

ENVIRONMENTAL ASSESSMENT

For the Proposed

Pleasant Valley Wind, LLC Transmission Project and Associated Substation Facilities

*Pleasant Valley Wind, LLC
Mower County, Minnesota*

DRAFT July 6, 2010

Prepared for:



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**Transmission
Project Name:**

Pleasant Valley Wind, LLC Proposed Transmission Project

**Transmission
Project Location:**

Mower County, Minnesota:

- Sargeant Township – Sections 9 -13, 24, 25, 33-36
- Pleasant Valley Township – Sections 7, 18, 19, 30, 31
- Dexter Township – Sections 1-4

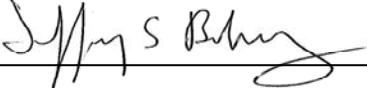
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ACRONMYN LIST

BC	Before Christ
BMPs	Best Management Practices
CAFOs	Confined Animal Feeding Operations
COE	U.S. Army Corps of Engineers
CON	Certificate of Need
CUP	Conditional Use Permit
EA	Environmental Assessment
ELF	Extremely Low Frequency
EMF	Electromagnetic Fields
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Act
FIRM	Flood Insurance Risk Map
FWS	United States Fish and Wildlife Service
GRE	Great River Energy
HVTL	High Voltage Transmission Lines
ISTS	Individual Septic Treatment Systems
LWECS	Large Wind Energy Conversion System
MBESI	McGhie & Betts Environmental Services, Inc.
MDA	Minnesota Department of Agriculture
MERC	Midwest Rural Energy Council
mG	Millguass
MGS	Minnesota Geological Survey
MNDNR	Minnesota Department of Natural Resources
MNDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MPUC	Minnesota Public Utility Commission
MS	Minnesota Statute
MSP	Minneapolis-St. Paul International Airport
MW	Megawatt
MWWTP	Municipal Waste Water Treatment Plant
NESC	National Electrical Safety Code
NHIS	Natural Heritage Information Systems
NL	Not Listed
NNG	Northern Natural Gas
Northern	Northern Natural Gas Company
NPDES	National Pollution Discharge Elimination System
OHWL	Ordinary High Water Level
OES	Office of Energy Security
RCRA	Resource Conservation and Recovery Act
RES	Renewable Energy Systems, Inc.
ROW	Right-of-Ways
RPS	Renewable Portfolio Standard
RST	Rochester International Airport

SDS	State Disposal System
SHPO	State Historic Preservation Office
SNA	Scientific and Natural Area
SPC	Special Concern Species
SWCD	Soil and Water Conservation District
SWPPP	Storm Water Pollution Prevention Plan
THR	Threatened Species
TOB	Dodge Center Municipal Airport
USDA	US Department of Agriculture
USGS	United State Geological Survey
USEPA	U.S. Environmental Protection Agency
WCA	Wetland Conservation Act
WHO	World Health Organization
WMA	Wildlife Management Area

1 Executive Summary

Pleasant Valley Wind, LLC, a wholly-owned subsidiary of RES America Developments Inc., (“RES Americas”) proposes to construct up to 301 megawatt (MW) Large Wind Energy Conversion System (LWECS), referred to as (“the Project”) in portions of Dodge and Mower Counties, Minnesota. Energy generated by the Project will be transmitted into the grid with the construction of two proposed transmission route facilities. Electricity generated by the turbines will be transmitted to two (2) 34.5/138 kilovolt (kV) proposed substations via underground 34.5 kV electric cables. Two (2) single circuited 138 kV overhead transmission lines will transmit the energy to a third substation where it will interconnect into the grid, the POI (“the point of interconnection”) via one of the following two options:

- Option 1: For this option the Applicant will construct an interconnection substation and switchyard that will be located in the SE $\frac{1}{4}$ of SW $\frac{1}{4}$ of Section 18 of Pleasant Valley Township, approximately 0.3 miles (1,730 feet) east of the 680th Avenue and 310th Street intersection and north of the GRE power plant access road, adjacent to the existing 345 kV Xcel transmission line. At the intersection of 680th Avenue and 310th Street, the two (2) overhead transmission lines will be double circuited, or co-located on the same structures for a distance of 0.3 miles (1,726 feet) before the energy is transmitted into the Preferred East Substation. Here, the voltage will be stepped up to 345 kV with a 138/345 kV autotransformer. From the high side of the 138kV/345 kV autotransformer, interconnection bus work within the Preferred East Substation will connect with a new tap into Xcel’s existing 345 kV line, (the “Point of Interconnection Option 1”).
- Option 2: For this option energy will be transmitted to the Preferred East Substation (POI Option 2) located approximately 1,300 feet west of the existing Great River Energy Pleasant Valley Substation in the SE $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 24 of Sargeant Township. Here, the voltage will be stepped up to 345kV with a 138/345kV autotransformer. The energy will then be transmitted through a short proposed 345 kV East Transmission Line that extends approximately 3,600 feet where it interconnects to Xcel Energy’s 345kV bus, (the “Point of Interconnection Option 2”) within the Pleasant Valley Substation.

Based on guidance from the State of Minnesota Office of Energy Security (OES), and the Minnesota Public Utilities Commission (MPUC), Pleasant Valley Wind, LLC, (“the Applicant”) is eligible for the alternative permitting review process in accordance with Minnesota Statutes 216E.04. On May 4, 2010 the Mower County Board of Commissioners accepted local authority to permit the Pleasant Valley Wind transmission facilities, (“the Transmission Project”), in accordance with Minnesota Statutes 216E.05. In accordance with Minnesota Rules 7850.5300 Subp. 5, an environmental assessment (EA) is required to be prepared by the local unit of government with jurisdiction to permit the project. As part of this process, the Mower County Board of Commissioners allowed the public an opportunity to participate in developing the scope of this EA during the meeting of the Mower County Board of Commissioners on June 1, 2010. A follow-up meeting of the Mower County Board of Commissioners was held on June 22, 2010 to determine the scope of this EA.

The content of the EA contains a general description of the proposed facility, discusses alternate routes and the potential impacts on the human and natural environment of the proposed Transmission Project, analyzes the feasibility of each preferred route, addresses required permits and details additional matters identified in the scoping process. The proposed Transmission Project consists of the following transmission facilities:

Preferred POI Option 1: The total length of this option is 14.1 miles.

- Substations
 - North Substation (5.7 acres): located in the SW ¼ of SW ¼ of Section 9 of Sargeant Township (T104N R16W)
 - South Substation (5.7 acres): located in the NE ¼ of SW ¼ of Section 4 of Dexter Township (T103N R16W)
 - East Substation (5.7 acres): located in the SE ¼ of SW ¼ of Section 18 of Pleasant Valley Township (T104N R15W)
- Preferred Transmission Lines
 - Preferred North (PN) Transmission Route (6.2 miles long): consists of segments PN-1, PN-2, PN-3, PN-4, PN-5, and PN-6
 - Preferred South (PS) Transmission Route (7.9 miles long): consist of segments PS-1, PS-2, PS-3, PS-4, PS-5, PS-6, PS-7, and PS-8

Preferred POI Option 2: The total length of this option is 14.1 miles and resembles the Preferred POI Option 1 with the following modification:

- Substations
 - North Substation (5.7 acres): This substation is the same as the Preferred POI Option 1.
 - South Substation (5.7 acres): This substation is the same as the Preferred POI Option 1.
 - East Substation (5.7 acres): This substation is located approximately 1,300 feet west of the existing Great River Energy Pleasant Valley Substation in the SE ¼ of the NE ¼ of Section 24 of Sargeant Township.
- Preferred Transmission Lines
 - North Route (6.4 miles long): consists of segments PN-1, PN-2, PN-3, PN-4, PN-5 and terminates at the end of PN-6 where it would then connect to the Preferred POI Option 2 East Substation located in Section 24 of Sargeant Township.
 - South Route (7.0 miles long): consists of segments PS-1, PS-2, PS-3, PS-4 and terminates at the end of PS-5 where it would connect to the Preferred POI Option 2 East Substation located in Section 24 of Sargeant Township.
 - East Route (0.7 miles long): consists of a short transmission line made up of segments PE-1, PE-2, and PE-3 that extends approximately 3,490 feet where it interconnects to Xcel Energy's 345kV bus, (the "Point of Interconnection") within the Pleasant Valley Substation in Section 19 of Pleasant Valley Township.

The Applicant will pursue one of these two options depending upon the outcome of negotiations with GRE and Xcel regarding the ultimate POI into the grid. For the purposes of this EA both preferred options have been evaluated.

Additionally, the following alternatives were considered by the Applicant during the development of the Transmission Project but were found to be less feasible than the Preferred Substation and Preferred Transmission Route locations, and were therefore rejected. The Rejected Alternate Transmission Facilities include the following transmission facilities:

- Rejected Transmission Routes and Substations
 - Rejected Alternate North Route (AR 1) is approx. 5.4 miles long and consists of segment PN-1, AR-1, PN-6
 - Rejected Alternate South Route (AR 2) is approx. 7.0 miles long and consists of segment AR-1, AR-2, PS-3, PS-4, PS-5, PS-6, and PS-7
 - Rejected Alternate Route (AR34): Option to bury the transmission lines
 - Rejected Alternate Route (AR45): No-build option

The Applicant does not have the power of eminent domain to acquire land or wind rights for the Transmission Project. Wind and land rights necessary to build the facility must be in the form of voluntary easements or lease agreements between individual landowners and the Applicant. The Transmission Project proposed routes will be sited within existing county road rights-of-way (ROW) and adjacent to Township road ROW with the exception of a one (1) mile segment of the preferred south route which will run across cropland along the centerline of Section 4 in Dexter Township. Approximately 125 poles will be installed at a spacing of 600-800 feet within the 100-foot wide route corridor as described below for all routes:

- POI Option 1:
 - North Route (6.4 miles long) will have 52 poles
 - South Route (7.9 miles long) will have 69 poles
- POI Option 2:
 - North Route (6.2 miles long) will have 54 poles
 - South Route (7.0 miles long) will have 61 poles
 - East Route (0.7 miles long) will have 6 poles

For both options, the 100-foot wide route corridor will encompass approximately 171 acres of land under easement including land that will continue to be cultivated for row crops and ROW including ditches and roads. All three (3) substations will encompass a total of 17.1 acres of agricultural land. The construction of the proposed Transmission Project is not anticipated to have any significant adverse impacts to the environment, land use, property values, or cultural values within the proposed Transmission Project area. Key statements that support these findings are summarized below:

- Environment: The Applicant has completed due diligence for land within the proposed Transmission Project and has found no environmental issues that will negatively impact wetlands, wildlife, rare and unique natural resources or surface water and floodplain resources in the area. Additionally, the Applicant has given consideration to the Mower County Shoreland Ordinance during the route selection process to minimize impacts to protected waters' crossings. A thorough review of potential environmental impacts was conducted and the Applicant's consideration of these factors is reflected in the preferred transmission line routes that have been selected.
- Land use: The Applicant has considered the effects of the proposed Transmission Project on land use and does not believe the facilities will negatively impact current designated agricultural or rural residential land uses. Transmission lines will have poles erected just outside existing Township road ROWs and the easement for the overhead lines will extend into adjacent agricultural land and into the ROW. However, the footprint will be less than a 1 foot by 2 foot diameter hole every 600 to 800 feet (the typical pole width spacing) and the total project impact will not be a significant impairment to continuing row crops, pastures, gardens or other agricultural production along the easement. The Applicant has selected the preferred routes to minimize impacts to occupied residences and structures. The

Transmission Project has been sited no closer than 140 feet from occupied residences. Additionally, the proposed routes were designed to avoid impacting the existing small groves of trees and to the extent practicable to minimize visual impact of structures near residences.

- Property Values: Since the land use in the Transmission Project area is primarily agriculture and the proposed transmission routes follow existing county and township roads the Applicant does not anticipate adverse affects to property value. At current land rental rates of \$170/acre/year the retirement of 17.1 acres for the three (3) substations represent an estimated annual cumulative financial loss of less than \$3,000/year. Additionally, recent estimated land values for Mower County during 2008 through 2009 from the Minnesota Land Economics indicate property values have increased between 15-20 percent per year in townships with and without wind energy facilities. This data provides a strong case that properties near wind energy facilities and transmission lines have not resulted in a decrease in property values. Therefore, property values will not adversely affect adjoining or nearby properties.
- Cultural values: The Applicant believes the proposed Transmission Project promotes the principles and cultural values critical for the economic growth of Mower County, a leader in wind power generation and transmission. Only a small area of agricultural land will be impacted by the Transmission Project. The steady stream of income provided to participating landowners by the Applicant, and the revenue generated by the County and Townships from the energy production tax will help to diversify the local economic base, add economic growth and local vitality to the area, and promote responsible development that will not interfere with the rural lifestyle of the area.

Additional discussion that provides data supporting these findings is provided in *Section 5 (Environmental Information)*, of this document.

2 Description of the Proposed Transmission Project

Pleasant Valley Wind, LLC (the “Applicant”), a wholly-owned subsidiary of RES America Developments Inc. (“RES Americas”), proposes to construct a 301 megawatt (MW) Large Wind Energy Conversion System (LWECS) (“the Project”) in portions of Dodge and Mower Counties, Minnesota, as shown in Map 1 “Pleasant Valley Wind, LLC Proposed Transmission Project Index.” The Project will provide renewable energy for the region and will help the state of Minnesota reach its renewable energy objectives.

In order to safely transmit the wind energy generated by the Project into the grid, construction of two (2) or three (3) transmission lines (depending on the POI option selected) and three (3) substations is necessary. In accordance with Minnesota Statutes (216E.05) and Rules (7850.5300) the Applicant has an eligible project that can be approved by an appropriate local unit of government. Therefore, on May 4, 2010 the Mower County Board of Commissioners accepted local permitting authority for the Transmission Project.

In accordance with Minnesota Rules 7850.5300 Subp. 5, an environmental assessment (EA) is required to be prepared by the local unit of government with jurisdiction to permit the project. As part of this process, the Mower County Board of Commissioners allowed the public an opportunity to participate in developing the scope of this EA during the meeting of the Mower County Board of Commissioners on June 1, 2010. A follow-up meeting of the Mower County Board of Commissioners was held on June 22, 2010 to determine the scope of this EA. The continuation of

six (6) previously submitted conditional use permit applications will commence after this EA has been completed and approved.

2.1 Transmission Project Facilities

The EA will focus on the environmental impacts only as they relate to the transmission facilities for the Project. Based on the total projected output of the Project, the Applicant proposes to site and construct the following transmission facilities, known as “the Transmission Project.”

Substations

- North Substation
- South Substation
- East Substation

Preferred Transmission Routes

- Preferred North Transmission Route that consists of segments PN-1, PN-2, PN-3, PN-4, PN-5 and PN-6
- Preferred South Transmission Route that consist of segments PS-1, PS-2 and PS-3, PS-4 PS-5, PS-6, PS-7, and PS-8
- East Transmission Route (only for POI Option 2): the transmission line is approx. 0.7 miles long, and the substation is located in SE ¼ of SE ¼ of Section 24 of Sargeant Township, consists of segments PE-1, PE-2 and PE-3

The following alternatives were considered by the Applicant during the development of the Transmission Project but were found to be less feasible than the Preferred Substation and Preferred Transmission Route locations, and were therefore rejected. The Rejected Alternate Transmission Facilities include the following transmission facilities:

- Rejected Alternate North Route (AR 1) consists of segment PN-1, AR-1, PN-6
- Rejected Alternate South Route (AR 2) consists of segment AR-2, PS-3, PS-4, PS-5, PS-6, and PS-7
- Rejected Alternate Route 4 (AR4): Option to bury the transmission lines
- Rejected Alternate Route 5 (AR5): No-build option

Greater detail depicting the locations of the proposed Transmission Project is provided in Maps 1 - 5.

The Applicant has selected two (2) locations in Sargeant Township, one (1) location in Dexter Township and one (1) location in Pleasant Valley Township as the most appropriate sites for the proposed substations. The electricity generated by the individual turbines will be transmitted by underground circuits to two (2) proposed 34.5/138 kV substations (the North Substation and the South Substation), where the energy will be transmitted by two (2) single circuited 138 kV overhead transmission lines to a third substation where it will interconnect into the grid, the POI (“the point of interconnection”) via one of the following two options:

- Option 1: For this option the Applicant will construct an interconnection substation and switchyard that will be located in the SE ¼ of SW ¼ of Section 18 of Pleasant Valley Township, approximately 0.3 miles (1,730 feet) east of the

680th Avenue and 310th Street intersection and north of the GRE power plant access road, adjacent to the existing 345 kV Xcel transmission line. At the intersection of 680th Avenue and 310th Street, the two (2) overhead transmission lines will be double circuited, or co-located on the same structures for a distance of 0.3 miles (1,726 feet) before the energy is transmitted into the Preferred East Substation. Here, the voltage will be stepped up to 345 kV with a 138/345 kV autotransformer. From the high side of the 138kV/345 kV autotransformer, interconnection bus work within the Preferred East Substation will connect with a new tap into Xcel's existing 345 kV line, (the "Point of Interconnection Option 1").

- Option 2: For this option energy will be transmitted to the Preferred East Substation (POI Option 2) located approximately 1,300 feet west of the existing Great River Energy Pleasant Valley Substation in the SE ¼ of the NE ¼ of Section 24 of Sargeant Township. Here, the voltage will be stepped up to 345kV with a 138/345kV autotransformer. The energy will then be transmitted through a short proposed 345 kV East Transmission Line that extends approximately 3,600 feet where it interconnects to Xcel Energy's 345kV bus, (the "Point of Interconnection Option 2") within the Pleasant Valley Substation.

The underground collection systems of 34.5 kV electric cables extending from the turbines to the substations are not part of the transmission system. These circuits are being installed on private land in accordance with agreements already in place between the owners and the Applicant.

