecting Brookings County, South Dakota to the southeast corner of the Twin Cities. The overall length of this segment is estimated at 165 to 200 miles. The Brookings to the Twin Cities transmission line has been divided into five major segments in an attempt to better analyze and

focus directly on the areas and issues that are unique within this proposed section of the CapX 2020 transmission line corridor.

The first segment of the Brookings to the Twin Cities portion of the project is a proposed 345 kV line between White, South Dakota (Brookings County) and Marshall (Lyon County). A 345 kV segment is proposed between Lyon County and Granite Falls and would also include a short segment of 230 kV line in the Granite Falls area. The next proposed segment is a new 345 kV double-circuit transmission line between the Lyon County Substation and the Franklin Substation, followed by a double-circuit 345 kV transmission line between the Franklin Substation New Prague (Helena Substation). The final portion of the proposed project consists of two 345 kV single circuit segments; one connecting the Helena Substation to the Lake Marion Substation (Lakeville) and the second connecting the Lake Marion Substation to the Hampton Corner Substation (near Farmington).

3.3.1 Brookings County Substation to Lyon County Substation

This segment of the project would start at the existing Brookings Substation located near White, South Dakota. A 345 kV line would be routed from the Brookings Substation to the existing Lyon County Substation near Marshall, Minnesota. Depending on the final route selected, this section of the transmission line is estimated to be 50 to 55 miles in length and would pass through Lincoln and Lyon counties (Map 13).

This section of the proposed transmission line corridor traverses the Inner Coteau, Coteau Moraines, and the Minnesota River Prairie ecological subsections in the southwest corner of Minnesota, correspondingly. Starting from the Minnesota/South Dakota border and moving east, the topography of the Inner Coteau or “High Plains” is mostly level with gently rolling hills composed of glacial till. The subsection then rises abruptly at Buffalo Ridge, the western boundary of the Coteau Moraines subsection. Buffalo Ridge is a high landform (1,995 feet above mean sea level), second in Minnesota only to Eagle Mountain on the North Shore of Lake Superior. Moving east from Buffalo Ridge the elevation tapers off and levels out into the Minnesota River Prairie Subsection. This area of Minnesota is well-known for its windy conditions, shallow lakes, and prairie wetlands.

The main thoroughfares through these Counties and this proposed transmission corridor are U.S. Highways 14, 59, and 75 and State Highways 19/68, and 23. The larger cities in the area include Marshall, Ivanhoe, Lake Benton, Minneota, Hendricks, and Tyler, with Hendricks and Marshall being the most densely populated.

Human Settlement

Overall, the population density is very low across the two counties. The total land area of Lincoln County is 537 acres in size and has a population of 5,963 or approximately 12 persons

per square mile. Lyon County is 714 acres in size with a population of approximately 24,640 or 35.6 persons per square mile. The percentage of people living at or below poverty in the two counties is similar to other county and statewide levels.

This portion of the proposed project is located in the Prairie Lake archeological region of Minnesota. The Minnesota Office of the State Archaeologist has recorded 47 archaeological sites distributed throughout Lincoln County and 122 sites in Lyon County. The archeological sites in this region are most often situated along the shores of larger lakes and streams (e.g., Lake Benton, the Redwood River) and on high or prominent topographical features that afford views of the surrounding area. Archeological sites are normally evaluated for significance only if there is potential for direct physical effects

Historic resources have been identified by SHPO in both Lincoln and Lyon Counties. The listed sites include architectural resources located within the city and township limits of Tyler, Drammen, Lake Benton, and Ivanhoe in Lincoln County and Minneota, Cottonwood, Lynd, Marshall, Tracy, and within Camden State Park in Lyon County, all of which are properties listed or eligible for listing on the National Register of Historic Places.

Land-based Economies

Land use within Lincoln and Lyon Counties is predominantly row crop and pasture (93 and 91 percent respectively). Zoned land use classifications across this segment include floodplain, agricultural, suburban/residential, urban expansion, highway/transportation, unincorporated and planned unit development. Urban expansion is planned around the cities of Marshall and Ghent in Lyon County.

Recreational areas in Lincoln and Lyon Counties include 61 and 46 WMAs respectively. In addition, there is the USFWS Big Stone WMD which purpose is to acquire and manage WPAs in Lincoln and Lyon Counties. There are currently eight WPAs, two FmHA conservation easements and six wetland or habitat protection easements in the district, totaling approximately 3,000 acres.

Camden State Park is located along the Redwood River in the southeastern portion of this proposed corridor, just south of the town of Lynd in Lyon County. The park offers a variety of winter and summer trail activities including hiking, biking, snowmobiling and skiing.

Natural Environments

As stated earlier there are numerous lakes, rivers, and wetlands located in or around this proposed corridor segment. A line of shallow lakes runs along the plateau and stretches from the city of Hendricks to the southwest corner of Lyon County. Significant surface flows include Yellow Medicine River, South Branch Yellow Medicine River, Three Mile Creek, Meadow Creek, Cottonwood River and Redwood River. In addition there are numerous wetlands strewn

throughout this area. The majority of the water bodies in Lincoln and Lyon Counties are listed on the PWI of Minnesota and the NWI of Minnesota.

The majority of the proposed transmission corridor from Brookings to Twin Cities is located within the North Central Glaciated Plains Section of Minnesota, as defined by the DNR Ecological Classification System. The principal habitat of agricultural land intermixed with wetlands, riparian areas, windbreaks and upland grasslands in this area commonly supports wildlife populations of deer, rodents, raptors and songbirds. Greater habitat diversity can usually be found in select riparian areas or large wetland complexes, which typically support a greater numbers of species, including a variety of migratory waterfowl such as the greater white-fronted goose, snow goose, Canada goose, wood duck, gadwall, American widgeon, mallard, blue-winged teal, canvasback, common and hooded merganser and great blue heron.

The DNR has currently identified 78 know SGCN or animals whose populations are rare, declining, and vulnerable to long-term health and stability in the Coteau and Inner Coteau Moraines Subsection and 116 SGCN within the Minnesota River Prairie Subsection. Some extreme examples include the Poweshiek skipper, the Topeka shiner, and the Creek heelsplitter. The two major problems for all the SGCN identified by the DNR in these three habitat subsections are habitat loss and habitat degradation.

Three species have been identified as threatened or endangered in Minnesota and two federally listed species have been identified between the proposed transmission line corridor from Brookings County and Lyon County Substations. The two species that have been listed as threatened in Minnesota are the Ottoe skipper and the Loggerhead shrike. The one endangered specie is the Burrowing owl. The Topeka Shiner is a federally listed endangered species and the Western Prairie Fringed Orchid is listed as a federally-listed endangered species.

3.3.2 Lyon County to Hazel Creek to Minnesota Valley Substations

This segment of the project would include the construction of the Hazel Creek Substation to be located southwest of Granite Falls, Minnesota. A proposed 345 kV line would replace an existing 115 kV transmission line and connect the existing Lyon County Substation to the new Hazel Creek Substation allowing connection to the existing transmission line system near Granite Falls. The proposed transmission line would be approximately 30 miles in length. Also proposed is a new 230 kV transmission line between the proposed Hazel Creek Substation and the existing Minnesota Valley Substation to replace a portion of the existing Lyon County Substation to Minnesota Substation 115 kV circuit. This new line would be approximately 8 to 10 miles in length. This entire portion of the Lyon County to Granite Falls (Hazel Creek Substation) segment would pass through the following counties depending on final route selection: Chippewa, Lyon, and Yellow Medicine (Map 13).

Similar to the Brookings County Substation to Lyon County Substation segment of the project, this segment of the proposed transmission corridor is also located within the North Central Glaciated Plains Section of Minnesota. However, a greater majority of the corridor crosses through the Minnesota River Prairie Ecological Subsection. The topography of this large subsection is flat to gently rolling glacial till material.

Human Settlement

The main highways are the same as the first segment with the addition of State Highway 67/U.S. Highway 212 and State Highway 274. Granite Falls in Yellow Medicine County is the major urban area in which this corridor is proposed.

Yellow Medicine County is 758 square miles in size with a total population of 10,430 or approximately 15 persons per square mile. Approximately 30 percent or more of the people in the County reside in and around the city of Granite Falls. The percentage of people living at or below poverty is similar to other county and statewide levels.

This portion of the project has a rich archeological heritage. The Upper Sioux Indian Community is located south of the Minnesota Valley Substation on the south side of the Minnesota River. A number of earthworks and mounds are recorded within the Minnesota River Valley, as well as several archeological recorded sites in close proximity to the Minnesota Valley Substation in Granite Falls. Archeological recorded sites are also found along the banks of Spring Creek near Hazel Run. There are properties that are on the NRHP that are considered eligible for listing.

A number of historic architectural properties are found near population centers, such as Canby Historical Commercial Center and the Granite Falls area. Isolated historic architectural structures and farmsteads may be found throughout this segment. There are properties that are on the NRHP that are considered eligible for listing.

Land-based Economies

Again, row-crop agriculture and pasture is the predominant and use (91 percent) of both Lyon and Yellow Medicine counties, where the majority of this segment of corridor is located. This segment also crosses areas zoned as floodplain, suburban/residential, urban expansion, highway/transportation, unincorporated and planned unit development. The urban areas are the main concern with regards to compatibility with transmission lines. This is due to the lack of available space to accommodate a transmission line when compared to agricultural areas.

The Granite Falls Municipal Airport is located about four miles south of Granite Falls. The runway at the airport runs north to northwest to south to southeast. The BNSF crosses through the center of the county. Prairie remnants have been identified along the BNSF Railroad tracks north and south of the city of Cottonwood in addition to other isolated locations.

Recreational areas in Lincoln and Lyon Counties include 35 WMAs. There are also two SNAs located in Yellow Medicine and Chippewa Counties; the Blue Devil Valley SNA and the Gneiss Outcrops SNA, respectively. The Blue Devil SNA is located approximately one mile southwest of Granite Falls and one-half mile west of the Minnesota Valley Substation. This SNA contains a granite outcrop community that supports one of the largest known populations of the rare Five-lined Skink. The Gneiss Outcrops SNA contains some of the oldest known rock on the earth's surface. This SNA is also home to a number of very rare plant species such as Great Plains prickly pear, brittle cactus, Carolina foxtail, rare little barley, and mousetail. Additional recreational resources in the area include the Upper Sioux Agency State Park located southeast of Granite Falls.