2.2 Route Width and Transmission Structures

The Applicant has acquired a 100-foot wide transmission line utility easement for the route siting. However, once the transmission line routes are finalized the total utility easements will only be 80-foot wide. The total land requirements for the 100-foot wide easements for all three (3) of the transmission line corridors will encompass 171 (or 137 acres for the 80-foot wide route corridor). The proposed transmission line design is based on using single pole structures every 600 to 800 feet apart with a forty (40) foot safety zone easement on each side of the transmission lines in accordance with the National Electric Safety Code. Finalizing transmission line design will require flexibility in structure placement and type, as well as coordination with other utilities with infrastructure in or near the proposed Transmission Project. With this design, the Applicant anticipates approximately 125 poles will be erected. For POI Option 1 the north and south transmission line routes will have approximately 52 and 69 poles along each route, respectively. For POI Option 2 the north, south and east transmission line routes will have approximately 56, 61 and 6 poles along each route, respectively.

3 Regulatory Framework

Permitting requirements for a project of this size are defined in Minnesota Statutes (216E) and Rules (Chapter 7850), which states that eligible projects may elect to seek local approval from an appropriate local unit of government. This Transmission Project meets the criteria for an eligible project, since the Applicant proposes to construct a high voltage transmission line between 100 and 200 kilovolts (Minn. Rules Chapter 7850.5300, subp. 2(C)). Therefore, on April 1, 2010 the Applicant requested local review for the Transmission Project, refer to Appendix A "Election of Local Review: MPUC Notification." As a result, the Mower County Board of Commissioners

accepted local permitting authority on May 4, 2010 as indicated by Appendix B “Mower County Local Review Acceptance Letter” and subsequently the MPUC recognized and approved local review with the letter provided in Appendix C “MPUC Confirmation of LGU Permit Authority.” Notification that the Applicant applied for a routing permit as required in Minn. Rules 7850.5300, subp. 3, is provided in Appendix D “Notification of Local Review to Project General List.”

3.1 Eligibility for Alternative Permitting Review

Based on guidance from the OES and MPUC, the Applicant is eligible for the alternative permitting review as described in Minnesota Rules 7850.2800 to 7850.3900. Specifically, the two (2) preferred 138 kV transmission lines (North and South) are between 100 kV and 200 kV in accordance with Minnesota Rules 7850.2800 subp. 1(C) and because the East 345 kV Transmission Line, while greater than 200kV, is less than five (5) miles length. As such, filing a route permit with the state is not required according to MR 7850.2800 subp. 1(D). Additionally, since the distance between the proposed East Substation and Great River Energy’s Pleasant Valley Substation is less than 1,500 feet the proposed East Transmission Route is within the jurisdiction for review through the alternative permitting process as provided in Minnesota Statutes 216B.2421 Subd. 2 (2). As required by Minnesota Rules 7850.2800, Subp. 2, the Applicant is required to provide written notification to the MPUC ten (10) days before submitting an application stating they intend to submit the Proposed Transmission Project application under the applicable alternative permitting rules, as documented in Appendix A “Election of Local Review: MPUC Notification.”

The Proposed Transmission Project is eligible for local review of the proposed facilities in accordance with Minnesota Statutes 216E.05. As required by Minnesota Rules 7850.5300, Subp. 3, the Applicant is required to provide written notification to the MPUC ten (10) days before submitting an application to a local unit of government stating they intend to submit the Proposed Transmission Project application under the applicable alternative permitting rules, as documented in Appendix A “Election of Local Review: MPUC Notification.”

3.2 Conditional Use Permit Requirements

The Mower County Zoning Ordinance, Division 6, states that all uses except permitted uses shall be required to obtain a Conditional Use Permit (CUP) that is approved by the County Board.

On April 1, 2010 the Applicant submitted a total of six (6) Conditional Use Permit applications to Mower County, one for each of the proposed substations (north, south and east), and one for each of the preferred transmission lines (north, south and east). In accordance with the Mower County Zoning Ordinance Division 6, and Minn. Statute 394.26 the Mower County Planning Commission held a public hearing on April 27, 2010 regarding the Applicant’s request for conditional use permits. As part of the local permitting process an EA is required to be prepared for the Transmission Project prior to approval of CUP applications by Mower County. As a result, the permitting for the CUP applications has been suspended until this EA has been finalized. CUP continuation hearings are scheduled to commence in August 2010. Official notification will occur ten (10) days prior to the date of the hearing.

Mower County will be required to re-notify property owners located in incorporated areas

within five hundred (500) feet of affected property and property owners in unincorporated areas within one-quarter (1/4) mile of affected property (or the ten (10) nearest properties, whichever provides the greatest number of owners). All municipalities within two (2) miles of the proposed conditional use as well as the affected Town Boards will be included in the re-notification. The CUP applications will address the need for the three (3) proposed substations and the two (2) proposed transmission line routes. The conditional use permits will allow the Applicant to collect the energy generated by the proposed 301 MW wind project and safely transmit it into the grid.

Once the Planning Commission has reviewed the CUP applications a report will be drafted within sixty (60) days that will be submitted to the Mower County Board for action. Following the Planning Commission recommendations the Mower County Board then has thirty (30) days to accept or deny the conditional use permits.

3.3 Environmental Assessment Requirements

In accordance with Minn. Rules 7850.5300, subp. 5, an environmental review, or environmental assessment (EA) is required to be completed by the local government unit with jurisdiction to permit the project. Information included in the EA shall provide a general project description, discuss alternative sites or routes, discuss potential impacts of the proposed project as it relates to the human and natural environment. The EA also provides plausible mitigative measures to eliminate or minimize potential adverse impacts for all selected sites or routes, discusses the feasibility of each alternative site or route considered, and identifies other permits required.

Once the EA is completed the Mower County Board of Commissioners will be required to provide notification that the EA has been completed in the Environmental Quality Board (EQB) Monitor. The notice shall include information on how to obtain a copy of the EA and provide guidance on how to submit comments. The local unit of government shall provide a copy of the environmental assessment to the MPUC upon completion of the document. In accordance with Minn. Rules 7850.5300, Subp. 5, finalization of the EA shall not be completed until ten (10) days after the EQB Monitor publication.

3.4 Certificate of Need

In accordance with Minnesota Statutes 216B.2421, subd. 2(3), a Certificate of Need (CN) for a 138 kV transmission line is not required for a transmission route permit filing if the proposed route is less than ten (10) miles long and does not cross the state line. The proposed routes in the permit application meet all of these conditions. Therefore, the Applicant was granted MPUC approval for exemption to non-applicable requirements for its CN application, as indicated by MPUC Docket No. IP-6828/CN-09-934. The MPUC approved acceptance of the filed CN application as complete on December 23, 2009. On June 11, 2010 the MPUC announced the CN Environmental Report is available for public review and can be found at the MPUC website.

3.5 Large Wind Energy Conversion System Site Permit

In accordance with Minnesota Statute 216F.04 a Site Permit is required prior to the construction of any large wind energy conversion system (LWECS) project with a nameplate capacity of 5,000 kilowatts or more. The Applicant's Project nameplate capacity is expected to be up to 301 MW (301,000 kW). The Applicant has applied for a

LWECS Site Permit and the MPUC accepted the filed LWECS application as complete on January 12, 2010. The MPUC issued its Order documenting this acceptance as complete on January 19, 2010, which initiated a 15-day period to complete required notice of the LWECS site permit. Notification of the LWECS application acceptance and the public information and scoping meeting was published in local newspapers and the meeting was held on Monday, February 22, 2010. Public comments were accepted until Friday, March 15, 2010 and were used to prepare the Draft LWECS Site Permit. The Draft LWECS Site Permit has been prepared and is available for public comment on the MPUC website.

The 301 MW Project is located in southern Dodge and northern Mower Counties. The Applicant's site control encompasses approximately 52,000 acres. Energy generated by the Project will be collected and transmitted to the Transmission Project facilities once the Mower County Board of Commissioners has granted approval of the conditional use permit applications and the Project has been constructed. The Transmission Project will be located in the following three (3) townships:

- Sargeant Township: Sections 9-13, 24 and 34-36
- Pleasant Valley Township: Sections 7, 18 and 19
- Dexter Township: Sections 3 and 4

3.6 Other Permits and Approvals Required

A detailed list of permits and approvals that may be necessary for the construction of the proposed Project is listed in Table 3.6. The Applicant will work in conjunction with all local, state and federal organizations to obtain all the necessary permits prior to constructing the Project.

Table 3.6: Potential Permits and Approvals Required for Construction and Operation of the Proposed Transmission Project

	Agency	Permit / Approval	Authority
Mower County	Mower County Highway Department	Moving Permit	Highway Dept.
		Access Drive and Entrance Permit	Highway Dept.
	Mower County Highway Department	Utility Permit	Mower County Ordinance Section 14-8.2
		ROW Obstruction, or Excavation Permit	Mower County ROW Ordinance
	Mower County Planning & Zoning and Environmental Land Use Offices	Permit to construct Sewage Treatment System	Mower County ISTS Ordinance; MN Rules Chapter 7080
	Mower County Planning & Zoning Department	Building Permits	Mower County Ordinance
	Mower County Planning & Zoning Department	Conditional Use Permits	Mower County Ordinance Section 14-140.1
Local	Soil and Water Conservation District (Mower County)	Wetland Permitting	Wetland Conservation Act
	Mower County Townships: Waltham, Sargeant, Pleasant Valley, Red Rock, and Dexter	Township Approval is advisory to Mower County	Mower County Planning Commission and County Board
State	Minnesota Public Utilities Commission (MPUC)	Large Wind Energy Conversion System (LWECS)	Minnesota Rules 7854.0500
	Minnesota Public Utilities Commission (MPUC)	Certificate of Need (CON)	Minnesota Rules Chapter 7849
	MN State Historic Preservation Office (SHPO)	Cultural and Historic Resources Review	National Historic Preservation Act; Historic Sites Act (Minn. Stat. §§ 138.661, 138.669); Field Archaeology Act (Minn. Stat. §§ 138.31-138.42); Private Cemeteries Act (Minn. Stat., Ch. 307)
	Minnesota Pollution Control Agency (MPCA)	401 Certification	Clean Water Act
	Agency	Permit / Approval	Authority
	MPCA	NPDES Stormwater Permit for Construction	Clean Water Act
	MPCA	Small Quantity Generator of Hazardous Waste	Minn Rules 7045

State	Minnesota Department of Natural Resources (MNDNR)	Consultation and Review of the Proposed Project regarding information on Minnesota's rare plants and animals, native plant communities, and other rare features.	Minn. Stat. § 84.0895
	Minnesota Department of Natural Resources (MNDNR)	Public Waters Work Permits	Minn. Stat. § 103G.005
	Minnesota Department of Natural Resources (MNDNR)	License to Cross Public Lands and Waters	Minn. Rules, Ch. 6135; Minn. Stat. § 84.415
	MN Board of Soil and Water Resources (BWSR)	Wetland Conservation Act Approval	Minn. Stat. §§103G.222-103G.2373; MN Rules 8420
	Minnesota Department of Transportation (MnDOT)	Work within ROW Permit	Minn. Rules 8810
	MnDOT Office of Freight & Commercial Vehicle Operations (OFCVO)	Oversize and Overweight Vehicles: Single Trip Permit	Minn. Stat. 169.862
Federal	US Fish and Wildlife Services (FWS)	Consultation and Review of the Proposed project regarding Federally Threatened and Endangered Species	Endangered Species Act of 1973
	US Army Corps of Engineers (COE)	Section 404 Permits	Clean Water Act
	US Army Corps of Engineers (COE)	Section 404 Permits	Clean Water Act

4 Proposed Transmission Facilities

4.1 Route Selection Process

During the process for selecting transmission line routes for the proposed Transmission Project, the Applicant analyzed the study area for route attributes based on the following key criteria:

- As a private company, the Applicant does not and will not have the power of eminent domain to acquire land rights for siting the proposed transmission lines and substations. Therefore, participation from landowners along the proposed routes in the form of voluntary easement agreements between individual landowners and the Applicant are essential for the viability of the proposed Transmission Project. These

private easements agreements allow the placement and continued operation of the poles and overhead wires.

- Sharing corridors to the maximum extent practical.
 - Sharing corridors along roadways including township, county roads, and state highways.
 - Locating transmission lines along section and quarter section lines or other established land lines and survey boundaries, such as field edges and fence lines rather than running the lines at a diagonal or in a manner that requires unusual land descriptions or preferred agreements.
 - Consideration to co-locating transmission lines where feasible with existing buried and overhead transmission or electrical distribution structures.
- When corridor sharing with existing transmission lines is not feasible, consideration has been given to locating transmission lines on the opposite side of the road from existing transmission lines. This decreases the amount of ROW required and minimizes impacts to agriculture.
- Paralleling property lines and rail roads to reduce transmission line impacts.
- Minimizing the number of residences located in proximity to the proposed transmission line routes.
- Minimizing proximity to natural features such as, wetlands, archaeologically significant sites, areas where endangered or threatened species are present, areas of significant biological or cultural significance, grassland, woodland and publically managed State and Federal properties.
- Accessing transmission lines for maintenance is taken into consideration in order to avoid areas where clearances would be required due to the proximity of trees and nearby structures.
- Minimizing the length of the transmission line to reduce the impact area and cost.

4.2 Description of Preferred Transmission Facilities

Energy generated by the Transmission Project will be transmitted into the grid with the construction of two (2) or three (3) proposed transmission route facilities (depending on the POI option selected). Electricity generated by the turbines will be transmitted to two (2) 34.5/138 kilovolt (kV) proposed substations via underground electric cables. Two (2) single circuited 138 kV overhead transmission lines will transmit the energy to a third substation (depicted in Figure 4.2) where it will interconnect into the grid, the POI (“the point of interconnection”) via one of the following two options, as depicted in Figure 4.2:

- Option 1: For this option the Applicant will construct an interconnection substation and switchyard that will be located in the SE ¼ of SW ¼ of Section 18 of Pleasant Valley Township, approximately 0.3 miles (1,730 feet) east of the 680th Avenue and 310th Street intersection and north of the GRE power plant access road, adjacent to the existing 345 kV Xcel transmission line. At the intersection of 680th Avenue and 310th Street, the two (2) overhead transmission lines will be double circuited, or co-located

on the same structures for a distance of 0.3 miles (1,726 feet) before the energy is transmitted into the Preferred East Substation. Here, the voltage will be stepped up to 345 kV with a 138/345 kV autotransformer. From the high side of the 138kV/345 kV autotransformer, interconnection bus work within the Preferred East Substation will connect with a new tap into Xcel's existing 345 kV line, (the "Point of Interconnection Option 1").

- **Option 2:** For this option energy will be transmitted to the Preferred East Substation (POI Option 2) located approximately 1,300 feet west of the existing Great River Energy Pleasant Valley Substation in the SE ¼ of the NE ¼ of Section 24 of Sargeant Township. Here, the voltage will be stepped up to 345kV with a 138/345kV autotransformer. The energy will then be transmitted through a short proposed 345 kV East Transmission Line that extends approximately 3,600 feet where it interconnects to Xcel Energy's 345kV bus, (the "Point of Interconnection Option 2") within the Pleasant Valley Substation.

The Applicant will pursue one of these two options depending upon the outcome of negotiations with GRE and Xcel regarding the ultimate POI into the grid.



Figure 4.2: Point of Interconnection - Option 1 and Option 2

4.2.1 Proposed Substations

Three (3) substations are proposed within the Project boundary to collect energy generated by the Pleasant Valley Wind Farm as shown in Maps 1 and 2. Collection circuits will run from the turbines to one of two proposed substations where the voltage will be stepped up from 34.5 kV to 138 kV. A third substation (POI Option 1 or POI Option 2) will be used to step up the voltage from the two (2) 138 kV transmission lines to 345 kV at the Point of Interconnection to enter the grid.

Construction of the North, South and POI Option 2 Preferred East Substations will each disturb approximately 5.7 acres of land (3.35 acres of temporary disturbance, and 2.35 for permanent disturbance) which provides adequate area for approximately a 2.35 acre substation facility and provide proper access. Construction of the POI Option 1 Preferred Substation will disturb approximately 5.7 (1.6 acres of temporary disturbance, and 4.1 acres for permanent disturbance). Each substation will have the following standard components: transformers, outdoor breakers and relays, high voltage bus works, steel support structures, overhead lightning protection and a control house. The total disturbed acreage for both temporary and permanent impacts will be 17.1 acres for all 3 substations (a total of 8.8 acres of permanent disturbance). These are typical land requirements for wind power generation substations. A chain link fence, security and safety lighting, and a security system will control access to the facilities. Remaining area around the fenced substation provides for visual and noise buffer.

Construction of the proposed substations will require delivery of major equipment such as transformers, breakers, capacitors, outdoor relaying equipment, control house materials, and various other equipment. Construction will occur in several stages including grading, pouring of transformer foundations, steel work, breakers, control construction, erection and placement of the steel work, and electrical work for all of the required terminations. All excavation, trenching and electrical system construction work will be done in accordance with the Minnesota Pollution Control Agency (MPCA) Construction Stormwater permit and site-specific Storm Water Pollution Prevention Plans (SWPPP) required as part of the permit.

The substations are subject to local zoning requirements and each substation requires a Conditional Use Permit from Mower County.

4.2.1.1 Proposed North Substation

The Applicant proposes to locate the North Substation in the northeast corner at the intersection of 640th Avenue and 320th Street in the SW $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 9 of Sargeant Township, as depicted in Map 2 "Proposed Substations: North, South and East." This substation will have:

- The fenced enclosure for the substation will measure 320 X 320 feet covering 2.35 acres,
- Up to eight (8) 34.5 kV collector circuits feeding from turbine sites into the substation, with a total estimated generation of 165 MW,
- One (1) 34.5/138 kV main transformer,
- Circuit breakers and protection devices for each collector feeder and CTs/VTs,
- A capacitor bank system (the size is to be determined),
- A control building to house all protection and control cabinets, and a DC battery system.

Appendix E “Typical 138 kV North Substation Physical Layout” provides details for a typical 138 kV substation physical layout.

4.2.1.2 Proposed South Substation

The proposed location for the South Substation will be on the east side of 640th Avenue between 280th Street and 265th Street in the NE ¼ of the SW ¼ of Section 4 of Dexter Township, as shown in greater detailed in Map 2. This substation will have:

- The fenced enclosure for the substation will measure 320 X 320 feet covering 2.35 acres,
- Up to seven (7) 34.5 kV collector circuits feeding from turbine sites into the substation with a total estimated generation of 135 MW,
- One (1) 34.5/138 kV main transformer,
- Circuit breakers and protection devices for each collector feeder and CTs/VTs,
- A control building to house all protection and control cabinets and a DC battery system.