Areas of high visual sensitivity for this segment would include Blue Devil SNA, Gneiss Outcrops SNA, Upper Sioux Agency State Park, and the Minnesota River. A stretch of the Minnesota River extending from Lac Qui Parle Dam to the Redwood County state aid highway 11 bridge near the city of Franklin is designated as both scenic and recreational under the Minnesota Wild and Scenic Rivers Program. Map 16 displays, in greater detail, the proposed corridor where the transmission line would likely span the Minnesota River.

Natural Environments

There are lakes scattered throughout the east-southeast corner of Yellow Medicine County and the northeast corner of Lyon County with School Grove, Sham, Curtis, and Wood being a few of the larger lakes. In addition to the streams previously identified in Lyon County, the following streams or rivers are located in Yellow Medicine County: Minnesota River, Hawk Creek, Yellow Medicine River, Hazel Creek, Wood Lake Creek, and Boiling Springs Creek. There are an estimated 13,361 acres of wetlands listed on the NWI and located throughout Yellow Medicine County.

There are no state or federal listed threatened or endangered animal species identified along this proposed corridor. The (Fink) Sheard black disc lichen is a Minnesota endangered plant species that has been identified within the area of the proposed corridor.

3.3.3 Lyon County Substation to the Franklin County Substation

The Lyon County Substation to the Franklin County Substation segment of the proposed project consists of a new 345 kV double-circuit transmission line between the Lyon County Substation and an area in close proximity to the city of Franklin. Depending on siting and final route selection, the line would terminate at a newly constructed substation or the existing Franklin Substation and would be approximately 45 miles long and pass through Lyon and Redwood Counties (Map 14).

The entire proposed corridor crosses through the Minnesota River Prairie Ecological Subsection. As described earlier, the topography of this large subsection is flat to gently rolling glacial till material.

Human Settlement

The prominent state highways in Redwood County where the majority of cities are located are State Highway 19/67 & 68 and U.S. Highway 71. The city of Redwood Falls is the major urban area located within this proposed corridor. Redwood County is 880 acres in size with an estimated population of 15,791 or an average of 19 people per square mile. Redwood Falls is the County Seat and has an estimated population of 5,200 people. Pertinent information about Lyon County can be found in the previous sections. The percentage of people living at or below poverty in the two counties is similar to other county and statewide levels.

Archeological sites have been recorded in the eastern half of this segment concentrated along the shores of the Redwood and Minnesota Rivers. Most sites have not been evaluated and none of the recorded sites are listed in the NRHP. It is possible that sites within this segment may be found eligible for listing, especially those linked with the Minnesota River.

Similarly, the recorded historic architectural properties are found in the major population centers of the cities of Redwood Falls, Morton and Franklin. Approximately 25 recorded architectural properties in this segment are listed on the NRHP.

Land-based Economies

Land use in this section of the proposed corridor is predominantly row crop agriculture and pasture. Land west of Redwood Falls is zoned for future suburban residential use. The remainder of the proposed corridor is mainly zoned agriculture. This segment of the corridor is located in the Minnesota River Watershed.

Recreation includes WMAs scattered across the landscape, 46 in Lyon County and 30 in Redwood County. Fort Ridgely State Park is located southeast of the city of Franklin. The Minnesota River is listed as a State Canoe Route in this area. There are also parcels of forested land concentrated along the Minnesota and Redwood River valleys and near Redwood Falls that the DNR manages.

Areas of high visual sensitivity for this segment would include a stretch of the Minnesota River extending from approximately the city of Morton to the area near Fort Ridgely, which is designated as a Minnesota State Wild and Scenic River by the DNR. Portions of the Minnesota River in this area are also listed on the NRI and are recognized for their ORV with regards to scenery, recreation, wildlife, and history. Map 17 displays, in greater detail, this portion of the proposed corridor that would necessitate a crossing of the Minnesota River.

Natural Environments

There are a number of water bodies throughout this proposed segment that are listed on Minnesota PWI and NWI maps. Most notable is Ramsey Creek, a DNR designated trout stream managed for brown trout. Ramsey Creek is located just northwest of Redwood Falls.

The Redwood River and the Minnesota River are two major rivers located in this proposed corridor. The Redwood River flows from west to east into the Minnesota River north of Redwood Falls. The Minnesota River flows southeast and runs directly across this proposed segment defining the east/west boundaries of Redwood/Renville, respectively. The Minnesota River in this area is also designated as a Minnesota State Wild and Scenic River by the DNR.

The National Rivers Inventory (NRI) lists 310 miles of the Minnesota River starting in Chaska, Minnesota, running through this proposed segment and ending at Big Stone Lake near Ortonville, Minnesota as a river segment possessing more than one ORV of national significance. This stretch of the Minnesota River is recognized for its ORV with regards to scenery, recreation, wildlife, and history.

The NRI is a register of river segments that potentially qualify as national wild, scenic or recreational river areas, and is compiled and maintained by the National Park Service. The National Wild and Scenic Rivers Act (16 U.S.C. 1271-1287, section 5.(d)) states that "In all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic and recreational river areas." The NRI qualifies as a comprehensive plan under Section 10(a)(2)(A) of the Federal Power Act.

Larger wetland complexes are associated with the lakes on the western edge of this segment, the Redwood River floodplain and the Minnesota River floodplain. There are approximately 10,413 acres of wetlands in Redwood County. The Minnesota River is also recognized as a major flyway for migrating waterfowl.

Swedes Forest, Homme-Kollin Unit SNA is located in the Minnesota River Valley just south of the Minnesota River at the intersection of Yellow Medicine, Redwood, and Renville Counties. This SNA is known for its Five-lined skink community. In addition, several undisturbed wetland areas are found within this SNA.

Native vegetation is primarily associated with biodiversity significance areas, primarily located in the Redwood River and Minnesota River floodplain. In particular there is an area of outstanding biodiversity located southwest of the city of Franklin. Also located in the area are the Prairie bush clover which is both State and Federally-listed as threatened and the (Fink) Sheard black disc lichen that is listed as endangered in the State of Minnesota. There are no other State or Federally listed threatened or endangered species within this portion of this segment.

3.3.4 Franklin Substation to Helena Substation

A double-circuit 345 kV transmission line is proposed between the Franklin Substation and a newly constructed substation identified as the Helena Substation to be located in the general vicinity of the city of New Prague. The proposed Helena Substation would connect the new double-circuit 345 kV line to the existing Blue Lake to Wilmarth 345 kV line. Depending on siting and final route selection this segment of the project would be approximately 45 miles long and pass through Le Sueur, Nicollet, Renville, Scott, and Sibley Counties (Maps 14 and 15).

This segment of the proposed project also passes through the Minnesota River Prairie Subsection and includes Nicollet, Renville, and Sibley Counties.

Human Settlement

State Highway 19 runs west to east through this portion of the project. A number of highways intersect Highway 19 perpendicularly, such as State Highways 4, 15, 21, 22 and U.S. Highway 169. Population density varies through this proposed corridor and is most concentrated in Scott County on the eastern portion of the segment as well as the cities of Gaylord, Belle Plaine, and Le Sueur. The percentage of people living at or below poverty throughout this portion is lower than other county and statewide data.

This segment is located within the Prairie Lake Archeological Region. The greatest number of recorded sites is found mainly along the Minnesota River and its tributaries. Few sites are eligible for listing or are listed on the NRHP. If impacts to any recorded site cannot be avoided, that recorded site will require formal significance evaluation to determine if it meets the eligibility requirements of the NRHP. If found significant, strategies to mitigate and minimize impacts will be required.

Historic architectural resources recorded within this segment are mainly concentrated in and around the past and current urban communities such as Morton, Franklin, Fairfax, Morgan, and Fort Ridgely State Park. There are a number of NRHP listed properties identified in this segment.

Land-based Economies

This proposed corridor is mainly zoned agricultural, reflecting the typical row crop and pasture land use of the area with the exception of Scott County, which contains a greater percentage of land zoned for urban expansion. Future urban expansion in this area is planned from the city of Jordan south to the city of Belle Plaine and around the city of Gaylord.

Le Sueur Municipal Airport is located approximately two miles south of the city of Le Sueur. A few private airstrips are located along the Minnesota River on the eastern part of this segment.

Areas of high visual sensitivity for this segment would include a spanning of the Minnesota River somewhere between the city of Belle Plaine area to the city of Le Sueur area. Identified earlier in this section, this portion of the Minnesota River is listed as a State Canoe Route and includes significant locations such as the Chamberlain Woods SNA, Fort Ridgley State Park, and parts of the Minnesota Valley State Recreation Area. Map 18 displays, in greater detail, this portion of the proposed corridor that would necessitate a crossing of the Minnesota River.

Natural Environments

The Big Wood Subsection includes the following Minnesota counties in their entirety: Wright, Hennepin, McLeod, Carver, Scott, Le Sueur, and Rice; as well as portions of Meeker, Sibley, Blue Earth, and Dakota Counties. The DNR indicates a total of 121 SCGN are known or predicted to exist within this subsection. The 121 SCGN include 55 species that are listed federal or state endangered, threatened, or of special concern. Specifically, seven mammal SCGN are identified to occur in this subsection, approximately 32 percent of all mammal SCGN in the state.

The federally and state threatened Trumpeter Swan has been identified near the border of Renville and Sibley Counties. Concentrations or “beds” of mussels including state-listed threatened and endangered species such as the Winged Maple leaf are found in the Minnesota River near Redwood Falls. Additional concentrations of freshwater mussels have been identified near Belle Plaine and Henderson.

The Minnesota River Valley is recognized as a major flyway for migrating birds. There are three colonial water bird nesting sites in this proposed segment that are north of Gaylord, along the Minnesota River north of Le Sueur and Henderson.

Native plant communities are prevalent in the valley and along the bluffs of the Minnesota River. There are several miles of prairie along the Dakota, Minnesota and Eastern Railroad right-of-way. Prairie remnants with records of Prairie bush clover, a federal and state-threatened species, are found along the bluffs of the Minnesota River Valley. Other plants listed as threatened and endangered include state-listed threatened species Sullivant’s milkweed, kitten-tails, and (Fink) Sheard black disc lichen.

Numerous WMAs are located in the counties through which this proposed segment traverses: 33 WMAs in Nicollet County, 19 in Sibley County, 19 in Le Sueur County, and 14 in Scott County. The Chamberlain Woods SNA is located southwest of the city of Le Sueur along the Minnesota River. The Minnesota River is listed as a State Canoe Route from State Highway 4 to the city of Le Sueur. Fort Ridgley State Park is located along the upper Minnesota River just south of Franklin. The Lawrence Headquarters of the Minnesota Valley State Recreation Area, Minnesota Valley State Park and the Rush Creek Area of the Minnesota Valley State Recreation Area are located along the Minnesota River near the city of Jordan.

3.3.5 Alternative: Minnesota Valley Substation to the West Waconia Substation

The identified alternative configuration for the Brookings County to Twin Cities 345 kV project would instead connect the Minnesota Valley Substation (Granite Falls) with the West Waconia Substation and then connect at the Helena Substation.

The proposed portion of the segment is approximately 85 miles long and crosses portions of Chippewa, Renville, McLeod, Carver and Sibley Counties (Map 15).

This segment is located within the previously described Minnesota River Prairies Subsection and the Big Woods Subsection of the Minnesota.

Human Settlement

The cities in this segment are scattered throughout and concentrated along Highways 212 and 5. The population density varies and is denser towards the endpoints of each segment (Granite Falls and western suburbs of the Twin Cities). The number of people living at or below poverty in the west is similar to county and statewide data and decreases moving east; closer to the Twin Cities.

This segment is located in the Prairie Lake and Southeast Riverine archeological regions of Minnesota. Recorded archeological sites in this region are most often situated along the shores of larger lakes and streams and on high or prominent topographical features that afford views of the surrounding area. It is likely that significant recorded sites exist within or near this segment, especially those associated with permanent water bodies north and east of Young America.

There are several recorded historic properties in Benton Township. Several properties are listed on the NRHP or are considered eligible for listing.

Land-based Economies

This segment is mostly zoned agriculture (row crop and pasture), reflecting the area's typical land use. Future urban expansion is projected around the city of Granite Falls in Chippewa County, the city of Olivia in Renville County, and the cities of Norwood Young/America in Carver County. Several private airstrips are concentrated along Highway 212.

Recreation areas include 13 WMAs in Renville County and 21 in McLeod County. The Minnesota River is also a State Canoe Route through this area. There are three federally-managed easements that offer habitat for various common species.

Aggregate resources are concentrated along a series of water bodies that run from west to east near the cities of Sacred Heart, Renville, Danube and Olivia.

Natural Environments

This proposed segment is located within the Minnesota River Basin and the Upper Mississippi River Basin. The western portion of the segment contains numerous small surface flows and ditches that drain towards the Minnesota River Valley. The east portion of the segment is populated with more lakes and wetlands, many of which are listed on the NWI/PWI.

Prairie remnants have been identified along the Twin Cities and Western Railroad Company Railroad between the cities of Granite Falls and Glencoe. There are occurrences of State-listed threatened and endangered kitten-tails and (Fink) Sheard black disc lichen across the bluffs of the Minnesota River Valley, respectively.

The endangered Henslow's sparrow and threatened Loggerhead Shrike animal species are located in this segment. These species occur in grassland areas with wind rows. There are four colonial water bird nesting sites located in Carver (1), McLeod (1) and Renville (2) Counties.

3.3.6 West Waconia Substation to Helena Substation

The West Waconia Substation to Helena Substation segment is about 30 miles long and crosses portions of Carver, Scott, Sibley and Le Sueur Counties.

It is located within the previously described Minnesota River Prairies Subsection and the Big Woods Subsection. This proposed route is north/south positioned.

Human Settlement

The cities are generally associated with Highway 212 and the Minnesota River. Population densities are most concentrated in Scott County around the city of Belle Plaine. People living at or below poverty in this segment are lower than county and statewide data.

Conservation, agriculture and urban expansion zones reflect the typical land use in this area. Urban expansion is planned around the city of Jordan and the city of Belle Plaine. Again, most of Scott County within this segment is zoned for urban expansion.

Recorded sites consist of burial mounds and earthworks along the Minnesota River Valley. There are no properties in the area that are listed on the NRHP. If properties are listed on the NRHP or if they are considered eligible for listing, they may be afforded protection under federal and state regulations.

Architectural properties listed in the state inventory are clustered in the urban areas of Henderson, Belle Plaine, Le Sueur and Jordan, each with properties listed on the NRHP.

Land-based Economies

The primary recreational activities are associated with the Minnesota River and have been previously described in Section 3.3.4.

Locations of high visual sensitivity would include recreation areas along the Minnesota River. The Minnesota River would need to be crossed along some point in this proposed segment of the corridor. Portions of the Minnesota River in this area are listed as a State Canoe Route and include WMA locations. The Minnesota Valley Wildlife Refuge, managed by the USFWS, is located north of the city of Jordan. Numerous threatened and endangered species including several mussel species are located in the Minnesota River, along with the Trumpeter swan, and the Bald eagle.

Natural Environments

The Minnesota River traverses this proposed corridor section from east to west. There are many surface flows and ditches that drain to the Minnesota River Valley. Wetlands are generally scattered throughout, with concentrations occurring in the north around the lakes between the cities of Waconia and Young America and along the Minnesota River in the southeast portion of this segment.

This area is rich with native plant communities, protected plant species and State and Federally protected lands. Rare species are generally associated with remnant prairie, wetland/surface water features, grassland, oak savanna, woodland, deciduous forest areas or, in the case of freshwater mussels, within rivers. The majority of these areas occur in and around the Minnesota River Valley.

The Minnesota Valley Wildlife Refuge, managed by the USFWS, is located north of the city of Jordan. These habitats also support several threatened and endangered species including several mussel species in the Minnesota River, the trumpeter swan, and the Bald eagle, a federally threatened species.

3.3.7 Helena Substation to Lake Marion Substation

The final portion of the proposed project consists of two 345 kV single circuit segments located in the southern part of the Twin Cities. One of the 345 kV transmission lines would run from the proposed Helena Substation to the existing Lake Marion Substation in Lakeville, Minnesota. The second of the two proposed 345 kV lines would exit the Lake Marion Substation and would continue to the proposed Hampton Corner Substation, as described in Section 3.1.1 in the Twin Cities to La Crosse segment analysis. Depending on final route selection, the Helena Substation to Lake Marion Substation line would be approximately 20 to 30 miles long and the Lake Marion Substation to Hampton Corner Substation line would be approximately 25 miles long. The

Helena Substation to Lake Marion Substation segment crosses portions of Scott, Le Sueur, Rice, and Dakota Counties (Map 15).

This proposed segment is also located in the Big Woods Subsection of the Minnesota. Only a small fraction of the Big Woods remains today, as row crop agriculture and pasture have dominated the land use. The forest areas are now fairly separated from each other, but still provide important edge habitat. The area also includes gentle sloping hills with smooth slopes that transition into a broad depressed landscape with significant water features.

Human Settlement

The cities are concentrated along Highways 169, 21 and 19. The population density varies across the western portion this segment and increases in density further east and closer to the Twin Cities. The total land area of Scott County is 356 square miles in size and has a population of 124,092 or approximately 251 persons per square mile. Dakota County is 569 square miles in size with a population of approximately 388,001 or 624 persons per square mile. The number of people living at or below poverty is much lower when compared with other county and statewide data.

According to the Scott County 2020 Land Use Plan, urban growth is expected to occur in the northeast portion of the county and surrounding the cities of Belle Plaine, Jordan, New Prague, New Market and Elko. The eastern portion of this segment in Scott County is defined as rural residential growth. The area is planned to remain residential west of New Prague and south of Belle Plaine. Urban growth is expected to occur in the northwest portion of Dakota County, according to the Metropolitan Council 2040 Growth Strategy.

This segment is located within the Prairie Lake archeological region and known records of archeological resources are primarily associated with water bodies. There are no known sites either on or eligible for listing on the NRHP. There are a large number of inventoried architectural properties. Those that are listed or eligible for listing on the NRHP are concentrated within the communities of New Prague and Belle Plaine.

Land-based Economies

Private airstrips include Sky Harbor Residential Airpark about two miles south of Elko, and Loon Lane Seaplane Base, located in New Prague in Scott County.

Natural Environments

There are numerous bodies of water scattered within this segment that are sited on Minnesota PWI and NWI maps. Surface water resources in this proposed segment are primarily small streams that drain into lakes and associated wetlands. The lakes are primarily concentrated between the cities of New Prague and New Market in Scott County and south of the city of Lonsdale in Rice County. There are approximately 60,604 acres of wetland scattered throughout Scott and Dakota Counties.

Vegetation in the area is associated with areas of high biodiversity significance that are concentrated along the Minnesota River and water features. Riparian areas occur primarily in conjunction with the Minnesota River and along streams.

The primary habitat of agricultural land intermixed with wetlands, riparian areas, windbreaks and upland grasslands supports populations of common animals in this segment. Three state or federally threatened or endangered species are found in this segment: the Blanding's turtle is a state-listed threatened species, the Loggerhead shrike, a songbird, is also a state-listed threatened species found in Rice County in prairie and grassland habitats.

Rice and Dakota Counties are the two counties not included in the previous section and include 14 and 5 WMAs respectively and are located along both the western and eastern edges of this segment. Black Dog Nature Preserve SNA is located in Dakota County approximately one mile east of U.S. Highway 35W and north of County Road 32. Whitney Island SNA is an island located in Cedar Lake in Rice County. According to the DNR there are normal timber harvest sites located in Sheas WMA in Le Sueur County and in Marsh WMA in Scott County.

3.3.8 Special Environmental Considerations

The configurations identified for the proposed transmission line corridor between the Brookings County Substation and the Hampton Corner Substation have a limited number of environmental issues that would preclude the routing or construction of a transmission line. In general, the following environmental issues should be of greatest concern for this segment of the CapX 2020, Group 1 Projects:

- The primary issue associated with Brookings to Twin Cities segment will be the three proposed Minnesota River crossings near Granite Falls, Redwood Falls/Franklin, and north of Le Sueur (Maps 16-19). Concern is to:
 - Ensure consideration of the following outstandingly remarkable values of national significance (scenery, recreation, wildlife, and history).
 - Protect the Minnesota Valley Scenic Byway paralleling the Minnesota River.
- The Lower Sioux Indian Community Reservation located northwest of Franklin.