Appendix F “Typical 138 kV South Substation Physical Layout” provides details for a typical 138 kV substation physical layout.

4.2.1.3 Proposed East Substation

A third substation is proposed to be located at either the POI Option 1 or POI Option 2 location as shown in Map 2 and 3 and described below.

POI Option 1

POI Option 1 will consist of constructing an interconnection substation and switchyard that will be located in the SE ¼ of SW ¼ of Section 18 of Pleasant Valley Township, approximately 0.3 miles (1,730 feet) east of the 680th Avenue and 310th Street intersection and north of the GRE power plant access road, adjacent to the existing 345 kV Xcel transmission line.

The POI Option 1 Preferred East Substation will have the following components:

- Both the substation and switchyard are expected to have a fenced enclosure footprint of approximately 300’ x 600’ (4.1 acres),
- Two Terminals
 - One terminal will connect to the new 138 kV line running to the north substation,
 - The second terminal will connect to the new 138 kV line running to the south substation,

- A single 345-138 kV autotransformer, 138 kV breakers, 345 kV breakers, disconnects, and a control building.
- The switchyard will include 345kV breakers and disconnect switches and will share a common fence on one side with the substation.
- The 345kV line will be “tapped” to the new switchyard and the configuration will be a 3-breaker scheme. The substation and switchyard will each have dedicated access and separate control buildings.

POI Option 2

POI Option 2 will be located approximately 1,300 feet west of the existing Great River Energy Pleasant Valley Substation in the SE ¼ of the NE ¼ of Section 24 of Sargeant Township,

At POI Option 2 Preferred East Substation the voltage will be stepped up to 345 kV with a 138kV/345 kV autotransformer. This substation will have the following components:

- The fenced enclosure for the substation will measure 320 X 320 feet covering 2.35 acres,
- Two Terminals
 - One terminal will connect to the new 138 kV line running to the north substation,
 - The second terminal will connect to the new 138 kV line running to the south substation,
- One auto transformer 138/345 kV,
- A circuit breaker on the 345 kV for the auto transformer,
- Circuit breakers and protection devices for each 138 kV incoming line and CTs/VTs

Appendix G “Typical 345 kV East Substation Physical Layout” provides details for a typical East Substation physical layout.

4.2.2 Preferred Transmission Routes

The Applicant proposes to transmit the energy collected at the two (2) substations (the North and the South Substations) via two (2) 138 kV overhead transmission lines as shown in Map 4 “Preferred North Transmission Route (PN)” and Map 5 “Preferred South Transmission Route (PS).” Each line will extend approximately 6 to 8 miles, to the Preferred East Substation depending on which option is selected (POI Option 1 or 2). The two (2) Preferred East Substations will be located in one of the following two (2) sections:

- Section 18 of Pleasant Valley Township, approximately 0.3 miles (1,730 feet) east of the 680th Avenue and 310th Street intersection just north of and adjacent

to the site where the GRE Pleasant Valley Substation is located (POI Option 1)

- Section 24 of Sargeant Township approximately 1,300 feet west of the existing Great River Energy Pleasant Valley Substation (POI Option 2), as shown on Map 1.

At either of these locations the voltage will be increased from 138 kV to 345 kV and the energy will enter the grid. For POI Option 1, the preferred north and south 138 kV transmission lines will connect north and east of the intersection of 680th Avenue and 310th Street/CR 1. Here the two (2) 138 kV north and south transmission lines will be combined onto single pole structures as double circuited structures. The lines are co-located for 1,726 feet, to the east where they connect to the POI Option 1 East Substation. This intersection is located between the south section line of the SW ¼ of the SW ¼ of Section 18 of Pleasant Valley Township and the north section line of the NW ¼ of Section 19 of Pleasant Valley Township. At the East Substation the power from the two (2) 138 kV transmission lines will be stepped up to 345 kV with a 138/345 kV autotransformer. The energy will then be connected into the grid with a “tap” directly into the existing Xcel Energy 345 kV transmission line.

From the Preferred East Substation for POI Option 2 the power will be transmitted via a short proposed 345 kV East Transmission Route less than one mile to the POI at Xcel’s 345kV ring bus within the GRE Pleasant Valley Substation. From here, the wind energy will be transmitted into the regional power grid via Xcel’s existing 345kV line. A detailed display of the Preferred East Substation options is provided in Map 3 “Detail of East Substation.”

The preferred 138 kV transmission lines (North and South) will be constructed with:

- 138 kV single-poles, 3-phase configurations of wood poles that are a minimum of 50 feet and a maximum of 80 feet tall. (As needed, poles will be guyed or reinforced with concrete poles at corners, etc.),
- Conductor size - 795 ACSR (Drake),
- Type – ACSR (Aluminum conductor steel re-enforced),
- Single circuits.

The double circuited north and south transmission lines for POI Option 1 will be constructed with:

- 138 kV single-pole, 3-phase configurations of poles 70-100 feet tall (If needed, poles will be guyed or reinforced with concrete poles at corners, etc.),
- Conductor size - 795 ACSR (Drake),
- Type – ACSR (Aluminum conductor steel re-enforced),
- Single circuits

The proposed 345kV East transmission line for POI Option 2 will be constructed with:

- 345kV single-pole, 3-phase configurations of poles up to 70-100 feet tall (If needed, poles will be guyed or reinforced with concrete poles at corners, etc.),
- Conductor size - 795 ACSR (Drake),
- Type – ACSR (Aluminum conductor steel re-enforced),
- Single circuits.

For either POI option the poles will be assembled and fitted with cross-arms, cable supports and insulator hardware on the ground at each pole location, as depicted in Appendix H “Typical 138 kV Overhead Line Design Sheets,” and Appendix I – Typical 345 kV Overhead Line Design Sheets.” Holes for each pole will be excavated using a soil auger and set in place with a small crane or boom truck. Concrete will be poured around the base of the pole or clean fill will be compacted around the pole base according to the local soil conditions an engineer’s specifications. The overhead lines will be a minimum of 50 feet above ground and will connect the substations to the POI.

The transmission lines are subject to review through the Environmental Assessment, local zoning requirements, and, each substation will require a Conditional Use Permit from Mower County.

4.2.2.1 Typical Route Right-of-way Descriptions along Township Roads

The Applicant has acquired a 100-foot wide transmission line utility easement for the route siting. However, once the transmission line routes are finalized the total utility easements will only be 80-feet wide.

The preferred North and South Transmission Routes will parallel existing township road ROWs. The current ROW width of all township roads along both proposed transmission routes is sixty-six (66) feet, or thirty-three (33) feet from centerline to property line. Most Township Road ROWs run along section or quarter section lines that also define property boundaries. For the siting of the proposed routes the Applicant will secure a 100-foot wide easement that will overlap thirty-three (33) feet with the existing township road ROW, where the easement rights will overlap with the ROW reserved for the Township and the transmission easement reserved for Pleasant Valley Wind LLC.

The remaining sixty-seven (67) foot easement will extend away from the ROW into the adjacent private land, where the Applicant will be the sole holder of the transmission easement in accordance with the agreements signed with the individual property owners. Within the sixty-seven (67) foot easement the Applicant plans to place the poles approximately forty (40) feet from the township road centerline, just outside of the existing township road ROW, as depicted in Figure 4.2.2.1. The proposed transmission line design places structures adjacent to township road ROWs to minimize impacts on agricultural land, and maintain clearances in accordance with National Electrical Safety Code

Standards.

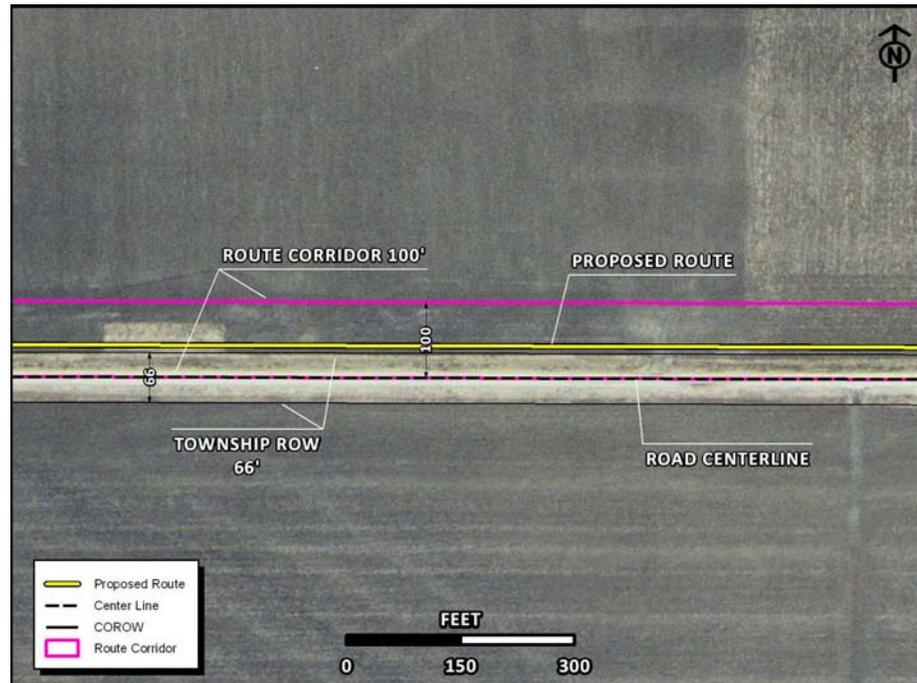


Figure 4.2.2.1 – Typical ROW Corridor along a Township Road

An example of a typical route ROW legal description along a township road is described as follows: The (North or South) 100 feet of the Southwest Quarter of Section X, Township XXX North, Range XX West, of Mower County, Minnesota.

The preferred North and South Transmission Routes that follow along existing Township road ROWs are identified below:

- Preferred North Transmission Route:
 - Segments PN-1, PN-2, PN-3, PN-4, and PN-5
- Preferred South Transmission Route:
 - Segments PS-2, PS-3, PS-5, and PS-6

Please note segment PS-1 follows along a field/section centerline and is not included in either description for a typical route ROW for township or county roads. However, the 100-foot private utility easement will also be acquired for this segment.

4.2.2.2 Typical Route Right-of-way Descriptions along County Roads

Only One (1) segment along the preferred North Transmission Route, PN-6 will be located within existing county road ROW. Two (2) segments along the preferred South Transmission Route, PS-4 and PS-8 will be located within existing county road ROW. The width of the existing county road ROW is ninety (90) feet, or forty-five (45) feet from centerline to property line. For the siting of segments PN-6, PS-4, and PS-8 within the preferred routes the

Applicant will secure a 100-foot wide easement that will overlap forty-five (45) feet with the existing county road ROW, where the easement rights will be shared. The remaining fifty-five (55) foot easement will extend away from the road into the adjacent agricultural land, where the Applicant will be the sole holder of the transmission easement. Depending on the final pole placement, the Applicant will place the structures within the fifty-five (55) foot easement at a distance that is between forty-five (45) and sixty (60) feet from the county road center line, outside of the existing county road ROW, as depicted in Figure 4.2.2.2.

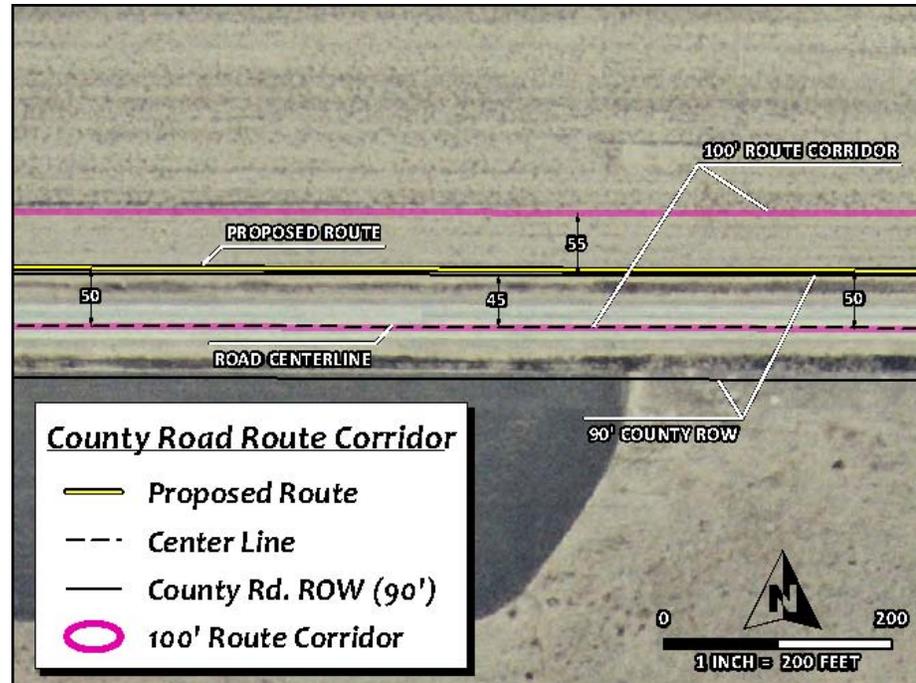


Figure 4.2.2.2 – Typical ROW Corridor along a County Road

An example of a typical route ROW legal description along a county road is described as follows: The (North or South) 100 feet of the Southeast Quarter of Section XX, Township XXX North, Range XX West, of Mower County, Minnesota.

4.2.2.3 Preferred North Transmission Route (PN): Map 4

The preferred north transmission route is approximately 6.2 miles long and begins at the North Substation as proposed on Map 4 “Preferred North Transmission Route (PN).” The Applicant has secured a 100-foot wide route corridor along township and county road ROWs. The corridor is needed to safely site and construct the proposed transmission line.

To clearly describe the proposed transmission line route locations their descriptions have been divided into segments, as described below:

- PN-1: Segment PN-1 originates at the North Substation and then proceeds east along the north side of 320th Street for 2.4 miles. Within the first mile of this segment, the route crosses the North Branch of the Root River within

the SE ¼ of the S ½ of Section 9 of Sargeant Township. At this crossing the placement of the transmission pole structures will be located outside of the 50 foot Shore Impact Zone, and at a distance that is outside the Minimum Structure Setback requirement of 100 feet, but will be located within the 300 foot (from OHWL) Shoreland Overlay Zone which is protected by the Mower County Zoning Ordinance. Therefore, the Shore Impact Zone will not be impacted since the transmission pole structures will completely avoid the shoreland area by spanning the 600 foot Shoreland Overlay Zone with a pole spacing of 800 feet, refer to Map 9 “Detail of Protected Water Crossings” for more detail. Segment PN-1 begins at 640th Avenue and ends at 665th Avenue, where it connects to segment PN-2.

- PN-2: Segment PN-2 begins on the west side of 665th Avenue. The route then proceeds north for 0.5 miles from segment PN-1 to 325th Street. segment PN-2 then connects to segment PN-3.
- PN-3: Segment PN-3 starts on the south side of 325th Street and extends east for 1.5 miles from segment PN-2 to 680th Avenue. Segment PN-3 then connects to segment PN-4.
- PN-4: Segment PN-4 begins on the west side of 680th Avenue. The route then extends 402 feet south before it travels 400 feet to the southeast, crossing over a bridge and above the North Branch of the Root River. The crossing ends south of 325th Street on the east side of 680th Avenue. Segment PN-4 then connects to segment PN-5. Refer to Map 9 for more details. Consideration is being given to sharing portions (1.5 miles along PN-4 and PN-5) of this route segment with the proposed 161 kV line proposed by Xcel Energy. If the Preferred North Route and the Xcel 161 kV line were to share a corridor, they would likely be on shared single-pole steel structures within a shared ROW. No additional ROW would be needed to accommodate the double-circuited structures. The placement of the transmission pole structures will be located outside of the 50 foot shore impact zone, and at a distance that is outside of minimum structure setback requirement of 100 feet from the OHWL, but will be located within the 300 foot Shoreland Overlay Zone which is protected by the Mower County Zoning Ordinance. Proper approval for placement of structures within this zone and special conditions will be determined during the conditional use permitting process administered by Mower County. A key goal of structure placement is to minimize visual impact while meeting safety requirements.
- PN-5: Segment PN-5 originates on the east side of 680th Avenue, where the route proceeds south for 1.3 miles from segment PN-4 to just north of 310th Street/CR 1 and east of the 680th Avenue intersection before it connects to segment PN-6 and to segment PS-7 of the Preferred South Route.
- PN-6: Depending upon the outcome of negotiations with GRE and Xcel regarding the final selection of the POI (POI Option 1 or 2) location for interconnection into the grid, the description for segment PN-6 for the Preferred North Route will connect to one of the following two POI options:

- **PN-6 (POI Option 1):** Segment PN-6 (POI Option 1) begins in the SW $\frac{1}{4}$ of the S $\frac{1}{2}$ of Section 18 of Pleasant Valley Township, specifically in the northeast corner of the 680th Avenue and 310th Street/CR1 intersection where it connects to segment PS-8 of the Preferred South Route. At this point both the north and south 138 kV transmission lines will be co-located on single pole structures with a double circuited design. The co-located lines extend east for 1,726 feet where segment PN-6 ends at the East Substation, referred to as then POI option 1.
- **PN-6 (POI Option 2):** Segment PN-6 (POI Option 2) begins in the NE $\frac{1}{4}$ of the 680th Avenue and 310th Street intersection and extends south on the west side of 680th Avenue for 0.5 miles, before entering the Preferred East Substation, POI Option 2. Energy is then stepped up with a 138kV/345 kV autotransformer and then transmitted via a 345 kV transmission line through segments PE-1, PE-2, and PE-3 (which are described in Section 4.2.2.5).