4.0 System Alternatives

According to Minnesota Rule 7849.7060 subp 1B, an Environmental Report must include the following:

A general description of the alternatives to the proposed project that are addressed. Alternatives shall include the no-build alternative, demand side management, purchased power, facilities of a different size or using a different energy source than the source proposed by the applicant, upgrading of existing facilities, generation rather than transmission if a high voltage transmission line is proposed, transmission rather than generation if a large electric power generating plant is proposed, use of renewable energy sources, and those alternatives identified by the commissioner of the Department of Commerce.

This section provides a broad view of alternatives and impacts, especially those specified in the state rules, those alternatives reviewed by the applicant, and those addressed in public comment. It covers, as noted in the Scoping Decision, the impacts of the “no-build” option, demand side management and facilities of a different size or configuration (described as system improvements and alternative corridors in the scoping document). This section also evaluates the possibility of employing a generation alternative to the transmission proposal that incorporates dispersed generation.

An alternative generally reviewed in a Certificate of Need case is whether the Applicants could purchase power to meet the increased load growth in project(s). Typically, this would be more relevant in a power plant application. In this transmission application, purchased power would not solve any system inadequacies. While power could be purchased to meet local load serving issues, that power would have to be transferred and delivered along an arguably inadequate transmission system. Additionally, purchased power does nothing to provide additional access on the grid to renewable energy systems. This is not a feasible alternative in this case.

The proposal outlined in the Application is intended to meet three separate types of need through the proposed projects. The proposal is designed to meet system reliability and expansion needs in order to address an expected 4-6000 MW increase in capacity needed throughout the projects by the year 2020. It is also being presented to accommodate load serving needs, especially in the Alexandria, St. Cloud, Rochester and La Crosse areas. In additional, the system is being portrayed as an opportunity to provide outlet to wind generation, especially along the Brookings to the Twin Cities route.

The alternates reviewed in this section will be unlikely to meet all the stated need in every area. For example, a generation alternative may be able to solve load serving issues along the Fargo

line, but may not have any capacity to move renewable energy off the Buffalo Ridge to end users. In this review, alternatives are not discounted merely because, in and of themselves, they may not be feasible alternatives to the entire need addressed by Applicants' proposal. Alternatives are evaluated for what they may or may not be able to contribute to the need, to separate project areas or the whole project, and what environmental impacts that may imply.

4.1 No-Build Alternative

The Environmental Report content rule requires the ER to describe and analyze the impacts of a no-build alternative. This section assumes that under the no-build alternative, one or more of the CapX2020 Project segments would not be built. None of the newly proposed transmission lines or substations in those segments would be constructed. The proposed improvements/upgrades to existing transmission lines and substations would also not be completed. The existing transmission system, at least in the area of those segments would continue to operate as it does today.

If the no-build alternative occurs, the potential for present and future transmission problems relating to community service reliability in Rochester and other parts of southeastern Minnesota and the La Crosse, Wisconsin, area would not be resolved. The same is true for the Alexandria and St. Cloud areas. Other alternatives may be able to alleviate some of these issues, but this option assumes no action; so the inadequacies would persist.

Subsequent Office of Energy Security testimony will argue that the existing transmission network will not be able to accommodate an anticipated total system-wide growth of 4,000 to 6,000 MW in parts of Minnesota and surrounding states by the year 2020.

In addition, the prospect of adding generation outlet and renewable energy support for the future development of renewable energy generation would be diminished. The 2007 legislative initiative requiring electricity providers to supply 25 percent of retail energy in Minnesota from renewable sources (e.g. Buffalo Ridge wind energy generation) by the year 2025 may be difficult to accomplish.

In fact, renewable energy development impacts or benefits could be moved from the Buffalo Ridge region to somewhere else in Minnesota or to neighboring states if adequate transmission lines are developed to serve wind energy development elsewhere.

Under this alternative, peak-demand periods would likely increase across various parts of Minnesota, e.g., Rochester, Fargo, Alexandria and St. Cloud. An increase in localized line overloads and voltage deviations would compound and ultimately result in the increased risk of reliability outages. Several hours would be needed to restore electric service to customers in the

areas under such a scenario, and once service was restored the companies may need to institute rotating blackouts to insure that voltage would not collapse again.

Denial of all parts of the Project is not a feasible alternative to address the proposed need. This alternative does not address the voltage support issues that are being experienced in areas throughout Minnesota; it is likely that there would be an unacceptable negative effect on residents and local economies due to unreliable electrical service; and progress towards the state's RES might be significantly impeded.

4.2 Renewables Transmission and Gas Generation Alternative

The Scoping Decision calls for analysis of building generation facilities as an alternative to building the proposed CapX Transmission Project(s).

In Chapter 7 of their Application, the CapX utilities analyzed several generation-based alternatives to meet the same needs as the proposed CapX Transmission Project. The Applicants analyzed a local peaking generation alternative relying on natural gas or oil fueled combustion turbines ("peaking plants"), a distributed generation alternative relying on generation facilities less than 10 MW in size each, and a renewable energy generation alternative using dispersed, community-owned wind facilities.

The Applicants concluded that costs (capital, fuel, and O&M) of a local peaking alternative would exceed the cost of the CapX Transmission Project while delivering somewhat less electric system reliability. In addition, the Applicants noted that additional transmission lines would need to be built to accommodate interconnection and delivery of the electricity generated under such an alternative.

The Applicants also concluded that the CapX Transmission Project will actually enhance the transmission system's ability to accommodate further development of renewable and distributed generation resources.

In this section, the DOC considers a different generation alternative that attempts to meet the same needs as the proposed CapX Transmission Project (renewable energy generation outlet capacity, customer service support, and regional reliability benefits).

This generation alternative is intended to:

- Construct approximately 800 MW of transmission facilities to meet similar renewable energy transmission outlet capacity needs alleged by the Applicants,

- Construct new electric generation facilities in Rochester, St. Cloud, Alexandria, and La Crosse to attempt to satisfy the local load serving needs alleged by the Applicants.

This section describes the typical environmental impacts associated with that alternative.

The overall feasibility, environmental impacts and economic reasonableness of a natural gas generation scenario compared to the proposed CapX Transmission Line Project(s) are heavily dependent on a number of site-specific factors, such as the availability of a large natural gas pipeline, adequate wind resources, sufficient transmission capacity for each generation source, and proximity to customers. In addition, each generation facility must be adequately sized to provide reliable electric capacity to customers in the local benefit area during times of peak demand. The Department has used information from previous energy facility permitting and other publicly available transmission planning documents to determine likely environmental impacts from a generation alternative.

4.2.1 Generation and Associated Infrastructure

The generation alternative assumes the following generation and associated infrastructure as an alternative to the proposed CapX Transmission Line Project(s):

- Construction of sufficient transmission line capacity to support approximately 800 MW of wind generation capacity in locations and quantities similar to those identified by the Midwest Independent System Operator (MISO) Group 4 Interconnection Studies, MISO's Group 5 Interconnection Studies, and the Minnesota Community Based Development Transmission Study.
- Construction of four, state-of-the-art natural gas fired combined cycle or simple cycle generation facilities and associated pipeline and transmission infrastructure similar to the Mankato Energy Center (MEC), the Faribault Energy Park (FEP), and Cannon Falls Energy Center (CEC) generation facilities recently completed or under construction in Minnesota. The generation capacity and location of each natural gas-based generation facility is discussed in further detail below.

These and similar facilities have an established track record of regulatory review and permitting in Minnesota, thus possible impacts are readily obtained. The MISO Group 4 and Group 5 wind interconnection studies provide detailed transmission interconnection requirements for a large, representative quantity of wind energy under development in Minnesota. The transmission additions or rebuilds identified in the MISO's Group 4 and Group 5 interconnection studies are almost exclusively located in Southern Minnesota or Northern Iowa.

The Community Based Energy Development Transmission Study (CapX Utilities 2007) provides a high level, theoretical analysis of transmission system impacts expected if 800 – 1,400 MW of “dispersed” wind facilities were added to the transmission system in west central Minnesota. The study provides limited and generalized transmission system impacts, mitigation measures and costs⁵.

The impacts of transmission lines on a per line mile basis required for the alternative are likely to be similar to previously permitted transmission projects discussed below and similar in many aspects to the proposed CapX Transmission Line Project(s). However, without specific routes to analyze, it is difficult to make a direct comparison of impacts with the CapX Transmission Line Project(s).

The general environmental impacts and mitigation measures are expected to be consistent with those impacts identified in route permit environmental review documents prepared by the Department in recent years. Table 4-1 lists completed permitted cases that are expected to have transmission line impacts and mitigation measures similar to the transmission lines required in this generation alternative due to their geographic proximity to the Group 4, Group 5 and CapX projects, and similar size and type of projects.

Table 4-1 Transmission Line Projects with Similar Expected Environmental Impacts

Transmission for Wind	Transmission lines for Combustion Turbine Combined Cycle (CTCC)
Buffalo - Ridge to White 115 kV (EQB 04-84-TR-XCEL)	Mankato Energy Center (EQB 04-76-PPS CALPINE)
Split Rock - Lakefield Jct. 345/115 kV (EQB 03-73-TR-XCEL)	Faribault Energy Park (EQB 02-48-PPS-FEP)
Lakefield - Fox Lake 161 kV (EQB 03-64-TR-XCEL)	Invenenergy Cannon Falls Energy Center (EQB 04-85-PPS-Cannon Falls EC)

Direct land use impacts of the natural gas simple cycle or combined cycle facilities envisioned in the generation alternative were estimated based on past site permits for simple cycle and combined cycle natural gas facilities in Minnesota, assuming the facility uses a new site. Direct land use correlates to actual size of disturbed area for the power plant site.

⁵ The CBED Transmission Study estimates do “not include the cost for interconnecting the generator to the transmission system and any impacts on the lower voltage transmission system” which could add up to significant costs and significant transmission facilities (p1).

Table 4-2 Land Use of Natural Gas Combined Cycle Facilities

Permitted Project	MW Capacity	Direct Impact (Acres)	Acres/MW
Mankato Energy Center	655	25	0.04
Faribault Energy Park	250	37	0.03
Cannon Falls Energy Center	357	55	0.15

4.2.2 Transmission Requirements

Group 4 and Group 5 Wind

The MISO Group 4 and Group 5 wind interconnection studies conclude that adding between 750–2,850 MW of wind capacity will require significant new transmission additions for interconnection and delivery of the energy to markets.