4.2.2.4 Preferred South Transmission Route (PS): Map 5

The South route is approximately 7.9 miles long and begins at the South Substation on the east side of 640th Avenue between 280th Street and 265th Street in Section 4 of Dexter Township, and follows the proposed route Map 5 “Preferred South Transmission Route (PS)” as outlined below:

- PS-1: Segment PS-1 originates at the north side of the South Substation and commences east as it follows the centerline of Section 4 of Dexter Township for one (1) mile and ends on the east side of 650th Avenue. Segment PS-1 then connects to segment PS-2.
- PS-2: Segment PS-2 begins on the east side of 650th Avenue and continues north for 0.5 miles ending on the north side of 280th Street. Segment PS-2 then connects to segment PS-3.
- PS-3: Segment PS-3 begins on the north side of 280th Street and continues east for one (1) mile before ending at 660th Avenue/County Road 7 intersection. Segment PS-3 then connects to segment PS-4.
- PS-4: Segment PS-4 begins on the north side of 660th Avenue and extends east one (1) mile along existing ROW of County Road 7 as it crosses the North Branch of the Root River. Segment PS-4 ends at the intersection of 280th Street and 670th Avenue/County Road 7. Segment PS-4 then connects to segment PS-5. The protected water crossing is located in the S $\frac{1}{2}$ of Section 35 of Sargeant Township. At this crossing the placement of the transmission pole structures will be located outside of the 50 foot Shore Impact Zone, and at a distance that is outside the Minimum Structure

Setback requirement of 100 feet from the OHWL, but will be located within the 300 foot (from OHWL) Shoreland Overlay Zone which is protected by the Mower County Zoning Ordinance. Therefore, the Shore Impact Zone will not be impacted since the transmission pole structures will completely avoid the shoreland area by spanning the 600 foot Shoreland Overlay Zone with a pole spacing of 800 feet, refer to Map 9 “Detail of Protected Water Crossings” for more detail.

- PS-5: Segment PS-5 begins on the north side of 280th Street and extends east for one (1) mile, ending on the west side of the intersection of 680th Avenue and 280th Street. Segment PS-5 then connects to PS-6.
- PS-6: Depending upon the outcome of negotiations with GRE and Xcel regarding the final selection of the POI (POI Option 1 or 2) location for interconnection into the grid, the description for segment PS-6 for the Preferred South Route will connect to one of the following two POI options:
 - **PS-6 (POI Option 1):** This option consists of three segments PS-6, PS-7 and PS-8 as described as follows:
 - PS-6 (POI Option 1): begins on the west side of 680th Avenue and extends north for two and a half (2.5) miles before ending at segment PS-7.
 - PS-7 (POI Option 1): Segment PS-7 begins on the west side of 680th Avenue and proceeds north for 0.47 miles and ends in the southwest corner of the 310th Street/CR 1 and the 680th Avenue intersection. Here, segment PS-7 diagonals to the northeast for 0.03 miles (174 feet) to the northeast corner of the intersection of 310th Street/CR 1 and 680th Avenue where it connects to segment PS-8 along with segment PN-6 of the Preferred North Route.
 - PS-8 (POI Option 1): Segment PS-8 begins in the northeast corner of the 680th Avenue and 310th Street/CR 1 intersection on the east side of 680th Avenue and extends east for 0.4 miles from segment PS-7. Here, both transmission lines (Preferred North and South 138 kV lines) will be co-located on single pole structures with a double circuited design. The co-located lines will extend east for 1,726 feet. Segment PS-8 ends at the Preferred East Substation, POI Option 1.
 - **PS-6 (POI Option 2):** PS-6 (POI Option 2) begins in the same location as PS-6 (POI Option 1), but extends north on the west side of 680th Street for 2.5 miles before ending at the location of the Preferred East Substation, POI Option 2. Energy is then stepped up with a 138kV/345 kV autotransformer and then transmitted via a 345 kV transmission line through segments PE-1, PE-2, and PE-3 (which are described in Section 4.2.2.5).

4.2.2.5 Preferred East Transmission Route (PE) (only for POI Option 2): Map 3

The Preferred East Transmission would only be necessary if POI Option 2 is selected for connecting the Transmission Project to the grid. This route begins in the SE $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 24 of Sargeant Township (T104N R16W) and extends east from the Preferred East Substation to the POI at Xcel Energy's 345kV bus located within Great River Energy's Pleasant Valley Substation, as depicted in Map 3 "Detail of East Substation" as described below:

- PE-1: Segment PE-1 originates at the East Substation and extends east for 0.25 miles (1,330 feet) into the NW $\frac{1}{4}$ of Section 19 of Pleasant Valley Township to the edge of the Great River Energy's Natural Gas Peaking Plant Facilities footprint. Segment PE-1 then connects to Segment PE-2.

Pleasant Valley Wind LLC will construct the transmission line to the point of interconnection at the Great River Energy's Natural Gas Peaking Plant. The new lines within the existing facility boundary total another 0.4 miles (2,356 feet).

- PE-2: Segment PE-2 extends further east a distance of 0.22 miles (1,176 feet) into Great River Energy's Natural Gas Peaking Plant Facility. Segment PE-2 then connects to Segment PE-3.
- PE-3: Segment PE-3 then extends north for 0.22 miles (1,180 feet) into Xcel Energy's 345kV bus, the POI.

4.2.2.6 Preferred Route Attribute Comparison Matrix

An attribute matrix was prepared for the preferred north, south and east transmission line routes. Information provided in the table is useful as a quick reference guide to compare the attributes of each transmission route such as total distance, specific background conditions, and also aids in the identification of the routes' potential impact on public and private infrastructure and natural features. The matrix is provided below.

Table 4.2.2.6 – Route Attribute Comparison Matrix

Public and Private Infrastructure	Number of landowners affected	18.0	14.0
	Pleasant Valley Wind, LLC participating landowners	18.0	14.0
	Proximity to nearest residential structure	140 feet	0.3 miles (1,600 ft)
	Proximity to nearest registered feedlot	305 feet	390 feet
Natural Features	Existing ground profile/slope $\geq 6\%$	4.2	5.0
	Wetlands within the 100-foot wide route corridor (acres)	0.4	4.5
	Length through cropland (mile)	5.8	6.1
	Length through grassed waterways and grassland (mile)	0.2	0.7
	Length through woodlands (mile)	0.2	0.2
	Wildlife Management Areas (WMAs)	0	0
	Number of State-listed threatened and endangered plant species within 100-foot route corridor	0	2 plants within road ROW
	Number of protected waters stream crossings	2.0	1.0
	Number of floodplain crossings within 100-ft wide route corridor	2.0	1.0

¹Transmission /distribution lines on the same side of the road

²Transmission/distribution lines on the opposite side of the road

4.2.3 Description of Rejected Alternatives

During the route selection process numerous alternative routes were considered for each of the transmission routes including the North (AR-1) and South (AR-2). In addition two (2) other options were considered; including burying the transmission lines (AR-3) and the no-build option (AR-4). Consideration to alternative routes is discussed here; however, all four (4) alternatives were rejected for the reasons given below. Details that support the decision for rejecting the various alternatives are discussed in Section 4.2.4

4.2.3.1 Rejected Alternate North Route (AR-1)

The alternate north transmission route, AR-1 is approximately 5.4 miles long as shown on Map 1 “Pleasant Valley Wind LLC Proposed Transmission Project Index.” Similar to the preferred north transmission route the Applicant has secured a 100-foot wide route corridor along township road ROWs.

Portions of the alternate north route, AR-1 are the same as the segments PN-1 and PN-6 of the Preferred North Route. A description of the alternate north route as it begins from the proposed North Substation is described as follows:

- PN-1: The alternate north route, AR-1 begins at the North Substation and then proceeds east along the north side of 320th following along the preferred north route segment PN-1 for 2.5 miles. Segment PN-1 begins at 640th Avenue and ends in the northeast corner of the 320th Street and 665th Avenue intersection, where it then connects to segment AR-1.
- AR1: Segment AR-1 originates in the northeast corner of the 320th Street and 665th Avenue intersection and is located on the east side of 665th Avenue. From here, AR-1 extends south for one (1) mile before turning to the east for 1.5 miles on the north side of 310th Street. Then the route turns to the south on the east side of 680th Avenue for 0.5 miles. Segment AR-1 ends when it enters the Rejected Alternate East Substation located in the SE $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 24 of Sargeant Township.

This alternative was rejected due to landowner participation. The Applicant was only able to acquire eight (8) out of ten (10) transmission easements; therefore locating the route in this location is not feasible.

4.2.3.2 Rejected Alternate South Route (AR-2)

The alternate south transmission route, AR-2 is approximately 7.0 miles long as shown on Map 1. Similar to the preferred south transmission route the Applicant has secured a 100-foot wide route corridor along township and county road ROWs.

Portions of the alternate south route, AR-2 overlap with four (4) segments along the Preferred South Route including segments PS-3, PS-4, PS-5, and PS-6. A description of the alternate south route as it begins from the proposed South Substation is described as follows:

- AR-2: The alternate south route, segment AR-2 begins at the South Substation and then proceeds on the east side of 640th Avenue extending north for 0.5 miles before turning east on the south side of 280th Street. From here, segment AR-2 proceeds east for one (1) mile before it diagonals across 280th Street to the northeast for approximately 0.02 miles (145 feet). Segment AR-2 ends in the northeast corner at the intersection of 280th Street and 650th Avenue. Segment AR-2 then connects to segment PS-3.

- PS-3: The alternate south route follows along segment PS-3 which begins on the north side of 280th Street and continues east for one (1) mile before ending at 660th Avenue/County Road 7. Segment PS-3 then connects to segment PS-4.
- PS-4: The alternate south route follows along segment PS-4 which begins on the north side of 660th Avenue and extends east one (1) mile along existing ROW of County Road 7 as it crosses the North Branch of the Root River. Segment PS-4 ends at the intersection of 280th Street and 670th Avenue/County Road 7. Segment PS-4 then connects to segment PS-5.
- PS-5: The alternate south route follows along segment PS-5 which begins on the north side of 280th Street and extends east for one (1) mile, ending on the west side of the intersection of 680th Avenue and 280th Street. Segment PS-5 then connects to PS-6.
- PS-6: The alternate south route follows along segment PS-6 which begins on the west side of 680th Avenue and extends north for two and a half (2.5) miles. Segment PS-6 then ends at the Rejected Alternate East Substation located in the SE ¼ of the NE ¼ of Section 24 of Sargeant Township.

This alternative was also rejected because the Applicant was unable to secure a utility agreement from on landowner along the proposed route to participate. In order to locate the south route here, participation from a total of fifteen (15) landowners would be necessary. After landowner negotiations the Applicant was only able to obtain transmission easements from fourteen (14) landowners, therefore locating the south route as described above is not feasible.

4.2.3.3 Rejected Alternate Route: Buried Transmission Line Option (AR-3)

Instead of installing overhead transmission lines the Applicant has considered the option to bury the electrical transmission lines as a means to reduce visual impairments. Often the underground transmission option has been utilized in dense urban areas where land is unavailable or where other factors inhibit the use of overhead transmission lines.

Underground power transmission is less likely to be damaged by severe weather conditions, including lightning, wind, freezing rain or from windfalls of trees or structures. Underground lines can disturb less land, offers lower risks to low flying aircraft or to wildlife but and are slightly less susceptible to conductor theft, illegal connections, or damage.

However, high power transmission lines require extra insulation and special installations when installed underground. According to Xcel Energy, underground transmission lines often cost ten (10) times more to install. Underground transmission lines also have a shorter life-cycle, resulting in more transmission line replacements through maintenance, thus increasing the long-term costs of this option. Underground lines are more susceptible to damage from digging, a particular concern in areas with extensive agricultural drain tile.

In addition line problems can be difficult to diagnose and long delays often occur in correcting a power outage where underground transmission lines are used

A comparison the issues associated with overhead vs. underground transmission lines as it relates cost, outages, design and environmental factors has been summarized in Table 4.3.2.4.

Table 4.2.3.3 - Comparison of Issues Related to Overhead vs. Underground Transmission Lines, Source Xcel Energy

Issue	Overhead	Underground
Cost		10 times higher than overhead
Outages	Likely to be more frequent Shorter duration	Likely to be less frequent Longer in duration
Design	Standard designs require less engineering time	More times is required to design underground lines
Environmental	Disturb less land, lower risks to wildlife	More invasive construction techniques

All of these issues affect the overall safety and reliability of an electrical transmission system. Underground installations can make it more difficult and much more expensive to construct, operate and manage the electrical transmission system. Therefore, the Applicant has selected the proposed overhead transmission line routes.

4.2.3.4 Rejected Alternate Route 4: No-Build Option (AR-4)

Since the Transmission Project and the wind turbine project are so closely related, the no-build alternative would only occur if the Pleasant Valley Wind LWECS was not constructed. For the purposes of the EA the no-build alternative means that the wind project would not be constructed, therefore the Transmission Project would not be needed.

To consider the no-build alternative, the Applicant would have to assess the current environmental impacts associated with providing 301 MW of power from traditional fossil fuels with greenhouse gas emissions. As part of the state mandated renewable energy standard (RPS), Minnesota is required to produce 25 percent of its energy from renewable energy sources by the year 2025. Utility companies in Minnesota anticipate an additional 2,200MW of renewable energy will be necessary to fulfill the RPS. By not building this Project and associated transmission facilities the state's RPS is deferred and the state will take longer to reach their goal.

In order to adequately analyze the no-build alternative, the power produced by the proposed Pleasant Valley Wind Project would have to be replaced by another power source, such as another LWECS in a different location, or a power plant that principally produces power from non-renewable fossil fuel energy resources, such as a coal-fired power plant.

Based on the no-build alternatives analyzed for the Pleasant Valley Wind

LWECS in the Environmental Report prepared by the by the Office of Energy Security (OES) the Pleasant Valley Wind Project would produce approximately 1,091 gigawatt-hours (GWh/yr) annually. If Pleasant Valley Wind is not constructed, a 301 MW LWECS in a different location would likely have similar impacts to those that would occur from the Project. If a coal-fired power plant would be the replacement energy source, it would emit the following criteria pollutants to produce 1,091 GWh/yr:

- 1,637 tons/yr of nitrous oxides (NO_x)
- 1,637 tons/yr of sulfur dioxide (SO₂)
- 1,303,754 tons/yr of carbon dioxide (CO₂)

If the Transmission Project is not built there will be an economic loss due to a reduction in wind easement payments to landowners over the life of the Project, not only from the wind turbines, but also from the transmission line easements. It is also anticipated that local construction and permanent jobs will not be realized by local individuals.

Alternatively, renewable energy technologies, such as solar, hydropower, fuel cells and anaerobic digestion could also be viable options in lieu of constructing the proposed LWECS and Transmission Project. However, these technologies are currently not economically or technically feasible for the generation of 301 MW in Mower County, Minnesota.

4.2.4 Rejected Route Alternatives Discussion

All the alternative route options for the north and south transmission route alternatives have been rejected due to the lack of landowner agreements. The Applicant has been unable to negotiate transmission easement agreements with landowners along the rejected routes.

Burying the lines has been rejected due to the lack of reliability, safety risks from excavation or burrowing animals and the high cost of installation and maintenance.

Consideration for the Alternate Route: No-build option (AR-4) has been factored into the route selection analysis and it has also been determined that this option is not feasible.

5 Environmental Information

5.1 Environmental Setting

The Transmission Project is located in Mower County, a sparsely populated agricultural landscape dominated by approximately 320-acre farms that produce a rotation of mostly corn and soybean crops. The land is ditched and drained by agricultural drain tile. Farmers raise livestock, principally hogs, with a small number of dairy, beef, and turkey farms and isolated farms are producing organically-raised meat and produce.

There are few nearby residential or commercial developments outside the historic small town of Sargeant (pop. 74) and Dexter (pop. 325), the only incorporated cities within 2-3

miles of the Transmission Project. The small towns of Hayfield (pop. 1,338), Waltham (pop. 191) and Brownsdale (pop. 702) are all outside of the Transmission Project area. The nearest city with a population over 100,000 is the City of Rochester (pop. 100,845), located 15 miles to the northeast. Elevations within the Transmission Project area range from 1,372 to 1,375 feet above mean sea level (amsl).

5.1.1 Geology and Groundwater Resources

The Transmission Project lies on glaciated terrain that overlies a thick sequence of Paleozoic carbonate rocks of Upper Ordovician and Devonian age. The proposed Transmission Project lies on the southern end of the “Minnesota and Northeast Iowa Morainal” ecological section; a long band of prairie and deciduous forest that stretches 350 miles along the eastern margin of the Des Moines ice lobe, deposited during the last glaciation.

The Transmission Project is situated on land that varies from nearly level to gently sloping; few areas have slopes greater than six (6) percent. The soils and subsoil are unconsolidated Quaternary sediments consisting mostly of unsorted till deposits of clay to boulder size materials laid down directly from glacial ice. There are no bedrock outcrops within the Transmission Project. Water well logs from Ripley, Vernon and Dexter Townships show depths of glacial till ranging from 155 to 175 feet overlying the Galena Limestone.

Geologic interpretations by the Minnesota Geological Survey (MGS) suggest that the Laurentide Continental Ice Sheet advanced in five (5) distinct pulses from the Labrador ice sheet in the northeast and from the Keewatin ice sheet in the northwest. The maximum eastward advance of the Des Moines lobe was four (4) or five (5) miles west of Brownsdale, roughly along the western edge of the Cedar River that formed as the major melt water flow path.

Each of the five (5) major glacial advances brought a different mix of sediment that covered interglacial paleosoils and lake sediment deposits, which typically contain fine-grained and organic rich sediments including compressed peat. At least two (2), and perhaps five (5), interglacial periods left irregularly buried patches of organic soils, which can create soil stability concerns. Site investigations for each substation and transmission line route should include an evaluation of soil stability, compressibility and organic content.

The high ridge that runs north-south through Dexter, Sargeant and Hayfield Townships on the western most boundary of the Transmission Project is believed to be a landscape feature that is an eroded remnant of an ice-stagnation moraine of Browerville age that has interbedded lenses and thick beds of silty to sandy lake sediments. The stranded glacial ice allowed lakes to form while the ice loading is thought to cause glacio-tectonic thrusting of deeper, older glacial sediment, squeezing slabs of till to the east and creating a ridge of older glacial till at a higher elevation. This glacio-tectonic ridge corresponds to an elevation above 1,300 feet and represents the areas of the highest average wind speeds.

Wells drilled 150 to 350 feet into bedrock aquifers provide local groundwater resources. A few high volume wells extend up to 900-feet deep in the area. The area benefits from high water quality and potential groundwater yields. Rare shallow

alluvial wells usually associated with historic properties relied on alluvial aquifers that are more susceptible to contamination.

5.1.2 Soils

Farming is the dominant land use within the Transmission Project area. The Mower County Soil Survey was reviewed to determine the dominant general soil associations encountered within the Transmission Project. These include:

- Mower County: Tripoli-Oran-Readlyn Association – Nearly level and gently sloping, poorly drained and somewhat poorly drained, silty soils on till plains. This association consists of low ridges separated by broad drainage ways. Slopes are mostly long and uniform. Relief ranges from 20 to 50 feet and a well formed dendritic drainage system dissects the area.

5.1.3 Topography

The topography of the Transmission Project varies from glacial till plains with periodic glaciations to gently rolling hills with gentle side slopes ending in drainage ways. Elevations range from the north, south and east substations, between 1,350 feet amsl to 1,375 feet amsl, as shown in Map 6 “Topography.”

5.1.4 Impacts and Mitigation

All impacts and mitigation measures, if necessary will be minimized following the installation of the Transmission Project as construction activities will be focused in the road ROW and the 100-foot route corridor.

Geology and Groundwater Resources

Due to the geology of the Project area and the minimal ground disturbance required for the installation of transmission pole structures and substation facilities, the Applicant does not anticipate the geologic or groundwater resources will be impacted during the construction of the Transmission Project. Therefore, mitigation measures are not proposed.

Soils

The Applicant will permanently disturb the soil where the transmission line poles and the three (3) substation pads are constructed. Areas of permanent disturbance will require removal of existing topsoil. The topsoil will be stockpiled and spread over areas on site upon completion of construction. Installation of silt fences and other Best Management Practices (BMPs) for erosion control measures will be used in areas subject to disturbance. In addition, minimizing the total disturbed area required for the Transmission Project will limit the area exposed to compaction due to surface disturbance activities.

Additional impacts to soils and their mitigation measures are discussed in *Section 6.2.3 Construction Procedures and Section 6.2.4 Restoration Procedures*.

Topography

Significant impacts to the topography in the vicinity of the Transmission Project will not occur during construction and in the event they do occur, the Applicant will complete additional land leveling services to restore the natural grades of the landscape.

5.2 Effects on Human Settlement

An analysis of human settlement impacts, including factors such as, land use, property values, noise, aesthetics, socioeconomics, cultural values, recreational resources, public services and infrastructure, and land-based economics is discussed below.

5.2.1 Land Use

The Transmission Project is located in portions of three (3) townships, including Sargeant, Pleasant Valley and Dexter, where the predominant land use is zoned agricultural, as shown in Map 7 “Land Use and Recreational Resources.” The location of the three (3) substations will be on agriculturally zoned land with the consent from affected landowner(s) and approval of Conditional Use Permits from Mower County. The Applicant plans to locate the proposed transmission routes adjacent to township and within county road ROWs and has acquired 100-foot wide corridors for the proposed transmission line routes. All necessary approvals will be obtained from the appropriate county and township authorities.

Impacts

The effects on land use from the three (3) substations will be minimal, considering the area required to construct the north and south substations will only consume 2.35 acres, and east substation would consume up to 4.1 acres of tillable land, or up to 8.8 acres total.

Generally, transmission lines will be erected just outside existing township road ROW within a 100-foot wide route corridor. However, a one (1) mile reach in Section 35 of Sargeant Township, along the Preferred South Route will be sited within an existing county road ROW (CR7). A one (1) mile reach in Section 18 of Pleasant Valley Township, along both the Preferred North Route (segment PN-6) and the Preferred South Route (segment PS-8) will be sited within at existing county road ROW (CR1). The permanent land impact for the proposed transmission routes will be less than 171 acres and will require approximately 125 utility poles for the construction of 14 miles of transmission lines.

Mitigation Measures

The Applicant has considered the effects of the Transmission Project on land use and does not believe the facilities will negatively impact current designated land uses. Transmission lines will be erected just outside existing township road ROWs and will extend into adjacent agricultural land. However, the impact will be less than a 1 foot by 2 foot diameter hole every 600 to 800 feet (the typical pole width spacing) and will

not adversely affect agricultural operations. The Applicant has selected the proposed routes to minimize impacts to occupied residences and structures to the maximum extent practical; specifically the Transmission Project has been sited no closer than 140 feet from occupied residences. Additionally, the Preferred Routes were designed to avoid impacting the existing small groves of trees. No negative impacts are anticipated; therefore no further mitigation measures are proposed.

5.2.2 Property Values

Since land use in the Transmission Project area is primarily agriculture and the proposed routes follow existing county and township roads, it is not anticipated that property values of adjoining or nearby properties will be adversely affected. It should be noted that other wind farms in Mower County have enhanced property values and increased farmland income on the parcels with wind power facilities.

The Applicant is currently working with Freeborn/Mower Electric Cooperative Services to evaluate, where needed and commercially reasonable, burying underground existing overhead distribution lines along the proposed transmission routes. The final transmission design will reflect the results of this evaluation. The Applicant assumes portions of overhead distribution lines along or crossing the proposed routes will be placed underground to reduce congestion with new transmission line facilities and reduce visual impact to nearby residences. The Applicant does not anticipate the Transmission Project will adversely impact nearby landowners. In fact, underground distribution lines will avoid power outages due to severe weather (icing, high winds, etc.) improving electric service to these landowners.

Impacts

Often a major concern when wind farms and transmission lines are proposed for a particular area are the impacts the facilities will have on property values. A study called "The Impact of Wind Power Projects on Residential Property Values in the United States: a Multi-Site Hedonic Analysis" funded by the U.S. Department of Energy was just completed in December of 2009. To date this study is the most comprehensive study completed that assesses the property value impacts near High Voltage Transmission Lines (HVTL) and other electric generation facilities and the impacts of wind energy facilities on residential property values. The study used eight (8) different hedonic pricing models that included data from both repeat sales and sales volume models to assess over 7,000 sales of single-family homes located within 10-24 miles of operational wind farms in nine (9) different U.S. states. The model considered three (3) potentially distinct impacts of wind farms, including area, scenic vista and nuisance stigma.

The evaluation of area impacts considers the general area surrounding a wind energy facility and assumes the area will appear more developed with the installation of turbines, access roads and transmission line facilities, which will result in declines in property values, regardless if the wind turbines or transmission structures can be seen from a given property. The impact of impairing homesteads scenic vistas in areas close to wind energy facilities decreases with distance, but still has the potential to impact homes several miles away. As a result the area stigma model assessed these impacts. The results of this analysis concluded that property values within the study area showed no statistical evidence that homes were impacted by the wind energy

facilities and it made no difference if homes were within or located more than five (5) miles away.

Scenic Vista stigma considers homes can be devalued due to their proximity and view of wind energy facilities and is built on the principle that home values are derived from the quality of what can be seen from the property. As such, this model rates views from homes as below, poor, or average before comparing home buyers and sellers prices. In conclusion the scenic vista stigma model analysis was not able to identify any consistently significant data to prove impacts on property values occur.

Nuisance stigma considers the negative factors that may impact a residential home when it is located in close proximity (within one mile) to a wind turbine facility, and evaluates nuisances such as sound and shadow flicker. Of the nine (9) models evaluated, four (4) of them did result in analyses that concluded homes located more than five (5) miles away experienced a 5 percent decrease in the sale price of their home. However, the statistical analyses used to evaluate and verify this disparity did not produce statistically significant results. In one case during the study, a model produced results that indicated homes near wind turbine facilities have the potential to be depressed even before a new turbine facility is announced. As a result, the analysis of the nuisance stigma models indicates negative impacts to homes near wind turbine facilities are usually a preexisting condition of the area and the various models do not result in statistical significantly data to imply transmission lines, substations or wind energy facilities have negative impact on residential property values.

Evaluating these three (3) models together presents a strong case of consistent data and results that confirm with statistical evidence that property values are not impacted by wind turbines and other energy facilities, whether the view, or distance of homes to the energy facilities are considered.

As stated above, the Transmission Project will parallel existing road ROW. Therefore, impacts to agricultural land uses within the Transmission Project will minimally impact property values. In addition, the proposed transmission lines have been routed to avoid existing structures to the maximum extent practicable.

Mitigation Measures

Based on the minimal impacts to property values and the payments paid to landowners for easements, no further mitigation will be necessary

5.2.3 Noise

The Transmission Project will be located in a rural agricultural dominated landscape with typical agricultural noise sources, including farm machinery, construction and agricultural vehicle operations, recreational activities, such as hunting and ATVs, as well as motor vehicle traffic and road construction activities. Noise levels heard within the audible range depend on the distance from the noise source and the attenuation of the surrounding environment. Table 5.2.3 provides an estimate of decibel levels of common noise sources.

Table 5.2.3: Decibel Levels of Common Noise Sources

Sound Pressure Level (dBA)	Typical Source
140	Jet Engine (at 25 m)
130	Jet Aircraft (at 100 m)
120	Rock Concert
110	Pneumatic Chipper, Chain Saw
100	Jackhammer (at 1 m)
90	Chainsaw, Lawn Mower, (at 1 m)
80	Heavy Traffic
70	Business Office, Vacuum Cleaner
60	Conversational Speech, Typical TV Volume
50	Library
40	Bedroom, Rural Residential
30	Secluded Woods, leaves rustling
20	Whisper, Quiet Rural Nighttime
10	Threshold of Hearing
0	No Sound
Common Noise Sources and Sound Levels on the Farm	
74-112	Tractor
81-102	Grain Dryer
80-105	Combine
93-97	Grain Grinding
85-115	Pig Squeals
85-106	Orchard Sprayer
79-89	Riding Mower
88-94	Garden Tractor
83-116	Crop Dusting Aircraft
44	Agricultural Cropland

Source: MPCA and National Safety Council

While sound related to wind projects is often cited as a concern, it is less of an issue for the transmission lines associated with the facility. Transmission lines can produce an audible sound or buzz, often referred to as corona discharge. This effect is produced as a result of the power lines carrying electricity, a medium that transmits an electrical current producing an electric field. The perceived loudness of the buzz is amplified when moisture and pollutants are in the air. As the current is carried in the power line it alternates direction, propagating an electric field and generating an audible vibration in the air, ultimately producing a buzz that can be audible to the human ear.

Impacts

State of Minnesota sound standards require an L_{50} level of 50 dB(A) or less at nighttime (10:00 p.m. – 7:00 a.m.) for residential receptors (Minn. Rule Chapter 7030.0040), which means during a one-hour period of monitoring, the nighttime noise levels cannot exceed 50 dB(A) for more than 50 percent of the time (L_{50}). For purposes of comparison, Table 5.2.3 illustrates levels of noise pollution for typical sources already present within the Transmission Project.

During operation of the transmission facilities audible noise may be produced from a corona-generated sound that creates a hissing and crackling noise. This noise will be most noticeable to the human ear when wet weather persists, under conditions such as fog, rain, or snow. The average noise-level during wet weather at the edge of the

ROW for the proposed HVTLs is expected to be less than the L_{50} noise standard of 50 dB (A), in accordance with Minnesota Rules Chapter 7030.0040. The Applicant also anticipates sound from the substations and transformers will be less than the state noise standard at the boundary of each substation facility. Three (3) of the closest residences are located approximately 140 feet to 150 feet from the proposed transmission facilities and no more than 25 residences are located within one-half (0.5) mile from the proposed transmission facilities. Given the distances of residences from the proposed transmission lines and substations, the state noise standards will be met and notable noise impacts are not anticipated.

Mitigation Measures

The Applicant has considered noise impacts to nearby residents and other potentially affected parties for the selection of transmission line routes and has sited the line to minimize impacts to residences and other structures. As a result, no impacts are expected and no mitigation measures are anticipated. Noise levels will not exceed the state standards during the construction and operation of the proposed Transmission Project.

5.2.4 Aesthetics

The Transmission Project encompasses approximately 52 farmsteads within one (1) mile of the proposed substations and transmission lines as shown in Figure 5.2.4. The 2000 U.S. Census data estimates by Township show that 8.4 rural residents per square mile are present within the three (3) Townships within the Transmission Project, indicating low occupation rates for the identified farmsteads. The proposed North Substation is located approximately two (2) miles northeast from the town of Sargeant (2007 estimated population of 74), the closest incorporated city near the proposed facilities. The proposed South Substation and the Preferred South Transmission Route is located approximately 2 to 3 miles northeast of the Wild Indigo Prairie Scientific and Natural Area (SNA) and the town of Dexter (pop. 325). Additionally, the cities of Brownsdale (pop. 702), Waltham (pop. 191), and Hayfield (pop. 1,338) are all outside of the Transmission Project. The occupied parcels, small towns and major transportation routes are all areas where the Transmission Project may be visible to viewers, as shown in 5.2.4.

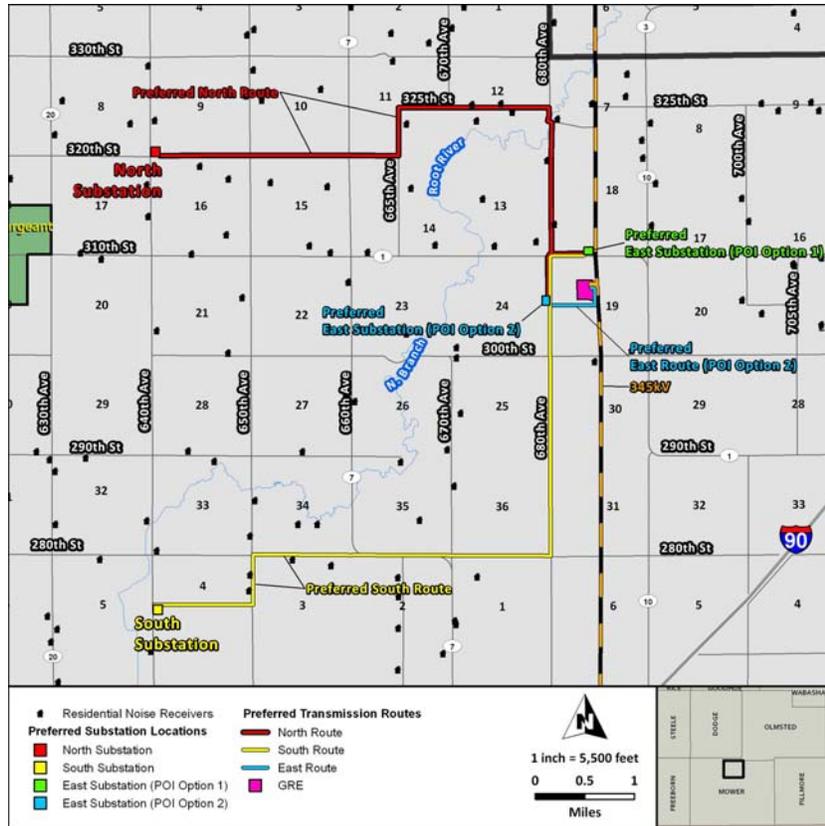


Figure 5.2.4 – Viewer Observation Points from Habitable Structures.

The proposed Transmission Project is located in an agricultural landscape dominated by rural farmsteads, row-crop production of annual crops and Confined Animal Feeding Operations (CAFOs). The route facilities are located in an area that is recognized as open space, but based on the topography and land uses, northern Mower County has limited scenic vistas, commanding views, and natural landscapes. The fertile ground and productive farms have a visual appeal to crop producers, but they typically have little appeal to naturalists or those interested in scenic vistas, artistic or cultural resources. The recent development of multiple LWECS projects south of the Transmission Project has recently attracted tourists interested in the new wind turbines.

Gently-sloping land with gradients at topographic elevations ranging from 1,272 to 1,375 characterizes the relief throughout the Transmission Project. The Transmission Project is located at the headwaters of the Root River, which flows to the north and east. Located near the headwaters of three (3) major rivers, the Transmission Project is not located where any major river valleys, bluffs, ridges or other prominent landscape features would require protection from visual impairment. The relatively high elevations within the area make the turbines, towers, tall structures and overhead transmission lines visible from a distance when viewed from the lower ground of the surrounding region. However, the high elevations also account for the relatively high average wind speed and relatively high net turbine capacity factors that make wind energy production feasible in the region.

The visual appeal of the area within the Transmission Project is seasonally variable and is dominated by cropland. The visual spectrum varies from brown to black fallow

cropland from October, to white through the snow covered winter. In the spring the checkerboard of black cropland and green field margins dominate the landscape until grasses and leaves emerge in early to mid-May, a point at which the landscape becomes dominated by green and brown row-crop production from June through September. Farmsteads and rural buildings are commonly surrounded by tree and shrub-lined shelterbelts and cities within the area are represented by homes located in small remnant urban forests, where agricultural tilling did not occur. Transmission poles will be 50 feet to 60 feet above ground level making them visible from nearby residences, but will not create any greater visual impairment than the existing electrical distribution lines already present within one (1) mile of all habitable structures along the proposed route. In many cases, there are tree stands between occupied residences and the proposed transmission routes, which would limit visibility of the transmission lines. The poles will not likely be as visible from great distances compared to the proposed 80 m (262 ft) wind turbine towers with 77 m (252 ft) to 101 m (331 ft) rotor blades that will dominate the visual landscape. Except for the two (2) overhead 138 kV feeder lines proposed by the Applicant (the Preferred North Route and the Preferred South Route), all electrical services will be buried and not visible.

Impacts

Given existing facilities such as transmission and electrical distribution lines, neighboring wind farm projects and the proposed Pleasant Valley Wind Project, the impacts of the Transmission Project will not add significant visual impairments to the area.

The visual impact of the overhead transmission poles will decrease as a function of distance and is not expected to have a significant impact. Since there are no important scenic vistas or important landscape features in the agricultural area, unique viewsheds will not be impacted.

Mitigation Measures

Mitigation measures for visual impacts from the Transmission Project have focused on utilizing existing road ROW corridors that avoid impacts to residences and structures where commercially reasonable. The Applicant will consult with landowners to minimize aesthetic impairment concerns for residences in the area. Additionally, the Applicant plans to bury existing overhead distribution lines present within the area where feasible, in areas where they coincide with the Preferred Transmission Routes. Typically the distribution lines are 30-40 feet tall, spaced every 100-200 feet apart. Where practicable, these lines will be replaced with 50-60 feet tall transmission line poles that are spaced 600-800 feet apart. Therefore, the Applicant will be reducing the total number of structures visible to nearby residences.

5.2.5 Socioeconomic Impacts

The Transmission Project is located in portions of Sargeant, Pleasant Valley and Dexter Townships, in Mower County, Minnesota, a rural agricultural landscape in southeastern Minnesota.