The Group 4 study provided a representative example of the requirements for 750 MW of wind energy in Minnesota. The Group 5 study provides a representative example of the requirements for 2,858 MW of wind energy primarily in Minnesota and northern Iowa. Both assume that all previously queued projects are constructed, including the Big Stone transmission projects. Transmission requirements would likely increase if previously identified transmission projects are not built, which shifts the previously identified transmission requirements onto Group 4 and Group 5 projects.

Table 4-3 Estimated Group 4 Wind HVTL Mileage (New or Rebuilt)

HVTL Segment	Mileage
Lake Yankton to Marshall SW 115 kV	16
Lyon County to Minnesota Valley 115 kV	29.1
Storden to S.Storden to Heron Lake 161 kV	10.1 S. 11.9 N Storden
Heron Lake to Lakefield Junction 161 kV	17.2
Total	66.4 to 73.2

The MISO Group 4 study provides sufficiently specific transmission improvement to allow the Department to estimate of the approximate length of transmission required for the Group 4 facilities; those estimates are displayed in Table 4-3. With the exception of Lake Yankton to

Marshall SW, mileage estimates are based on current transmission line segment lengths between these existing substations. The Lake Yankton to Marshall SW segment estimate is taken from the Xcel Energy Route Permit Application for the Lake Yankton to Southwest Marshall Transmission Project (PUC Docket E002/TL-07-1407). It is likely that the new (or upgraded) transmission line mileages estimated above could deviate from these lengths upon further engineering, reliability, and routing studies.

Several segments above have a second circuit between the end point substations. To provide a simple mileage of the second circuit, the length of the existing transmission line between the named substations was doubled. MISO does not provide analysis of the lengths of new ROW required, nor recommendations for double circuiting the required second circuits. Reliability requirements may or may not allow for double circuits for such segments.

Finally, the electrical transmission and distribution system in the general vicinity of the Storden, Heron Lake, and Lakefield Junction transmission substations is undergoing extensive study for wind energy expansion, reliability, and load growth. Such studies and proposals may differ considerably from the MISO's Group 4 requirements and may substantially change the impacts.

Gas Plant Transmission

Natural gas-fueled generation facilities are typically sited in locations in close proximity to HVTLS and natural gas pipelines, as well as in locations near the load center served. This is done to minimize the construction costs and impacts of natural gas pipelines and transmission lines. This practice is consistent with recent site permits for such facilities in Minnesota. The ER assumes that such siting factors would be followed in the wind and gas generation alternative, therefore, minimizing use of transmission and pipeline ROW needed.

The HVTL portion of the generation alternative is highly dependant on the location, timing, point of interconnection, and size of the facility. The ER assumes that the transmission required for the natural gas portion of the alternative is less than 10 miles. Without interconnection studies for properly sized natural gas-fired generating facilities in the St. Cloud, Alexandria, Rochester, and La Crosse areas, it is nearly impossible to identify transmission requirements for adding such additional facilities to the system.

The Mankato Energy Center required 3.8 miles of transmission lines and 3.5 miles of natural gas pipeline to be built prior to interconnection.

The Faribault Energy Park was required to replace wires (reconductor) on about 20 miles of transmission line and build less than one mile of new transmission line for interconnection to the high voltage system. Less than one mile of natural gas pipeline was also built for the FEP facility.

The Cannon Falls Energy Center facility required approximately 2.5 miles of additional high voltage transmission line infrastructure and a new 12 mile pipeline be constructed.

4.2.3 Size and Type of Structures

The natural gas generation facility impacts would be similar to or identical to the MEC, FEP and the CEC facilities and would be similar in structure size, type and location. MEC and FEP both utilize combustion turbines, a heat recovery steam generator (HRSG), cooling towers, wastewater management facilities, facility buildings, a natural gas pipeline, electric transformers and a switchyard. MEC also uses supplemental duct firing. The MEC facility site is approximately 25 acres; the FEP site is approximately 37 acres.

The height of the tallest structures, the HRSG stack, would be approximately 200 feet in height. The design of the facilities utilized several structures in the 70- to 120-foot range in height. Both MEC and FEP are sited in areas zoned for industrial use.

Based on the CapX Application for Certificate of Need, the Department estimates that the natural gas generation alternative would require several gas-fired electric generation facilities be built in the following communities in order to reliably generate electricity locally to meet current and future electric demand.

Wind Facilities

Typical structures for the transmission lines improvements required for the alternative to accommodate approximately 800 MW of new wind capacity to be either single pole or H-frame structures in wood or steel and range in voltage from 115 kV to 345 kV. The use of materials and structure types varies upon many factors including; location, cost of structures, engineering and reliability considerations, and land use along the ROW. Several similar transmission line projects specifically serving wind energy interconnection have been proposed and permitted in Minnesota in recent years. Impacts would be similar or identical to these permitting cases.

The transmission lines for wind projects would be shorter in height, spaced closer together, and would require more structures (poles) per mile than the CapX Transmission Line Project. The land-based impacts of the alternative are expected to be similar to the CapX Transmission Line Project because both projects would require transmission routes primarily in rural, agricultural areas. The Group 4, Group 5 and CBED transmission studies transmission requirements include a mixture of new transmission line construction, upgrades of existing transmission lines, and new transmission right-of-way acquisition requirements.

Table 4-4 Generation Alternative Costs

Location of Generation Facility	Need Required by 2020 (MW)	Min. Natural Gas Facility Capacity with Redundant Capacity for Reliability (MW)	Estimated Cost Based on EIA and Applicant Data⁶
Rochester Area	130	230	\$134,400,000
St. Cloud Area	172 - 230	344 - 460	\$181,776,000 – \$272,664,000
Alexandria	27	54	\$82,128,000
La Crosse	132 - 152	264 - 305	\$134,400,000
Total	461 - 539	862 - 1,048	\$532,704,000 – \$623,592,000
Wind Transmission Study⁷	MW of Wind Capacity	Transmission Cost	Transmission Cost Per MW of Capacity
Group 5	2,858	\$503,301,262	\$176,103
CBED Study	800	\$50,000,000	\$62,500
CBED Study	1,400	\$97,000,000	\$69,286
Study Average			\$128,569
Wind Transmission est. Costs (Low)	800	\$50,000,000	\$62,500
Wind Transmission est. Costs (Avg.)	800	\$102,855,200	\$128,569
Wind Transmission est. Costs (High)	800	\$140,882,400	\$176,103
Gen. Alt Total Cost (Low)		\$582,704,000	
Gen. Alt Total Cost (High)		\$764,474,400	

Natural Gas Combined Cycle

The structures for transmission lines associated with a natural gas combined cycle facility are assumed to be consistent with the MEC and FEP projects, and will be dependant on the voltage required, design, and location of such transmission lines. It is assumed that approximately ten

⁶ Table 39 “Cost and Performance Characteristics of New Central Station Electricity Generation Technologies,” *Assumptions to the Annual Energy Outlook 2007* (U.S. Energy Information Administration). CON Application page 7.14.

⁷ Community Based Energy Development Transmission Study, West Central Transmission Planning Zone, January 18, 2007. MISO Group 4 System Impact Studies. MISO “CS5 Final Rough Cost Estimates revised 10-19.xls.

miles of transmission would likely include single or H-frame structures in wood or steel. The land-based impacts are expected to be similar to the CapX Transmission Project.

4.2.4 Human and Environmental Impacts

Human Health

Wind facilities, CCCT facilities, and transmission lines all produce EMF. However, EMF exposure near these types of facilities drops significantly with distance from the facilities. In no cases will generation facilities be located within a few hundred feet of residences due to the requirement to site facilities far enough away from homes to assure compliance with MPCA noise standards.

The alternative assumes similar EMF levels to those described in Section 2 and similar to the Buffalo to White, Lakefield to Fox Lake HVTL, and natural gas projects.

Noise

Each of the project types in the generation alternative generates noise. Transmission noise impacts are expected to be similar to the proposed CapX Transmission Line Project and discussed in Section 2. Natural gas facilities also generate noise and are required to meet the same noise limit rules as wind facilities. In the MEC and FEP permitting cases, both projects were located at least 800 feet from residences and were expected to meet the MPCA noise limits.

.Visual

Each type of facility in the generation alternative has a visual impact, although visual impacts are difficult to measure and are very subjective. Impacts from various types of facilities are hard to accurately describe and assess.

The visual impacts of the alternative's transmission requirements are likely to be consistent with the proposed CapX Transmission Line Project as discussed in Section 2. However, the use of 115 kV and 161 kV transmission lines in the alternative may be shorter in height and spaced closer together, which is more consistent with the Buffalo Ridge to White and Lakefield to Fox Lake transmission projects permitted by the EQB. The 345 kV lines required in the studies are assumed to be virtually identical to the CapX Transmission Project and the EQB-permitted Split Rock to Lakefield Junction 345 kV project. The proposed CapX project, the permitted projects referenced above, and the generation alternative would all use primarily agricultural areas for transmission line routing.

Natural gas generating plants are typically developed in commercial or industrial areas and typically fit into the surrounding land use patterns. The most visible impacts are vapor or steam plumes from stack emissions or cooling towers. At times, plumes may be seen for miles around depending on plant operation, design and weather conditions. Such impacts are periodic and the impacts can be subjective from person to person

Air Quality

The primary difference between the air impacts of the proposed CapX Transmission Line Project and the generation alternative relate to the natural gas combined cycle generation facility. The transmission required for the alternative is assumed to have the same air quality impacts as the proposed CapX Transmission Line Project.

The alternative assumes the combined output of the four plants in this discussion would have the same air quality impacts as the combined output of the three plants in Table 4-5. Those outputs were identified in the Environmental Assessments in the MEC, FEP and CFEC permitting dockets. The table below provides maximum permitted emissions on an annual basis in tons as allowed in the MPCA air permits for the permitted facilities.

Table 4-5 Facilities' Potential to Emit as per MPCA Permits

	PM tons/ year	PM10 tpy	SO ₂ tpy	NO _x tpy	CO tpy	VOC tpy	H ₂ S O ₄ tpy	Single HAP tpy	Total HAPs tpy
Mankato Energy Center	207	198	134	368	3,999	599	20.2	9.54	23.08
Faribault Energy Park	361	361	132	124	696	459	4.6	Formaldehyde 5.86	10.94
Cannon Falls Energy Center	76	139	60	247	139	12	na	na	na

Water Quality

Some water quality impacts may result from the natural gas generation alternative, due to the increase in impervious surface, potential discharge of wastewater, and protection construction impacts. Innovative use of wastewater and stormwater treatment options exist, such as the use of municipal gray water or use-engineered wetlands for water discharge. Water quality impacts from natural gas generation facilities are dependent on the source of coolant water, method of wastewater treatment, and discharge. Natural gas generation facilities do not emit mercury, so no additional mercury would be emitted into the air or deposited in Minnesota waters.

Transmission water quality impacts are expected to be similar to those discussed in Section 2 and the impacts discussed in the Buffalo to White and Lakefield to Fox Lake transmission projects.

Natural and Wildlife Resources

Natural gas facilities have few impacts on wildlife and are assumed in the alternative to be consistent with previously-permitted projects. Of the reference projects recently permitted in Minnesota, the MEC facility was sited in a former gravel pit, the FEP facility converted agricultural land in a new industrial and commercial zoned area, and the CFEC facility was sited in a commercial and industrial area. These facilities disturb small tracts of land in areas compatible with industrial and commercial uses. Wildlife impacts from habitat loss are unlikely.

Impacts from the alternative's transmission lines are expected to be similar to the CapX Transmission Line Project (see Section 2) and the Buffalo to White and Lakefield to Fox Lake transmission line.

Social and Economic

The generation alternative may have a local or traditional independent power producer ownership component which may provide significant financial rewards and risks, or utilities may choose to own these types of facilities. Labor, materials, food, and lodging will provide temporary construction related income to nearby and regional businesses. Operations and maintenance personnel will be required to operate these facilities and possibly live in areas nearby, providing additional jobs. Taxes paid by the facilities would round out long-term economic impacts to the local community and governmental units.

Social and economic impacts from the generation alternative's transmission lines would be similar to the CapX Transmission Line Project (Section 2) and the Buffalo to White and Lakefield to Fox Lake transmission line projects.

4.2.5 Feasibility and Availability

The generation alternative could be constructed. The technologies analyzed have been constructed in similar quantities in Minnesota. Utilities and independent generation developers are able to successfully construct and operate such facilities.

However, the generation alternative does not necessarily achieve the same purposes or meet the same needs as the proposed CapX Transmission Project. The alternative may provide transmission capacity for further development of wind energy, but it is likely to fail to provide the same regional reliability benefits the CapX Project seeks to create, such as increasing the

ability to transmit energy across the North Dakota/Minnesota border and across the Minnesota/Wisconsin border.

In addition, the generation alternative may not provide comparable local load serving and reliability benefits that the CapX Transmission Project seeks to provide by building generation facilities in the communities. Natural gas fired generation would have significantly higher long-term fuel and operation costs than transmission lines due to the high cost of fuel, fixed and variable costs of natural gas-fired generation facilities. Transmission lines have very low operation and maintenance costs in comparison.

Finally, the natural gas-based generation discussed in the alternative may require significant transmission infrastructure for interconnecting and delivering electricity to customers.

4.3 Conservation and Demand-side Management Alternative

All Minnesota public utilities are required under Minnesota Statute, section 216B.241 (Energy Conservation Improvement) to invest in conservation improvement programs and file conservation improvement program plans with the Minnesota Office of Energy Security (OES). The program is intended to promote energy efficiency and conservation activities by providing incentives and consumer education to utility customers. In addition, through its conservation improvement plan, each individual public utility must achieve annual energy-savings that are equivalent to 1.5 percent of gross annual retail energy sales, unless the utility's savings goal has been modified by the OES Director.

This alternative would seek to address the need of 4,000-6,000 megawatts with conservation and demand side management. Again, this alternative would utilize programs designed to encourage consumers to modify their level and pattern of electricity usage. In cooperation with the public, the electric utilities would institute energy conservation measures that would ultimately reduce load in the area to a level allowing the current system to operate in a reliable manner. This conservation effort would most likely be a phased process and would be above and beyond what the Minnesota utilities are required to achieve under current statutes.

Most Minnesota utilities, including the ones party to this proceeding, have not achieved the level of energy savings required by Minnesota Statutes. Although OES believes the 1.5 percent energy savings goal is achievable, significant achievements beyond this goal, which would be needed to create an alternative, are not likely in the near future⁸. Conservation would have to be achieved in the project area to meet the needs that would otherwise be met by the proposed

⁸ The Office of Energy Security believes higher energy savings rates will be possible once more technologies are developed, better programs for motivating customers to change their behavior are investigated, more resources are devoted, and climate change regulations are in place.

project; the conservation and demand side management alternative is not a feasible alternative to the proposed CapX 2020 Group 1 Transmission project.

4.4 Existing System Upgrades and Reconfiguration Alternative

Minnesota Rule 7849.7060 requires the ER to describe and analyze the impacts of upgrading existing transmission lines and/or using different transmission line corridors to meet the alleged need. This section examines upgrades to existing lines and building new lines located in different locations.

The ER examines the transmission system and corridor alternatives evaluated in the Applicants' transmission studies found in Appendix A of the CON Application. The transmission engineering studies analyzed a large number of transmission line options leading to the Applicants' selection of the proposed CapX Transmission Project lines. The options studied, including those options rejected by the Applicants, are new lines and upgraded or rebuilt transmission lines at the 115 kV, 161 kV, 230 kV and 345 kV voltage levels.

The Applicants engineering studies compared the cost, incremental capacity, energy losses, feasibility, use of existing ROW and other factors associated with transmission line construction. The Applicants professional electrical engineers and transmission planners recommended the three CapX Project lines as the best option to satisfy the three areas of alleged need including community service reliability, system wide growth, and generation outlet/renewable energy support. These studies solicited the participation, technical input and comments of transmission engineering staff of regional transmission utility companies.

Chapter 8 of the CapX Transmission Project CON Application provides environmental data about each of the transmission options proposed, which generally overlap geographically with the rejected transmission options studied by the Applicants. This data forms the basis of comparison between the rejected options and the three CapX transmission lines proposed.

In general, the transmission line options rejected by the Applicants have very similar impacts on a per line mile basis to the human, natural and economic environments across the state of Minnesota.

However, due to the lack of route specific information for the CapX transmission project and the rejected alternatives, it is difficult to compare specific impacts of the proposed CapX transmission lines with the transmission options rejected in the engineering studies. Generally, the impacts of the rejected transmission options are the same as the proposed CapX Project.

4.4.1 Human and Environmental Impacts

Socioeconomic

The socioeconomic impacts of the rejected transmission options are likely to be similar to or greater than the proposed CapX Project, especially where the rejected transmission option provides only short term benefits, leading to the need for further transmission enhancements to achieve the same benefits as the CapX Project alleges to provide. In addition, the transmission studies included in the Application show that most of the rejected options have higher transmission system losses (a negative economic impact and a sign of inefficiency) than the proposed Project.

Displacement

The rejected alternatives would not be expected to displace any residential homes or businesses. There are no direct impacts to human settlements anticipated as a result of the rejected transmission line options. Additional analysis of potential displacement would occur within the route permitting process where final routes for transmission lines are developed and analyzed, including the possibility of home or business displacement.

Noise

Differences in noise impacts between the CapX Project and the rejected transmission options are route specific issues due to potential proximity of lines to noise receptors such as homes and businesses. The CapX Project and the rejected alternatives are expected to have similar noise impacts, although higher voltage lines generally have greater noise impacts. Mitigation measures would be consistent with those for the proposed CapX Project.

Aesthetics

All lines considered are HVTLs between 115 kV to 345 kV and would likely use similar structures (primarily single pole or H-frame structures) as the CapX Project. Differences in structure type would likely occur where a new lines and an existing transmission line are placed on a shared structure, a practice called a double-circuit, and where higher voltages require greater height structures. Double-circuit opportunities may exist and would be dependent on route selection and presence of existing transmission circuits appropriate for double circuiting. Double-circuit structures are usually slightly larger and may have a slightly higher visual impact compared with single circuit structures.

Additional variability in visual impacts may result due to route selection and crossing highly scenic areas, such as the Minnesota River and the Mississippi River. Mitigation measures for visual impact would be consistent with those for the proposed CapX.

Natural Environment

In general, all of the rejected transmission options appear to have similar potential environmental impacts to the proposed CapX lines. All of the transmission options evaluated by the Applicants are high voltage (115 kV, 161 kV, 230 kV and 345 kV), structure size (70–150 feet tall), and similar geographic areas as the proposed CapX Transmission Project. Each would require significant construction work associated with building new transmission lines, clearing right-of-way and similar environmental impacts on a per line mile basis. In general, constructing a 115 kV transmission line has slightly fewer direct environmental impacts than constructing a 345 kV transmission line along the same ROW.

There are several portions of the CapX Transmission Project and the rejected transmission options which require new or rebuilt transmission lines approaching, crossing, or near the Minnesota and Mississippi rivers, their bluffs, and protected lands. The Minnesota River and Mississippi River valleys contain large tracts of state and federally protected lands, many cities, biologically outstanding lands, high scenic values, and cultural resources. In most cases the mere presence of these resources does not prohibit new or rebuilt transmission infrastructure, the presence of and potential impacts to these resources may limit routing options or require special mitigation measures. The presence of and potential impacts of these resources are an important factor for the public and the PUC to consider at the CON and at the routing stages of the regulatory process.

Impacts and mitigation measures are expected to be consistent with the proposed CapX Project as described in Section 2 of this ER.

Recreation

The rejected transmission options in the CapX Application appear to have impacts to recreational resources consistent with the proposed CapX Transmission Project. In all cases, the majority of recreational resources in the project corridors appear to be associated with natural resource use. The rejected options do not appear have potential recreational impacts which could not be avoided or mitigated. Without route specific information, it is difficult to determine the exact impacts on recreational resources. Impacts and mitigation measures are expected to be consistent with the proposed CapX Project and described in Chapter 2 of this ER.

Agriculture

All of the rejected transmission line options studied in the CapX Application are expected to have the similar impacts to farmland resources as the proposed CapX Transmission Project. These impacts are consistent with those described and analyzed in Chapter 2. Impacts and mitigation measures are expected to be consistent with the proposed CapX Transmission Project and described in Chapter 2 of this ER.