Sargeant Township

In 2000, the U.S. Census reports indicated Sargeant Township had a population of 316, with 38 housing units. The most common occupation in Sargeant Township is education, health and social services (28.1 percent) in the area, followed by agriculture (21.2 percent), manufacturing (9.6 percent), construction (8.9 percent) and retail trade (7.5 percent).

Pleasant Valley Township

The 2000 U.S. Census reports indicated Pleasant Township had a population of 308, with approximately 35 housing units. The most common occupation in Pleasant Valley Township is education, health and social services (28.4 percent) in the area, followed by agriculture (21.2 percent), manufacturing (9.6 percent), construction (8.9 percent) and retail trade (7.5 percent).

Dexter Township

In 2000, the U.S. Census reports indicated Dexter Township had a population of 289, with approximately 25 housing units. The most common occupation in Dexter Township is education, health and social services (23.8 percent) in the area, followed by agriculture (21.3 percent), retail (9.8 percent), wholesale, real estate and insurance (8.2 percent) and manufacturing (6.6 percent).

Several small rural communities are within 4 or 5 miles of the Transmission Project including Hayfield, Vernon, Oslo, Waltham, Mayville, Brownsdale, Renova, Grand Meadow and Elkton. Five (5) public school districts surround the Transmission Project, including Hayfield, Blooming Prairie, Austin and Grand Meadow. Sargeant is the largest city within the Transmission Project with a population of 71. According to the 2002 Mower County Comprehensive Plan, the county population is expected to increase by 1,290 persons by 2010 due to the continued outreach of employers located in both the Austin and Rochester urban areas. Smaller, isolated communities in the area are projected to lose small portions of their existing resident base. Baseline population and demographic data for the Transmission Project area is available, as well as current business and economic statistical information. Data was obtained from the U.S. Census Bureau based on the 2000 census data and the Minnesota State Demographers 2005 population projections.

Roughly 90 percent of the land is in agricultural production, either as cropland or dedicated to grazing. A total of 1,088 farms are scattered across the Mower County landscape with the average farm size of 320 acres. According to the 2007 U.S. Census of Agriculture, the total market value of agricultural products sold in 2007 was \$287,603,000, including \$166,424,000 in crops and \$121,179,000 in livestock and poultry. The average annual farm income is \$264,341.

Mower County is home to Hormel Meat Company where a variety of meat and food products are produced. Other major employers within the vicinity of the Transmission Project include the Austin Medical Center and the Mayo Clinic.

According to the State DEED (Department of Employment and Economic Development) Demographer, in April 2009 the Mower County unemployment rate was

6.5 percent, which is substantially lower than the State of Minnesota's seasonally adjusted unemployment rate of 8.1 percent. Table 5.2.5 summarizes employment by industry and class of worker for Mower County from the 2005 Census data.

Table 5.2.5 – Employment by Industry and Class of Worker for Mower County

Industry	Mower County	
	2005	Percent
Total Civilian employed population (16 years and over)	18,690	100
Agriculture, forestry, fishing, hunting & mining	869	4.6
Construction	1,299	7.0
Manufacturing	4,068	21.8
Wholesale trade	633	3.4
Retail trade	1,767	9.5
Transportation and warehousing utilities	639	3.4
Information	324	1.7
Finance, insurance and real estate	448	2.4
Professional, scientific and technical services	1,150	6.2
Education services, and health care and social assistance	4,735	25.3
Arts, entertainment, recreation and food services	1,169	6.3
Other services	916	4.9
Public Administration	673	3.6
Class of Worker	Mower County	
	2005	Percent
Private wage and salary workers	14,792	79.1
Government workers	2,142	11.5
Self-employed	1,714	9.2
Unpaid family workers	42	0.2

Source: U.S. Census Bureau, 2005

Impacts

The development and construction of the Pleasant Valley Wind Project and the Transmission Project is anticipated to have a positive economic effect in the area. Landowners and rural communities will derive a steady stream of income from royalty payments, new business and new jobs for the construction, operation, and maintenance of the Transmission Project. This will also create new opportunities for job diversification in the area by giving local employees experience in a new industry.

Developing and constructing the 301 MW Project and the proposed Transmission Project is expected to cost over six hundred (600) million dollars. Construction will take several months to complete and will generate outside income and increase the tax base of the economy in this region. Currently construction accounts for roughly nine (9) percent of the work force within Mower County and is expected to increase during the construction stage of the Project. Job growth provides economic benefits to local communities from retail trade, services, housing and transportation and generates local tax revenue. Based on the Minnesota Wind Energy Production Tax of 0.12 cents per kWh, it is estimated the Project will increase the County tax base by \$660,000/each 150 MW phase of the Project (80 percent to Counties, 20 percent to city/precincts).

Mitigation Measures

The Transmission Project will not adversely impact the socioeconomics within the Transmission Project. The economic enhancement to landowners and the professional criteria of the jobs will all have a positive socioeconomic effect; therefore no mitigation measures are necessary. Mower County will see an increase in the local communities' tax base due to the increased number of jobs and the Minnesota Wind Energy Production Tax.

5.2.6 Cultural Values

The planning goals stated in the Mower County Comprehensive Plan are the principals that guide County-level decisions to protect cultural values. These goals include:

1. Conservation of prime agricultural lands for long-term agricultural use.
2. Conservation and enhancement of the County's rich natural resource base (air, water, soils and woodlands) to maintain a high standard of environmental quality and sustain commercial agriculture.
3. Preservation of the rural/small town/agrarian lifestyle in harmony with the urban lifestyle.
4. Accommodation of responsible urban expansion in areas that do not conflict with or appreciably diminish the supply of prime agricultural land or interfere with the rural lifestyle and where the full range of urban services can be provided.
5. Creation of expanded employment opportunities in concert with all units and levels of government as a means to retain young people.
6. Maintenance of healthful living environments and compatible land use relationships.
7. Maintenance of quality education standards, which adequately prepare young people for future educational and employment, endeavors.
8. Cooperation and improvement in working relationships between all units of government (Cities, Townships, County and State) to realize common goals and objectives.
9. Preservation of the County's investment in publicly owned facilities including roads, buildings and equipment.
10. Delivery of an appropriate and efficient level of public services, which recognizes, and is capable of adapting to changing circumstances (an aging population, etc.).

Impacts

The Applicant believes the Pleasant Valley Wind Project and the proposed Transmission Project promotes the principles and cultural values critical for economic growth of Mower County. First, the Transmission Project will affect only a small amount of agricultural land while providing expanded employment opportunities and diversifying the County's economy. The Applicant believes this maintains agricultural lands while promoting responsible development that will not interfere with the rural lifestyle of the area. Second, the Transmission Project will transmit renewable energy generated by the Project that helps further the State of Minnesota's ability to meet mandated Renewable Portfolio Standard (RPS) without threatening rural values, heritage, natural resources, or prime agricultural lands. Finally, the Transmission Project will also support the rural economy by providing a steady stream of income to landowners and rural communities derived from royalty payments, new businesses and new jobs.

Construction will take several months to complete and will generate outside income and increase the tax base of the economy within the vicinity of the overall Project. With the participation and endorsement of nearly 30 landowners and the positive benefits to the local economy, the Transmission Project will enhance opportunities for the citizens of Mower County by protecting and promoting their cultural values in a manner consistent with the County's Comprehensive Plan.

Mitigation Measures

The Transmission Project will be developed and constructed consistent with the Mower County Comprehensive Plan in a manner that minimizes impacts to rural lands. No negative impacts are anticipated; therefore no mitigation measures are proposed.

5.2.7 Recreational Resources

The Transmission Project lies in an area where the natural resources have been devoted to agricultural practices and natural resource functions and values have been less emphasized. Almost all the historic natural environments in the area, including prairies, oak savannas and wetlands have been tilled for row crop practices and drained with tile and ditches. Agricultural practices dominate over 90 percent of the land use within the area. The Applicant anticipates no adverse effects to recreational resources including snowmobile trails, hunting land, or creeks and rivers within the Transmission Project.

5.2.7.1 State Trails

One of the region's most popular wintertime recreational activities is snowmobiling. The Minnesota Department of Natural Resource, in cooperation with snowmobile clubs and local landowners designate "Grant-in-aid" snowmobile trails that designate routes and provide funds for trail development and maintenance. Snowmobile routes within the Transmission Project were compiled and noted in Map 7. One (1) primary corridor Grant-in-aid snowmobile trail, the Heartland Sno-goers Trail (No. 325) crosses the Preferred North Route and the Preferred South Route as follows:

- North Transmission Route: trail No. 325 crosses 680th Avenue from the west to the east, between Section 12 of Sargeant Township, and Section 7 of Pleasant Valley Township which then connects to the following two trails:
 - The Stewartville Driftskippers Trail (No. 181), a trail that runs east towards Stewartville.
 - The Dodge County Trail (No. 126), a trail that runs west towards Hayfield, Minnesota.
- South Transmission Route: trail No. 325 crosses 280th Street from the south to the north, between Section 2 of Dexter Township, and Section 35 of Sargeant Township. The trail connects to the Mower County Management Committee Trail (No. 176) that runs south of the route facilities from the west to east, adjoining Dexter to Austin, Minnesota.

Trail easements should be recorded on property titles and trails are clearly marked during the winter months. The Applicant will span any trails in the area and therefore, believes there will be no adverse impacts to snowmobiling from the proposed Transmission Project.

There are no other State-designated trails within the Transmission Project.

5.2.7.2 Wildlife Management Areas and Waterfowl Production Areas

No Wildlife Management Areas (“WMA”) or Federal Waterfowl Production Areas are within the Transmission Project, nor does the Minnesota Department of Natural Resources (MNDNR) recognize any local goose populations.

5.2.7.3 Scientific and Natural Areas

There are no Scientific Natural Areas (“SNA”) within the Transmission Project. However, one (1) SNA is located approximately 2 to 3 miles south of the route facilities location. The 145-acre Wild Indigo Prairie SNA, a former railroad, extends from Austin to Dexter, Minnesota, as shown in Map 7. The SNA is located along a 12-mile-long strip of abandoned railroad ROW in Mower County. Wild Indigo SNA is one of the few mesic tall grass prairie remnants located in southeastern Minnesota.

5.2.7.4 Water Resources

The most notable water resources within the Transmission Project are designated Public Waters, and Surface Water and Floodplain Resources as identified in Map 8 “Protected Waters and Public Drainage.” None of the identified Public Waters have significant recreational resources for fishing, swimming, or boating and are utilized principally as drainage conveyance for agricultural cropland. No public water access points are maintained by local or State government units. The Public Water reaches of the North Branch of the Root River, within the Transmission Project include:

- The North Branch of the Root River located in Sargeant and Dexter Townships of Mower County have numerous tributaries that form the

headwaters of the Root River. This reach is also protected by the MNDNR, as protected water.

For the construction of the proposed Transmission Project it will be necessary for the Applicant to span three (3) designated Protected Waters along the North Branch of the Root River. A detailed discussion about the crossings and requirements stated in the Mower County Zoning Ordinance is provided in *Section 5.4.2 – Water Quality and Shoreland Overlay*.

5.2.7.5 Parks and Recreation Areas

There are no local, County, State, or Federal Parks or Recreation Areas within the Transmission Project area.

Impacts

Recreational activities would not be significantly impacted by the Transmission Project. Game populations within Mower County would not decline as a result of the Transmission Project. Moreover, the route facilities would not reduce recreational activities such as camping or hiking opportunities. Visual impacts would be the most prominent impact to people who recreate on the Grant-in-aid snowmobile trail, or within the Sargeant area.

Mitigation Measures

The proposed transmission lines and substations will not be located in WMAs, SNA's, State Parks or other areas with exceptional value for recreation; therefore, no mitigation measures will be required.

5.2.8 Public Services and Infrastructure

The Transmission Project is located in rural southeastern Minnesota northeast of the town of Dexter in Mower County and encompasses portions of Sargeant (Sections 9-13, 24 and 33-36), Pleasant Valley (Sections 7, 18 and 19), and Dexter (Sections 1-4) Townships.

Existing public roadway infrastructure for city streets, township, county, state, and interstate roads in the vicinity of the Transmission Project are shown in Map 10 "Public Services and Infrastructure."

The Applicant anticipates impacts to public services and infrastructure will most likely relate to local and state agencies. However, the Applicant believes potential impacts to public services and infrastructure may include:

- Impacts to existing road and transportation ROWs
- Impacts to the operation of emergency vehicles during construction
- Impacts to planned public roadway improvements

- Impacts to pipelines
- Impacts to existing electrical transmission lines and other utilities
- Impacts to telecommunication facilities and microwave beam paths
- Impacts to airports and navigation aids
- Impacts to public drainage systems

5.2.8.1 Roads and Transportation Rights-of-way

The township roads are typically over 80 years old, were constructed from local materials for the purpose of serving the needs of local farmers, and are of variable construction and quality. Township roads are constructed in a one-mile grid throughout the area. The townships maintain gravel roads with a sixty-six (66) foot wide ROW and twenty-four (24) foot wide road deck with ditches on both sides of the road. Some of the township roads are transportation easements granted by the adjoining landowners, while others are dedicated roadways owned and operated by the townships. Culverts and bridges are maintained as required by the townships.

Impacts

During the construction phase of the Transmission Project impacts to township roads and transportation ROWs will occur at the following locations:

- North Transmission Route
 - Along 320th Street from 640th Avenue to 655th Avenue (2.5 miles),
 - On 655th Avenue from 320th Street to 325th Street (0.5 miles),
 - On 325th Street from 655th Avenue to 680th Avenue (1.5 miles),
 - Along 680th Avenue from 325th Street to the East Substation located adjacent to Great River Energy's Natural Gas Peaking Plant, in Section 24 of Sargeant Township (1.9 miles).
- South Transmission Route
 - Along 640th Avenue from the proposed South Substation to 280th Street (0.5 miles),
 - On 280th Street from 640th Avenue to 680th Avenue (4 miles),
 - Along 680th Avenue from 280th Street to the East Substation located adjacent to Great River Energy's Natural Gas Peaking Plant, in Section 24 of Sargeant Township (2.5 miles).

Potential impacts include traffic delays during installation of structures and

stringing of conductors. These delays will be temporary and primarily a result of construction vehicles. Normal traffic flow will be able to resume once the transmission line construction is completed.

Mitigation Measures

To minimize the damage of public roads during construction, the Applicant will meet with the MnDOT, Mower County, Sargeant, Pleasant Valley and Dexter Township road authorities to discuss impacts to road ROW within the Transmission Project. If damage occurs, public roads will be repaired in accordance with applicable laws and permits. Damage to private roads will be promptly repaired unless otherwise negotiated with the affected landowner. Access to ROW easement agreements will be obtained prior to construction and will be maintained to allow access to transmission facilities during the operation of the Project and Transmission Project.

The Applicant will also develop a formal Transportation Plan for the Transmission Project. Trucks hauling equipment will comply with current registration weight laws and will not exceed gross weight limits as described in Appendix J “Minnesota Gross Road Weight Limits.” Trucks and construction equipment parked along the road during construction will be properly marked for safety. The Applicant will also obtain the necessary hauling, driveway, utility access, and highway access permits as required by MnDOT or the local Highway Department and will acquire the required moving permits from the appropriate authorities for transporting oversize loads or equipment.

5.2.8.2 Planned Public Roadway Improvements

Currently, there are no scheduled road disturbances or road constructions projects along the proposed routes.

Impacts

No impacts to planned public roadway improvements are anticipated from the construction of the Transmission Project.

Mitigation Measures

The Applicant does not anticipate any impacts to planned public roadway improvements. Therefore, no mitigation measures are necessary. In the event planned public roadway improvements are scheduled, the Applicant will work in conjunction with MnDOT, the Mower County Highway Department, or the appropriate Township authorities to select alternate transportation routes.

5.2.8.3 Pipelines

Northern Natural Gas Company (Northern) is the primary owner and operator of the major gas transmission line that runs through the site in northern Mower County, as shown in Map 10. The pipeline extends south along the east side of 660th Avenue and then crosses the North Branch of the Root River at 325th Street between the section lines of Section 12 of Sargeant Township, and Section 7 of

Pleasant Valley Township. The pipeline continues south to Great River Energy's Peaking Plant, as shown in Appendix K "Northern Natural Gas Company GRE Branch Line."

According to Northern Natural Gas (NNG), pipeline easements and ROW agreements were acquired allowing them the "right to construct, operate, maintain, repair, modify, alter, protect, remove, replace and access a pipeline or pipelines within its easement." ROW, where defined, typically varies in width from twenty-five (25) feet to one hundred and twenty (120) feet, depending on the number and diameter of the pipeline(s), terrain and terms of the agreement. Often the original ROW easements contained unconfined or blanket legal descriptions where specific ROW widths or locations were not defined, therefore giving NNG rights to large tracts of land. As a result, the Applicant's construction work and heavy equipment crossing completed within any of Northern's ROW will require coordination with Northern to prevent encroachments and to protect the buried pipelines.

Impacts

Along the preferred north transmission route, from 325th Street south for approximately 0.1 miles (528 feet) the Project has the potential to impact a portion of Northern's pipeline. The Applicant will work with Northern to avoid impacts.

Mitigation Measures

To protect the buried pipelines and avoid impacts to Northern's gas transmission lines, all construction work (work or a heavy equipment crossing within one of Northern's ROW) will be completed after an Encroachment Agreement is obtained.

5.2.8.4 Electrical Transmission Lines and Other Utilities

Two (2) major electrical transmission lines including GRE's existing 161 kV line and Xcel's existing 345 kV lines are within the vicinity of the Transmission Project, as shown in Map 10. During the route facilities construction, local electrical service provided by Freeborn-Mower Cooperative Services will not be disrupted.

Impacts

To ensure safety, construction activity may require short outages of local distribution lines, which may result in short-term power loss to some local residents. Traffic delays may occur along road sections where transmission line construction is underway. Due to the proposed location for the Preferred North and South Route, impacts to Great River Energy's Pleasant Valley Substation electrical transmission line could occur in the northeast corner at the intersection of 310th Street and 680th Avenue, refer to Map 5 for details of segment PS-7 and PS-8. At this intersection the Applicant will install structures taller than the existing 161 kV transmission line in order to safely cross at the intersection.