Without additional route specific information, it is difficult to determine the precise difference in impacts between the CapX Transmission Project and the rejected transmission options.

Transportation

The rejected transmission options are not expected to have an impact on airports assuming that transmission line routes avoid airport safety zones and that lines are designed to meet FAA and local safety zone standards. Without additional route specific information, it is difficult to determine the precise potential impacts between the CapX Transmission Project and the rejected alternative options.

Impacts to surface transportation systems are expected to be minimal and consistent with the impacts of the proposed CapX Transmission Project. Impacts to road systems are typically found at the outer edge of road ROW when new lines are built parallel to roads. Impacts are generally limited to the construction phase. Long term impacts to surface transportation systems are not expected.

Impacts and mitigation measures are expected to be consistent with the proposed CapX Transmission Project.

Mining and Forestry

A small number of managed forestry operations and resources are present near the proposed lines, and it is assumed this is also the case for the rejected options. Impacts to forestry resources would be limited to ROW clearing and maintenance, which could potentially clear a 75 to 150-foot tree free ROW through forested lands. Route selection could avoid most forested lands thus eliminating potential impacts to forestry. The rejected options are not expected to have impacts on active forestry.

Active and inactive gravel, sand, and aggregate quarries are present near the rejected options, but impacts are not expected on mining resources.

4.4.2 Feasibility and Availability

The existing lines and alternative corridors alternative is feasible, it could be built. Transmission line technology of the type proposed is widely available and deployed throughout Minnesota.

However, according to the Applicants, the rejected alternatives are not able to meet all of the primary and secondary purposes of the proposed CapX Transmission Project. In some cases, the rejected options may address the same needs, however only for a short period of time requiring additional transmission infrastructure improvements to achieve the same long-term goals.

5.0 Regulatory Framework

On August 16, 2007, Great River Energy and Xcel Energy filed an application with the Minnesota Public Utilities Commission to certify several high-voltage transmission lines in Minnesota. On November 26, 2007, GRE and Xcel Energy filed supplementary information, at the direction of the Commission.

In accordance with Minnesota Statute 216B.243, the facilities would be a “large energy facility,” for which the Company must receive a “Certificate of Need” prior to constructing or siting the facility in Minnesota.

5.1 Certificate of Need

The involved utilities indicate that the facilities are needed for the following reasons: to address community service reliability concerns in Rochester and other parts of southeastern Minnesota, in St. Cloud, in the area around Alexandria, and in the Red River Valley; to strengthen the transmission network to meet demand growth in Minnesota and parts of the surrounding states; and to support the continuing development of renewable energy generation in southwestern Minnesota and elsewhere in Minnesota and the surrounding region.

In accordance with the Commission's June 4, 2007, “ORDER DESIGNATING APPLICANTS AND SETTING FILING REQUIREMENTS,” routing proceedings will be separate from the need proceeding. Ultimately, specific routes will be determined by the Commission only for the proposed Project components that are certified for need.

5.1.1 Ways to Review or Obtain a Copy of the CN Application

- Electronic copies may be reviewed on the utilities' project website at <http://www.CapX2020.com/>. All filings with the Commission, including the application, are also on the Commission's website at <http://www.puc.state.mn.us/>. Click successively on "eDockets & eFiling" and "Search documents," then enter the year "06" and the sequence number "1115." Additional information may be found on www.energyfacilities.puc.state.mn.us/Docket.html?Id=19120.
- Hard copies may be reviewed at the county libraries throughout the project areas.
- If you have questions about the availability of additional hard copies, contact Jim Alders, Xcel Energy at james.r.alders@xcelenergy.com or 612-330-6732.

5.1.2 Environmental Review

In accordance with environmental review rules, the Minnesota Department of Commerce prepares an Environmental Report for the proposed Project. The Environmental Report, this document, addresses the Project, as well as need-related alternatives, as required by Minnesota Rules, parts 7849.7010 to 7849.7110.

The Scoping Process

Under the above rules, the Department is required to schedule at least one public meeting in the area of the proposed Project. The purpose of the meeting is to advise the public of the Project and to solicit public input into the scope of the environmental review. A “scope” is a determination of what needs to be assessed in the environmental review in order to fully inform decision-makers and the public about the possible impacts of a project or potential alternatives.

Public meetings for this project were held from December 10-18, 2007, in ten cities throughout the project survey areas, in Fargo, Fergus Falls, Alexandria, Clearwater, Winona, Rochester, Marshall, Olivia, Arlington and Cannon Falls. Representatives of the Department and Xcel Energy were available at the meetings to discuss the project and the process, to answer questions, and to gather public opinion on the proposal. The comment period for interested parties was open until January 14, 2008.

After these processes, EFP reviewed the public comments on the scope of the environmental review and the rules governing the content of an ER (7849.7060). Based on that review, the Commissioner of the Department of Commerce issued a Scoping Order on February 18, 2008. The Scoping Decision is included in Appendix A of this ER.

5.1.3 The PUC Certificate of Need Process

What the Commission Decides

The certificate of need process is designed to evaluate the level of need, as well as the alternatives available to satisfy that need. The Commission determines the basic type of facility (if any) to be constructed, the size of the facility, and the timing of the facility (e.g., the projected in-service date). In a routing process, the Commission would determine the specific route to be followed in the construction process (if need is confirmed).

Steps in the Certificate of Need Process

The Commission's review process for the proposed facility consists of the following basic steps, mostly in chronological order:

1. Review of the application for completeness; order for the applicant to submit supplementary materials, if deemed necessary.
2. Request for assignment of an Administrative Law Judge (ALJ) from the Office of Administrative Hearings, an agency independent of the Commission.
3. Prehearing conference before the ALJ, to discuss several procedural issues, including an intervention deadline for requesting formal party status, discovery, locations of public and evidentiary hearings, and a schedule for the hearings.
4. Preparation of an environmental review document (i.e., the Environmental Report) by the staff of the Department of Commerce.
5. Efforts to notify the public of the hearing schedule and other matters, including display ads in local newspapers.
6. Prefiling of expert testimony on relevant topics, including environmental and socioeconomic effects, by the formal parties to the proceeding.
7. Public meetings/hearings to receive input and questions from the public.
8. Evidentiary hearings to receive testimony from formal parties and to conduct cross-examination of expert witnesses.
9. Filing of post-hearing briefs and findings of fact by the formal parties.
10. Filing of Findings of Fact, Conclusions and Recommendation by the ALJ.
11. Filing of exceptions to the ALJ's Report by the formal parties.
12. Oral argument by the formal parties before the Commission and oral deliberation by the Commission at a public meeting.
13. Issuance of a written decision or order by the Commission.
14. Post-decision activities, possibly including reconsideration and judicial review.

Note: The first two steps were considered by the Commission in written orders issued on November 21, 2007. The Commission determined that the application would be sufficiently complete to start the formal hearing process, as soon as the Applicants submitted an application supplement to respond to requirements indicated by the Commission. As indicated above, the supplementary material was filed on November 26, 2007. The Commission has referred the application to the Office of Administrative Hearings for a contested case proceeding; Administrative Law Judge Beverly Jones Heydinger has been assigned to hear the case. The prehearing conference to discuss procedural matters, including the hearing schedule, was held at 2:00 p.m. on Tuesday, December 18, 2007 in the Large Hearing Room at the Public Utilities Commission, 121 Seventh Place East, Suite 350, St. Paul, MN 55101-2147.

Length of the Need Process

The certificate of need statute includes a decision deadline of twelve months from the time a complete application is filed. The Commission will deliberate to make a final decision as soon as practicable following receipt of the ALJ's Report and exceptions from the formal parties to the proceeding

Ways for the Public to Participate in the Certificate of Need Process

Members of the public may participate in the following ways:

- By intervening as a formal party to the proceeding, which requires submission of an intervention petition to the ALJ. The deadlines for intervention were determined by the ALJ and are available in the *First Prehearing Order*.⁹
- By participating in the environmental review process conducted by the Department of Commerce.
- By offering comments and questions at the hearings specifically designed for that purpose. Members of the public do not have to meet any other prior requirements to be able to participate in these hearings.
- By submitting written comments to: Administrative Law Judge Beverly Jones Heydinger, Office of Administrative Hearings, 600 North Robert Street, St. Paul, MN 55101. The deadline for written comments will be determined by the Administrative Law Judge.

Hearing Schedule

Public hearings to discuss the need for the proposed facilities will be held from June 16-27, 2008, at locations yet to be determined. Some or all of those hearings will be held in the Project areas to receive questions and statements from members of the public. At those hearings, members of the public will be allowed to address need issues. Notice of the public hearings will be placed in local newspapers at least 10 days prior to the start of the hearings.

Evidentiary Hearings will be held in St. Paul from July 7-August 1, 2008.

5.2 Other Required Permits

In addition to the Certificate of Need, several other permits and approvals may be required from local governments and a number of state and federal agencies. Typically expected approvals that would be required before actual construction of the project are outlined in Table 5-1.

Local Approvals

Typical local government permits are included in the table, but specific permits may vary from jurisdiction to jurisdiction. However, when the Commission issues a route, permit, zoning, building and land use regulations are preempted per Minnesota Statute 216E.10, subd. 1.

⁹ *First Prehearing Order*, p. 2: "The deadline to intervene as a party is **June 27, 2008**. However, any person who wishes to call witnesses to testify at the Evidentiary Hearing shall file a Petition to Intervene on or before **April 15, 2008**, and, if the Petition is granted, pre-file testimony according to the schedule set forth below. Petitions to Intervene received after June 27, 2008, will be considered, but the scope of participation may be limited."

Table 5-1 Required Permits or Approvals

Permit	Jurisdiction
Local Approvals	
Utility Crossing Permit	County, Township, City
Land Permits	County, Township, City
Overwide Loads Permits	County, Township, City
Driveway Permit	County, Township, City
State of Minnesota Approvals	
Certificate of Need	Public Utilities Commission
Route Permit	Public Utilities Commission
Utility Permit (Highway Crossings)	MN/DOT
License to Cross Public Waters	Minnesota DNR Division of Lands and Minerals
Wetlands Conservation Act	BWSR
NPDES Permit for construction activity	MPCA
Federal Approvals	
Section 106 Review	Lead Federal Agency (if any)
Section 7 Consultation	USFWS
Section 10 Permit	U.S. Army Corps of Engineers
Section 404 Approval	U.S. Army Corps of Engineers
Permit to Cross Federal Aid Highway	FHWA
Notice of Proposed Construction (7460-01)	FAA
Notice of Actual Construction or Alteration	FAA
Prime Farmland (Form AD-1066)	NRCS
Spill Prevention, Control and Countermeasure	EPA
Compatibility Analysis of Disturbed Easements/Lands	USFWS

State of Minnesota Approvals

An HVTL cannot be constructed without a Certificate of Need and a separate Route Permit, both approved by the Commission.

A permit from MNDOT is required for construction, placement or maintenance of utility lines that occur adjacent or across a highway ROW. These permits would be acquired once line design was completed.

MN DNR 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 Statue 84.415 and Minnesota Rule 6135. Applicants would need to work closely with the DNR on these permits and would file for them once line design was complete.

The DNR Division of Waters regulates activities that affect the course, current and cross-section of lakes, wetlands, rivers and streams. Under Minnesota Statute 103G.245, subd.1, a DNR Public Waters Work Permit is required to:

1. Construct, reconstruct, remove, abandon, transfer ownership of or make any change in a reservoir, dam, or waterway obstruction on public waters; or
2. Change or diminish the course, current, or cross-section of public waters, entirely or partially within the state, by any means, including filling, excavating or placing of materials in or on the beds of public waters.

Applicants would determine cases in each project area where this permit might be necessary and, if needed, would need to file this permit once line design was complete.

A NPDES permit from the Minnesota Pollution Control Agency is required for storm water discharges associated with construction activities disturbing an area equal to or greater than one acre. A requirement of the permit is to develop and implement a SWPPP, which includes Best Management Practices to minimize discharge of pollutants from the site.

Federal Approvals

Section 10 of the Rivers and Harbors Act of 1899 requires approval prior to the accomplishment of any work in, over or under navigable waters of the United States, or which affects the course, location, condition or capacity of such waters. Approval under Section 404 of the Clean Water Act is required for projects that discharge temporary or permanent fill within a water of the U.S. or within wetlands. Other approvals that fall under the National Environmental Policy Act of 1969 may also be required where adverse impacts are anticipated.

Environmental Report Resource Materials

Avian Power Line Interaction Committee. www.aplic.org

CapX2020 Utilities. www.capx2020.com

Land Management Information Center. www.lmic.state.mn.us

Midwest Independent System Operator. www.midwestiso.org

Minnesota Department of Employment and Economic Development. www.deed.state.mn.us

Minnesota Department of Natural Resources. www.dnr.state.mn.us

Minnesota Department of Transportation. www.dot.state.mn.us

Minnesota Historical Society. www.mnhs.org

Minnesota Office of the Revisor of Statutes. www.revisor.leg.state.mn.us/pubs/

Minnesota Pollution Control Agency. www.pca.state.mn.us

Minnesota Office of the Revisor of Statutes. www.revisor.leg.state.mn.us

National Park Service. www.nps.gov

Natural Resource Conservation Service. www.nrcs.usda.gov

Public Service Commission of Wisconsin. www.psc.wi.gov

U.S. Census Bureau. www.census.gov

U.S. Code of Federal Regulations. www.gpoaccess.gov/ecfr/

U.S. Department of Agriculture. www.usda.gov

U.S. Energy Information Administration. www.eia.doe.gov

U. S. Environmental Protection Agency. www.epa.gov

U.S. Fish and Wildlife Service. www.fws.gov

U.S. Geological Survey. www.usgs.gov

World Health Organization. www.who.int/en/

Appendix A. Commissioner's Scoping Decision



**In the Matter of the Application of Great
River Energy, Xcel Energy and Others for
a Certificate of Need for the CapX 2020
345-kV Transmission Projects**

**ENVIRONMENTAL REPORT
SCOPING DECISION**

PUC Docket No. ET02, E002/CN-06-1115

The above matter has come before the Commissioner of the Department of Commerce (the Department) for a decision on the content of the Environmental Report (ER) to be prepared in consideration of the Xcel Energy, et al., Application for a Certificate of Need for three, 345 kilovolt (kV) high voltage transmission lines (HVTL) in Minnesota. According to Minnesota Rule 7849.7030:

The Commissioner of the Department of Commerce shall prepare an environmental report on a proposed high voltage transmission line or a proposed large electric power generating plant at the need stage. The environmental report must contain information on the human and environmental impacts of the proposed project associated with the size, type, and timing of the project, system configurations, and voltage. The environmental report must also contain information on alternatives to the proposed project and shall address mitigating measures for anticipated adverse impacts. The commissioner shall be responsible for the completeness and accuracy of all information in the environmental report.

An ER provides a high level environmental analysis of the proposal and system alternatives, and reviews environmental impacts associated with named and alternative project corridors. The ER does not take the place of an EIS that would evaluate route alternatives, nor is it comparable in scope. It is only one part of a larger Department investigation of the Certificate of Need Application. The Department in its overall review will address in detail all the issues and alternatives required by rule.

The Minnesota Department of Commerce Energy Facilities Permitting (EFP) Unit held public information meetings on December 10, 11, 13, 17 and 18 in Moorhead, Fergus Falls, Alexandria, Clearwater, Winona, Rochester, Marshall, Olivia, Arlington, and Cannon Falls to inform the public about the project and the regulatory proceedings; discuss environmental, social and economic issues of importance in the area potentially affected; and to gather public input into the scope of the Environmental Report to be prepared for the project. The meetings provided the public an opportunity to ask questions about the project and to suggest alternatives and specific impacts to address in the ER. The public was given until January 14, 2008, to submit written comments. Fifty-four written comments were received.

Having reviewed the matter, and having consulted with staff, I hereby make the following Order on the content of the ER:

MATTERS TO BE ADDRESSED

The ER will address the following subjects/matters for the proposed project:

PROJECT DESCRIPTION

The ER will describe the proposed project, right-of-way requirements, location, purpose, and proposed design.

REGULATORY FRAMEWORK

The ER will describe the regulations and regulatory processes which the project is being reviewed under, including the Certificate of Need, environmental review, and the public participation process.

ALTERNATIVES TO THE PROJECT

The ER will describe and analyze the feasibility of the following alternatives:

- No-build alternative,
- Conservation alternative,
- Existing line or system improvements,
- Generation alternative, and
- Use of alternative corridors.

ASSESSMENT OF PROJECT IMPACTS AND MITIGATION

The ER will describe the environmental setting within the project area and analyze the avoidable and unavoidable impacts of and mitigation measures for the proposed project corridors, including data specific to each of the Fargo, LaCrosse and Brookings projects respectively. As appropriate, data may include:

- Impacts on human settlement: socioeconomic, displacement, noise, aesthetics, radio and television interference, archeological and historic resources, human health and safety (including electric and magnetic fields, and safety codes).
- Impacts on land-based economies: recreation, prime farmland, transportation, mining and forestry, and economic development.
- Impacts on natural environment: air quality, water quality (including surface water, groundwater and wetlands), soils and geology, flora and fauna, rare and unique natural resources

PERMITS AND APPROVALS REQUIRED

The ER will describe the federal, state and local permits anticipated to build the project.

ISSUES OUTSIDE OF THE ENVIRONMENTAL REPORT

The ER will not consider the impacts or mitigative measures associated with specific routes within the proposed corridors. Site specific concerns (i.e., along specific routes) will be addressed in separate PUC permitting proceedings for each of the three line proposals expected to be filed sometime in late 2008. The ER will only identify the general potential impacts from the construction, operation, and maintenance of the proposed HVTLs along the broad geographic areas proposed, and the measures generally available to mitigate these potential impacts.

The ER will not review impacts of specific energy sources in addressing the project, such as carbon outputs from coal-generated facilities or environmental impacts from a wind generation installation. The proposal is a set of transmission lines designed, as stated, to serve local needs and to improve the access of Minnesota renewable energy sources unto the grid. Transmission operates irrespective of the source of energy and is managed on the grid by the Midwest Independent System Operators independent of generation type. Therefore, these transmission lines are not directly associated with any particular source. This project differs from others designed to accommodate or compensate for the connection of a proposed generating facility onto the grid.

It is not possible to associate this environmental review with any federal review at this time. Minnesota Rule 4410.3900 anticipates coordinating state and federal review where possible. However, the association is not possible in this case due to timing and relevance. First, completion of this ER is required for the contested case hearing prior to when any application initiating potential federal review would be filed.


Additionally, no application for a permit or funds from the Rural Utility Service is anticipated by any of the applicants. No action requiring a federal EIS is anticipated. If that situation were to change when any route applications are filed, the Department would pursue all opportunities to coordinate the EIS reviews in those proceedings with any relevant federal agency reviews.

SCHEDULE

The ER shall be completed by March 31, 2008, except for those portions which are dependent upon other direct testimony of the Department of Commerce due April 30, 2008.

Signed this 18 day of February, 2008

STATE OF MINNESOTA
DEPARTMENT OF COMMERCE



Glenn Wilson, Commissioner

Appendix B. Environmental Review Maps

- Map 1. CapX2020 Transmission Study Corridors
- Map 2. SE Twin Cities to La Crosse, WI, General Overview (1)
- Map 3. SE Twin Cities to La Crosse, WI, General Overview (2)
- Map 4. SE Twin Cities to La Crosse, WI, General Overview (3)
- Map 5. Alma Crossing of Mississippi River
- Map 6. Winona Crossing of Mississippi River
- Map 7. Trempealeau Crossing of Mississippi River
- Map 8. La Crosse/La Crescent Crossing of Mississippi River
- Map 9. Fargo to Twin Cities, General Overview (1)
- Map 10. Fargo to Twin Cities, General Overview (2)
- Map 11. Fargo to Twin Cities, General Overview (3)
- Map 12. Fargo to Twin Cities, General Overview (4)
- Map 13. Brookings, SD, to Twin Cities, General Overview (1)
- Map 14. Brookings, SD, to Twin Cities, General Overview (2)
- Map 15. Brookings, SD, to Twin Cities, General Overview (3)
- Map 16. Minnesota Valley Crossing of Minnesota River
- Map 17. Franklin Crossing of Minnesota River
- Map 18. Helena Crossing of Minnesota River
- Map 19. West Waconia Crossing of Minnesota River