Mitigation Measures

During the design phase, the Applicant will work with Freeborn-Mower Cooperative Services, the only utility provider in the area to ensure local electrical service interruptions are minimized. The Applicant will work with local officials to minimize traffic delays by providing detour signs and making reasonable effort to keep roads clear. To reduce the disturbance of existing buried utility lines, such as telephone or fiber optic cable lines, their exact locations will be determined prior to construction. In the event electrical services are impacted the Applicant and the effected provider will negotiate the mitigation measures. All existing overhead distribution lines will be buried where feasible, in locations where the Applicant proposes to construct the new transmission line routes. The Applicant will work with GRE to minimize impacts to the existing 161 kV transmission line at the intersection of 310th Street and 680th Avenue.

5.2.8.5 Telecommunication Facilities, Microwave Beam Paths, Cellular Phone Service, and Wireless Internet

There are no radio, television, or cellular communication, transmission or relay towers within the Transmission Project. MnDOT's Office of Electronic Communications maintains a network of emergency communication towers throughout the state that rely on microwaves, which require an uninterrupted line of sight between all of the towers in the network.

Impacts

Potential impacts of the Transmission Project on existing telecommunications infrastructure during the construction and operation phases of the Transmission Project was assessed by Evans and Associates to identify which Federal Communications Commission (FCC) licensed microwave paths that will pass through the Project area. The report found thirty (30) active FCC licensed microwave paths in the vicinity of the Project and the Transmission Project. However, none of the active FCC licensed microwave beam paths cross the Transmission Project as shown in Map 10. Therefore, the Applicant does not anticipate any impacts to microwave beam paths.

An analysis of TV broadcast facilities was completed and noted eight (8) digital television facilities within the Transmission Project. However, according to the Evans Associates analysis the number of instances of multipath disruption to over-the-air reception of the local stations (Austin-Mason City-Rochester market) is expected to be relatively small since the transmitters are fairly close to the Transmission Project and thus provide strong signals. A total of nineteen (19) FM broadcast facilities were identified within the Transmission Project. The report did not indicate any impacts to AM broadcast facilities will occur. Therefore, the Applicant does not anticipate any impacts to telecommunication facilities and microwave beam paths.

Power lines operate on utility frequency of 50 or 60 Hz, while wireless internet (IEEE 802.11) and cell phones (GSM and CDMA) (both of which are modern day innovations of two-way radios) operate in the Ultra High Frequency band to the tune of 2.5 GHz or higher. Based on this information cell phones and wireless

internet operates on a different frequency than the proposed transmission lines no impacts are anticipated.

Mitigation Measures

No impacts are anticipated that will interfere with telecommunication facilities microwave beam paths, cellular phone service and internet connection; therefore, the Applicant has not proposed any mitigation measures.

5.2.8.6 Airports and Navigation Aids

Three (3) airports are located within the vicinity of the Transmission Project as shown in Map 10 include:

- Rochester International Airport (RST): located approximately 15 miles northeast of the Project. The Project is outside of the defined safety zones, conical surface and approach zones.
- Austin Municipal Airport (AUM): located approximately 16 miles southwest of the Transmission Project. The Project does not interfere with the Austin Airport approaches or conical surfaces.
- Dodge Center Municipal Airport (TOB): located approximately five (5) miles northeast of the Transmission Project. The Project is outside of the defined safety zones, conical surface and approach zones.

The Minneapolis-St. Paul International Airport (MSP) is located sixty (78) miles north of the Transmission Project.

Each municipal airport has land use safety zones that are protected under Minn. Rules Chapter 8800.2400, which restricts structure heights and land uses that may be hazardous to the operational safety of aircraft using the airports. The height of the proposed route's overhead transmission lines will range between 50 - 60 feet above ground level, unless otherwise needed for specific crossings.

Impacts

The Applicant does not anticipate any impacts to local airports or navigation aids from the Transmission Project. All proposed structures will be outside of the designated air safety zones for airports located within the vicinity of the proposed facilities.

Mitigation Measures

Since no impacts are anticipated, the Applicant has not proposed any mitigation measures.

5.2.8.7 Public Drainage Systems

Within the Transmission Project, Mower County is known for its extensive networks of publicly-maintained drainage ditches that are operated for the mutual benefit of adjoining landowners, in accordance with Minnesota Statutes (Minn. Statutes, Chapter 103E). The public ditches are defined by easement or fee title and serve to collect and convey water from private ditches, drainage ways and subsurface tile lines that convey water from farm fields to public ditches as shown in Map 8.

The county drainage inspector at the Mower County Soil and Water Conservation District (SWCD) is responsible for the management and maintenance of established drainage systems. Property owners served by the ditches are assessed a proportional share of the cost to maintain and improve the public ditches. Private drainage systems are owned and maintained by the landowners.

Impacts

The Applicant plans to span the shoreline of the North Branch of the Root River, a protected water defined by the MNDNR. A description of the crossing is described by segments PN-1 and PN-4 and segment PS-3 in *Sections 4.2.2.3 and 4.2.2.4*, respectively. Transmission line pole spacing of 600-800 feet should be an adequate distance to avoid impacts to the shoreland. However, in the event of such disturbances the Applicant will obtain the required permits from the drainage inspector at the Mower County Soil and Water Conservation District (SWCD). *Section 5.4.2 – Water Quality and Shoreland Overlay* provides more detail related to shoreland impacts and mitigation measures.

Mitigation Measures

The Applicant will use transmission line construction equipment in a manner designed to minimize infrastructure impacts, including blockage of public drainage. Reasonable effort will be made to place poles in locations to minimize adverse impact on drainage system.

5.2.8.8 Public Water and Wastewater Treatment Systems

The closest Municipal Waste Water Treatment Plant (MWWTP) is located in the City of Sargeant about 2-3 miles west of the Transmission Project where a sewer system and a series of wastewater stabilization ponds are operated within the city limits. The ponds are subject to National Pollution Discharge Elimination System/State Disposal Systems (NPDES/SDS) Permits from the MPCA and are subject to volume controls, pollution discharge limits and sludge handling and disposal criteria. All other septic treatment for homes and businesses within the Project area is handled by Individual Septic Treatment Systems (ISTS).

Impacts

The Transmission Project will not require public water and waste water treatment systems. Therefore, no impacts are anticipated. Temporary lavatory facilities will be provided on-site for the duration of construction.

Mitigation Measures

The Transmission Project will not interfere with the operations of permits required by the Municipal Waste Water Treatment Plants (MWWTP) during the construction and operation of the facilities. Therefore mitigation measures are not anticipated.

5.2.9 Public Health and Safety

The Transmission Project will be designed and constructed to promote the protection of public health, safety and general welfare. The Applicant will comply with all local, state, and National Electrical Safety Code (NESC) standards in a manner that promotes public health and safety for all residents, including air traffic, electromagnetic fields, traffic and security for the development of the proposed transmission lines and associated facilities. The Applicant's established standards and industry standards for safety precautions will be followed throughout the transmission line installation and maintenance period. Proper signage and adequate access will be provided during construction activities. The Applicant expects several trucks will be required for the delivery of equipment during installation. However, no more than typical wear and tear on the roads is anticipated. Any road damage incurred during the installation of the transmission lines will be repaired in accordance with county standards.

To ensure public safety is protected after the transmission lines have been constructed, the Applicant will install protective devices, such as circuit breakers, and relays which are capable of triggering a disconnection, or de-energizing the line in a troubled area before the power is transmitted to the substation. These measures will ensure that continuity of the electrical service is provided, limit injury to people, and reduce damage to equipment when problem situations develop. In addition, the substations facilities will be fenced, limiting access to only authorized personnel. Proper signage will be posted to warn the public about dangers and risks associated with contact of energized equipment.

A discussion about the potential risks associated with electric and magnetic fields is addressed in *Section 5.2.9.2 - Electromagnetic Fields*. The Applicant has given consideration to the proximity of nearby residences during the route selection process and does not anticipate the proposed Transmission Project will have any public health affects to nearby landowners.

5.2.9.1 Air Traffic

A detailed discussion about airports and the proposed impacts and mitigation measures is described in *Section 5.2.8.6 – Airports and Navigation Aids*.

5.2.9.2 Electromagnetic Fields

According to the World Health Organization (WHO) electromagnetic fields (EMF) occur naturally in our environment or are human induced; created from a combination of electric and magnetic fields when coupled together which create high-frequency radiating fields. Electric fields are generated when two objects have opposite electrical charges. Magnetic fields are produced when a

continuous electrical, or current flows through a wire or medium. Together these terms represent EMFs and are present whenever lines are energized and electricity is produced. However, their strength attenuates (reduces) as the distance from the source increases.

All electrical power is transmitted through High Voltage Transmission Lines (HVTL) in order to minimize the loss of electricity through transmission. Extremely low frequency (ELF) fields are common in homes and are generated from typical household appliances, and power lines. At higher frequencies radios, TV signals, X-rays, electric transmission or distribution lines and substations all contribute EMFs to our environment. Table 5.2.9.2a demonstrates the typical electric and magnetic field levels generated from overhead power lines.

Table 5.2.9.2a – Typical 60Hz electric magnetic field levels from overhead power lines

Line Voltage	Centerline	Approx. edge of ROW	100 feet	200 feet	300 ft
115kV					
Electric field kV/m	1.0	0.5	0.07	0.01	0.003
Magnetic field mG	30	6.5	1.7	0.4	0.2
230kV					
Electric field kV/m	2.0	1.5	0.3	0.05	0.01
Magnetic field mG	57.5	19.5	7.1	1.8	0.8
500kV					
Electric field kV/m	7.0	3.0	1.0	0.3	0.1
Magnetic field mG	86.7	29.4	12.6	3.2	1.4

Source: National Institute of Environmental Health Services/National Institutes of Health: EMF Associated with the Use of Electric Power

The level of EMF exposures generated by HVTLs will be small and infrequent, compared to the common EMF exposure humans are faced with on a daily basis from the use of common household appliances. Table 5.2.9.2.b shows common EMF exposures from some standard household appliances.

Table 5.2.9.2b – Typical magnetic field measurements from common household appliances.

Source	Distance from Source			
	6''	1'	2'	4'
Garbage Disposal	80	10	2	-
Microwave ovens	200	40	10	2
Mixers	100	10	1	-
Electric Ovens	9	4	-	-
Toasters	10	3	-	-
Hair Dryers	300	1	-	-
Electric Shavers	100	20	-	-
Color TVs		7	2	-
Window Air Conditioners		3	1	-

Note all values in the table are reported in mG (milligauss) Source: USEPA.

In addition to the two (2) transmission routes planned by the Applicant, two (2) existing transmission lines cross the Transmission Project including, the 161 kV line that runs west to east through Waltham, Sargeant and Pleasant Valley Township, and the 345 kV line that runs north to south through Rock Dell, Pleasant Valley and Grand Meadow Townships; all having the potential to produce measurable EMFs, as shown in Map 10.

The proposed transmission lines will all produce some level of EMFs, within the known acceptable limits for the protection of health and safety. The Applicant has proposed the construction to the most current industry safety standards and will continue to work with federal, state and local agencies as necessary to ensure the proposed transmission lines are properly installed along field edges or within road ROW corridors.

Impacts

EMFs have been a concern regarding affects to human health and have been widely studied for more than 30 years. Overall, current research does not indicate EMFs cause any health concerns. According to a white paper published by the Minnesota Department of Health in 2002, they concluded “that the current body of evidence is insufficient to establish a cause and effect relationship between EMF and adverse health affects.”

Since the use of electric power is so widespread, humans are constantly exposed to electric and magnetic fields. Studies reviewed by the National Institute of Environmental Health Sciences have found links between magnetic fields strength and the risk of leukemia in children, but have failed to find a strong conclusive relationship. Even the small numbers of studies that have looked at adult exposure from increasing EMF have not been able find evidence indicating residential or rural EMF exposure can cause cancer, such as leukemia, brain cancer or breast cancer in adults. .

Therefore, the development of additional transmission and substation facilities is not expected to significantly increase the general public’s exposure to EMF within the proposed Transmission Project.

Mitigation Measures

Electrical utilities can implement various methods to reduce the effects of EMF exposures when installing transmission lines, such as increasing the distance from the line to nearby structures and using phase cancellation. The proposed lines will be constructed in a delta configuration which will allow for phase cancellation. The lines have also been sited to maximize the distance to nearby structures, thus lowering exposure to EMF. The closest residence is more than 140 feet away from any of the proposed routes.

5.2.9.3 Stray Voltage

Electrical supply systems delivering power to farms, homes, and businesses are grounded to the earth to make them safe and to ensure their reliability. Grounding of these electrical supply systems results in a small amount of current moving through the earth. A small voltage called neutral-to-earth voltage may develop at each point where the electrical system is grounded. When neutral-to-earth voltage is found near animal contact points at levels considered to have potential impact on animals, it is often called stray voltage. Stray voltage is the difference in voltage measured between two points contacted simultaneously by a person or animal (typically less than 10 volts).

Stray voltage is a result of current flow on a neutral wire and the resistance of the grounded neutral network. Stray voltage arises from poor electrical connections, deteriorated insulation, or faulty equipment. Some sources of stray voltage are cathodic protection systems, telephone systems, and direct current power lines. Stray voltage has been raised as a concern on some dairy farms because of the potential for dairy cows to come into contact with two points and provide a conducting path for current to flow, thereby impacting operations and milk production. Prevention of stray voltage can be aided with the proper sizing, installation and maintenance of wiring systems to keep the resistance of the grounded neutral system low.

Impacts

Stray voltage is typically a problem with the electrical distribution system and is not typically an electrical transmission line problem because it occurs from the installation and operation of distribution lines and private electrical services. Where stray voltage occurs from distribution and electrical service lines, animals that come into contact with grounded electrical devices may receive a mild electrical shock that results in behavioral changes. This voltage can ultimately cause a small current to flow through the animal into the ground. For instance a horse that is subjected to a mild electrical shock may flinch, or at higher voltage levels the behavioral response of an animal may even result in avoidance. Similarly this also occurs in dairy cows and can lead to reduced feeding, or water consumption, nervousness or excessive movement during milking.

Mitigation Measures

In rare instances when transmission lines have been shown to contribute to stray voltage, the electric distribution system directly serving the farm/structure was directly under and/or parallel to the transmission line. These circumstances are considered when installing transmission lines and can be readily mitigated. Appropriate measures will be taken during transmission line detailed design and construction to prevent the potential for any stray voltage problems for this project. The Applicant would be required to address and rectify any stray voltage problems that arise during transmission line operation as a result of the transmission line.

Since stray voltage is a natural consequence of operating safely grounded

electrical systems and some level of stray voltage will always be present on- or off-farm as a direct result of distribution systems, not transmission. Parties concerned about stray voltage should contact their electric service providers. To mitigate these occurrences an owner and electric service provider will work to ensure proper grounding. According to the Midwest Rural Energy Council (MERC), electrical codes provide an added safety measure by requiring the grounded conductor of all farm electrical systems be connected to barn metal, including water lines.

5.2.9.4 Security and Safety

The proposed Transmission Project is planned in a rural community, with a low population; therefore the security and safety of the general public will not be compromised.

Impacts

The development of the proposed Project and Transmission Project will not cause any adverse effects to the security and safety of the surrounding community.

Mitigation Measures

Safety will be addressed during construction by monitoring access within the construction footprint at all times and unauthorized personnel will be escorted off site. The Applicant does not foresee that any security issues will need to be addressed and if safety issues arise they will be addressed by the Applicant's established safety protocol.

5.2.9.5 Traffic

See Section 5.2.8 – Public Services and Infrastructure for a detailed description of traffic resources.

Impacts

City, township, county and state road traffic will be temporarily impacted during the construction of transmission lines and substations. However, minor delays or detours will only temporarily impact traffic flow.

Mitigation Measures

In order to minimize the impacts to traffic flow, publicly traveled city, township, county and state transportation ROW and other infrastructure, the Applicant will work in cooperation with local and state agencies to coordinate efforts. Coordination among agencies will ensure public safety and general welfare is maintained. The following permits will be obtained from state and local agencies and will serve as the primary mitigation strategies:

Local Agencies

- Mower County Highway Department
 - A ROW Permit will be obtained from the County Highway Department for the installation and construction of electrical utilities within the public road ROW that are under the County's jurisdiction.

State Agencies

- MnDOT
 - A ROW permit will be obtained from MnDOT for the installation and construction of electrical utilities within the public road-of-way that are under MnDOT jurisdiction.

The Applicant will comply with all road weight restrictions, seasonal weight limits, weight laws and trucks will not exceed gross weight limits or associated axle limits. Safety concerns related to increased traffic during the construction phase will be managed by the construction manager.

5.2.9.6 Lightning

The transmission lines will be designed with a top-mount shield wire to ground the lines and protect the power cables from direct lightning strike. The wires will be grounded and attached to a lightning arrestor that is installed periodically on designated poles along the line. If lightning were to strike, these measures would ensure the lightning is grounded to one of the closest arrestors.

Impacts

With the installation of lightning shielding devices, the Applicant does not anticipate any impacts will occur.

Mitigation Measures

The Applicant will install lightning protection devices on the transmission lines to protect the power cables from direct lightning strike. Additional mitigation measures are not proposed at this time.

5.3 Effects on Land Use and Land-Based Economics

5.3.1 Agriculture

Row crop and feedlots are the dominant land use and main economic base within the proposed Transmission Project as shown in Map 7. Row crops consisting of a three-year rotation of corn/corn/soybeans dominate the landscape, with minor production of alfalfa and cannery vegetables. Most of the soils in the area are designated as Prime Soils with high productivity ratings. Drainage improvements including subsurface drainage tile and private and public drainage ditches enhance the yields by allowing earlier planting. Urban development, forestry and mining are not significant land uses

within the area.

The agricultural land in the area of the Transmission Project is divided into square mile sections bounded by public roads. According to the most recent US Department of Agriculture (USDA) census the farms in the area average slightly more than 320 acres. Crops are produced in expansive fields ranging from 40 to 640 acres that are generally uninterrupted by fences. Each section has an average of two farms and cropland covers over 95 percent of the land area. Field size and configuration is an important consideration to local farmers who utilize large equipment, such as 24-row corn planters and 12-row combines that require wide turning radii.

Cropland is both owner-operated and tenant-operated. Farm rental rates are an indicator of land values and are used by farmers and landowners to evaluate the financial impact of retiring land from production. In 2007, Mower County had a five-year average farm rental rate of \$161/ac. The University of Minnesota study noted that from 2003 to 2007 farm rental rates increased 10.21 percent per year. Local sources have told us that rental rates driven by high commodity prices in 2007 and early 2008 were as high as \$350/ac on some farms; however, falling commodity prices in late 2008 and 2009 have substantially lowered the rental rates for the 2009 crop year.

The highly productive soils in the area result in exceptional crop yields that are much higher than the regional average. Test plot data published by the Mower County Corn Growers in 2008, showed corn yields of 187-191 bushels/ac and soybean yields of 46-47 bushels/ac.

A large proportion of the cropland is drained with agricultural pattern tile that discharges to private and public drainage ways and ditches. The tile line installations date back to the early to mid 1900s and consist of clay tile; concrete and perforated plastic pipe typically buried less than four (4) feet deep on 50-100 foot spacing.

Livestock production is a major industry in the area that is dominated by confined hog feeding operations. The feedlots are regulated by local and state authorities. According to the USDA Ag Census, the hog feedlots in the area typically have fewer than 1,000 animal units.

Hormel Foods and Quality Pork Producers provide a healthy local hog market. Quality Pork Producers of Austin, less than fifteen (15) miles from the south end of the Transmission Project, slaughters an average of 16,000 hogs per day to supply the Hormel processing facility in Austin. Most of the hogs slaughtered in Austin are raised within a 100-mile radius of Austin.

Feedlot production generates manure that is stored in open pits and tanks and is utilized as a crop nutrient. Manure management plans in the area require a minimum of nine-month storage capacity. Manure management is associated with odors and the challenges of managing large volumes of liquid wastes.

In addition a few organic farming operations are present within the Project area and are becoming a more popular method of raising animals and crops. These farming methods rely on crop rotation, green manure, composting and use of organically approved pesticide application and mechanical cultivation that restricts the use of synthetic fertilizers, synthetic pesticides, livestock antibiotics and food additives. The

extent of the organic farming operation along the transmission routes is very small compared to the traditional agricultural farming practices.

Impacts

The development of the Transmission Project will result in temporary and permanent disturbance and crop-land conversion. There is no anticipated impact to feedlots or other land based economies within the area. Substation locations, temporary and permanent land disturbance and concerns for agricultural drainage systems will be addressed with landowners and farm tenants during easement acquisition. Easements will be negotiated to address landowner concerns.

The temporary disturbance of agricultural land will be necessary for the installation of transmission line routes. The largest temporary disturbance will be from the construction of the substations that will disturb approximately 5.7 acres of land (17.1 acres total) which is necessary to provide a 2.35 acre substation facility for the North, South and Preferred East Substation POI Option 2 and a 4.1 acre substation facility for the Preferred East Substation POI Option 1 and provide proper access. However, once the three (3) substations are erected the north and south substation footprint will encompass a total of 2.35 acres, and the east substation footprint will encompass up to 4.1 acres (8.8 acres total). Other surface disturbances will include land clearing, soil compaction and the temporary placement of fill. The temporary impacts will be restored to crop production.

Permanent conversion of cropland will be required for three (3) proposed substations with smaller permanent disturbances for the utility poles for up to fourteen (14) miles of overhead transmission lines will require 171 acres to be placed under easement. Except for the footprint of the poles, this area will still be farmed or used as ROW and yards. The substation pads will be converted from cropland to load bearing crushed rock or grassy surfaces that will no longer support crop production. Based on the proposed Transmission Project the permanent land conversions are summarized in Table 5.3.1.

Table 5.3.1 – Summary of Permanent Land Conversion

FACILITY	ACRES
3 Substations	17.1
Transmission Lines (14.1 miles with poles approximately every 600 feet)	171
TOTAL	188.1

The estimated 17.1 acres of permanent land conversion for the Transmission Project represents less than 10 percent of the total Transmission Project area.

At current land rental rates of \$170/ac/year the retirement of 17.1 acres represents an

estimated annual cumulative financial loss of less than \$3,000/year spread among the proposed routes. An analysis based on crop yields is slightly higher and would fluctuate with yields and commodity prices. The route facilities will not represent a major loss of productive land and payments for transmission facilities easements will represent a substantial net financial gain to the landowners in the area.

Some farmers and landowners have expressed concerns over the placement of transmission line poles for the two (2) transmission line routes. Farmers have commented that when transmission line poles are not parallel to field edges the angled corners at the field ends are difficult to farm with large equipment and have the effect of leaving fallow or unproductive land in the triangular corners.

Every effort will be made to locate and avoid cutting tile lines during erection of the poles, however, pole installation could result in cutting drain tile that is in place within the easements. The Applicant will identify and repair any tile lines damaged by the placement of poles. Drain tile maps are available for many, but not all fields, allowing designers to avoid drain tile disturbance in some areas. During the installations, constant inspection is required to identify field tiles that must be repaired.

In addition, the proposed Transmission Project will not adversely affect the regular and natural production of organically grown crops. The Applicant proposes to locate the transmission line routes a safe distance away from agriculturally farmed land. The transmission lines will be placed on poles that are approximately 50-60 feet off the ground that are spaced between 600-800 feet apart along road ROWs. At this spacing interval a property owner of a 40-acre parcel of land will only realize at a maximum two (2) transmission line structures and any organic farming practices will not be impacted from air emission, discharges or chemical application for the construction of the proposed Transmission Project. Therefore, the Applicant does not anticipate any environmental affects will occur to these farming practices.

Mitigation Measures

The Applicant has proposed the following mitigation measures based on the identified impacts:

Mitigation for Temporary Impacts

- The producer will be compensated for any impact or loss of growing crops resulting from the construction of the Transmission Project, via payments for easement acquisitions.
- Cropland areas temporarily disturbed by the Transmission Project from grading or compaction will be reclaimed.
- All agricultural drain tile damage will be repaired in accordance with specific landowner agreements.
- During the construction of the transmission routes the Applicant will be cognizant of any organic farming operations and will avoid discharging any unwanted materials onto their properties.

Mitigation for Permanent Impacts

- Permanent losses of cropland for substation pads are addressed through landowner compensation on a case-by-case basis.
- Service roads, where needed will be constructed at grade wherever practicable to allow farm equipment to drive across the roads.
- Land for the substation and operations facility will be purchased from willing landowners.

5.3.2 Forestry

Virtually all the pre-European settlement native prairie, wetlands and woodlands have been converted to row crop agriculture consisting of corn, soybeans and alfalfa. Over 98 percent of the Transmission Project area is now cropland and minimal amounts of pasture and forested land remain (refer to Map 7). Farmsteads and rural buildings are commonly surrounded by tree and shrub-lined shelterbelts and the cities represent older houses set in small urban forests.

Impacts

Very few tracts of forested land remain within the Transmission Project. However, the tree and shrub-lined shelterbelts that remain surrounding farmsteads and rural buildings will be preserved to the maximum extent practicable by placing the transmission line routes on the opposite side of the ROW, avoiding the remaining forested areas. Therefore, the Applicant does not anticipate any impacts.

Mitigation Measures

Since, no impacts are anticipated the Applicant does not propose additional mitigation measures at this time.

5.3.3 Tourism and Community Benefits

Significant recreational resources within the Transmission Project are discussed in greater detail in *Section 6.2.7 – Recreational Resources*. One of the largest local recreational attractions within the Project boundary is snowmobiling, as indicated by the one (1) state grant-in-aid snowmobile trail that crosses the Transmission Project (refer to Map 7). The Transmission Project will not affect the Scientific and Natural Area (SNA) that is located south of the proposed routes. No Wildlife Management Areas (WMAs) are present within the vicinity of the Transmission Project. There are no local, County, State or Federal Parks within the Project area.

Impacts

The Applicant will not adversely affect the recreational resources and tourist attractions that exist within the Project area.

Mitigation Measures

No mitigation measures are required, since tourism within the Transmission Project will not be impacted. The local and surrounding community will receive economic benefits by an increase in revenues and jobs from the development of the Transmission Project.

5.3.4 Mining

Bedrock is not exposed in the Transmission Project, however, outcrops and quarries of limestone and dolomite suitable for aggregate and road building materials are available ten (10) miles to the east between Grand Meadow and Racine and fifteen (15) miles to the south near Leroy.

Impacts

Since there are no mining operations or identified mineral resources located within the Transmission Project, the Applicant does not anticipate any impacts will occur.

Mitigation Measures

The Applicant does not propose any mitigation measures at this time.

5.4 Effects on the Natural Environment

5.4.1 Air Quality

Air quality issues associated with Transmission Lines include the production of small quantities of ozone (O₃), and oxides of nitrogen (NO and NO₂) due to corona discharges along the conductor lines and at substations.

According to the Minnesota Department of Health, ozone is a colorless gas that occurs from natural processes and human activities. Two kinds of ozone occur in the environment, ozone in the upper atmosphere, often referred to as “good ozone,” protects our skin from the sun’s harmful ultraviolet rays, and ground-level ozone, often referred to as “bad ozone.” Ground-level ozone is formed from chemical reactions that occur when oxides of nitrogen and volatile organic hydrocarbons (VOCs) are found in the presence of heat and sunlight and near transmission lines. The corona effect ionizes air when imperfections in the conductors occur from a scratch, or from drops of water that resides on the conductor, resulting in trace levels of ozone.

Ozone is a highly reactive oxidizing agent that decays rapidly under atmospheric conditions. However, due to its highly reactive behavior, state and federal governments have regulated allowable concentrations of ozone through the ambient air quality standards for ozone. Currently, the State of Minnesota Ambient Air Quality Standard for ozone is 0.08 ppm (based on a daily maximum 8 hour average; the standard is attained when the average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than or equal to the standard) and the 8-hour National Ambient Air Quality Standard for ozone is 0.08 ppm (based on the 3-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration measured at each monitor). There have been no known incidents of

ozone above the ambient air standards due to the corona effect on transmission lines.

During construction air pollution may be temporarily impacted from dust and particulate matter and emissions from construction vehicles. These impacts will be minimal and temporary.

Impacts

During operation of the transmission lines and substations air pollution will generate trace amounts of ozone that will slightly contribute to elevated ozone levels

A study published in the Journal of Environmental Engineering and Landscape Management, in 2009 measured the ozone concentrations near HVTLs and found the average ozone concentration near HVTLs was two percent higher than the “background” ozone concentration present in the ambient air. Due to the rapid decay of ozone under atmospheric conditions, the Applicant does not anticipate the state and federal ambient air quality standard will be exceeded. Therefore no impacts are expected.

Mitigation Measures

The Applicant does not anticipate impacts will occur from the operation of the HVTLs. Dust issues related to the construction of the proposed structures will be handled during the Conditional Use Permitting process in Mower County. The Applicant has not proposed any additional mitigation measures.

5.4.2 Water Quality and Shoreland Overlay

A review of the United States Geological Survey (USGS) maps and the Flood Insurance Rate Maps (FIRM) produced by Federal Emergency Management Agency (FEMA) identified the following streams, rivers and tributaries within the Transmission Project. One (1) river and its tributaries have their headwaters within the proposed route permit area, as shown in Map 8. The named and unnamed tributaries include the North Branch of the Root River, which is located in Dexter, Sargeant and Pleasant Valley Townships.

Wetlands adjoining identified drainage systems are discussed in *Section 5.4.4 - Wetlands*.

Water Quality

The 2008 Minnesota Impaired Waters lists two (2) rivers and streams in the area as impaired waters; the North Branch of the Root River (aquatic life impairments) and Wolf Creek (Aquatic recreation, Fecal Coliform impairments). The Transmission Project will not create any illicit discharges nor contribute to surface water impairments and will obtain the proper Section 401 Water Quality Certifications prior to construction. The proposed BMPs for stormwater runoff will be discussed in the National Pollutant Discharge Elimination System Permit application and Stormwater Pollution Prevention Plan that will be developed prior to construction of the Transmission Project.

Shoreland Overlay

The Mower County Zoning Ordinance has adopted shoreland management provisions to protect and enhance the quality of surface waters in the county. In accordance with Division 9, the Shoreland Management Overlay Regulations in the Mower County Zoning Ordinance, three (3) provisions or development standards as defined below apply to the proposed Transmission Project:

- Shore impact zone is defined in Section 14-94 (a), as a line parallel to and 50 feet from the ordinary high water level (OHWL). For Mower County, this zone can be interpreted as an area that is equal to a total distance of 100 feet from the OHWL on both sides of the stream banks. Construction is prohibited from this zone and no structures are allowed.
- Following the special overlay standards within shoreland areas outlined in Section 14-96 (b), the minimum structure setback from OHWL from a river is 100 feet.
- The Mower County Zoning Ordinance defines shoreland as land located within 300 feet from public waters, such as a river or a stream. This area is often referred to as the Shoreland Overlay Zone. From the OHWL on both banks of the stream the total distance of the Shoreland Overlay Zone is 600 feet, unless the landward extend of a river or stream's floodplain is greater than 300 feet.

Impacts

The location of the substations and transmission line poles are proposed in the upland portions of the landscape, where the headwaters of the North Branch of the Root River begin. In order to construct the proposed Transmission Project it is necessary for the Applicant to cross the North Branch of the Root River over three (3) designated public waters crossings as identified in Map 8. The Applicant will be required to avoid or minimize impacts to shoreland. A description of the location for the three (3) designated Public Water crossings is described below:

- The preferred north transmission route will have two (2) public waters crossing, including:
 - Segment PN-1: One located in the S $\frac{1}{2}$ of the SE $\frac{1}{4}$ of Section 9 of Sargeant Township
 - Segment PN-4: The other crossing will span the North Branch of the Root River extending across two (2) Sections, the first being the NE $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Section 12 of Sargeant Township, and the second Section is located in the SW $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 7 of Pleasant Valley Township
- The preferred south transmission route proposes to have one (1) public waters crossing described as follows:
 - Segment PS-3: Located in the S $\frac{1}{2}$ of the SW $\frac{1}{4}$ of Section 35 of Sargeant Township

Flexibility in the design of the transmission line pole spacing will allow the Applicant to place structures up to 800 feet apart, a distance that is adequate to completely span portions of the shoreline across segments PN-1 and PS-3. By placing structures outside of the shoreland overlay zone, a zone that is a total of 600 feet across, the Applicant will avoid impacts to the shoreland within these two segments, as shown in Map 9 “Detail of Protected Water Crossings.”

However, avoiding the shoreland overlay zone will not be possible along the river crossing for segment PN-4. A detailed diagram that depicts the structure setbacks and overlay zones for segment PN-4 is provided on Map 8. At this location the Applicant will not be able to adequately span or avoid the shoreland of the North Branch of the Root River. As a result the Applicant will be subject to applicable Shoreland Alteration Standards outlined in Section 14-97 of the Mower County Zoning Ordinance. Specific conditions or requirements for constructing transmission line pole structures will be addressed by Mower County representatives in the conditional use permitting process.

Additionally, construction impacts will be avoided or mitigated where necessary in streams, creeks and surface water drainage systems to prevent flooding issues and untreated surface water discharge. BMPs will be implemented during the construction phase of the project as discussed in *Section 6* to prevent sediment from discharging into adjacent water sources, streams or rivers. Any subsurface tile drainage systems impacts will be addressed and repaired during construction. Mitigation measures will be utilized where sedimentation issues are a risk. As a result, no significant impact is expected.

Mitigation Measures

If any impacts to Waters of the United States or Minnesota Public Waters are proposed within the route permit project limits, application of necessary permits will be completed prior to construction. Prior to construction a NPDES permit application and SWPPP plan will be submitted by the Applicant. Inspections of all BMPs proposed in the NPDES permit will be completed on a routine basis to assure no erosion or sedimentation issue occur within or outside of construction limits.

5.4.3 Vegetation

Mower County is dominated by agricultural land uses. A desk top review of land use/land cover (refer to Map 7) generated by townships included the following significant vegetative features within the Transmission Project boundaries:

- Linear arrays of shrub land are principally along fencerows, road ditches and drainage features surrounded by cropland. These shrub areas could be used as breeding bird habitat for some species in the area.
- Upland deciduous forest tracts are small and confined to the headwater corridors of the Root River and Cedar River.

A majority of the existing wetlands in the Project area have been drained due to agricultural practices and do not show up on the land-cover map.

Impacts

The proposed transmission lines will be located within existing township and county road ROW, where the adjacent agricultural tilling has encroached or significant road construction activities have already disturbed the native vegetation. The Applicant will place the transmission line poles in areas that will reduce the impacts to grasslands or woody vegetation that occur in drainage ways at road crossing sites. The proposed substation will be located on existing agricultural land; therefore no perennial vegetation will be disturbed. In addition, infrastructure including underground buried cable, access roads and supporting facilities will be designed to minimize impacts to existing grassland and woody vegetation. Impacts to state-threatened plant species located in native prairie remnants and road ROWs within the Transmission Project will be avoided.

Mitigation Measures

During the construction phase of the Transmission Project, impacts to grassland and forested areas will be avoided or minimized. Mitigation of unavoidable impacts will occur by restoring area grades and re-vegetating where required upon completion of construction. All proposed impacts to forested areas will be discussed and approved by landowners prior to construction. In areas where construction activities are planned within the native prairie remnants and road ROWs the Applicant will work with the MNDNR Environmental Review Coordinator to ensure plant species are preserved. The Applicant does not anticipate that native prairie remnants or Conservation Reserve Program (CRP) will be impacted, therefore no mitigation measures are proposed.

5.4.4 Wetlands

McGhie and Betts Environmental Services Inc. (MBESI) is currently in the process of completing a wetland delineation survey that includes identifying all existing wetlands encountered within the boundaries of the Transmission Project. A wetland delineation report will be completed determining all wetland boundary locations adjacent to areas of proposed Transmission Project construction. The wetland delineation report and permit application required by Minnesota Wetland Conservation Act (WCA) and the US Army Corps of Engineers (COE) will be submitted following completion of the wetland reconnaissance survey. The occurrence of wetland signatures is displayed on Map 7.

Impacts

The wetland reconnaissance survey included a review of the location of the proposed Transmission Project infrastructure to determine where it may potentially impact wetland areas. A review of National Wetland Inventory (NWI) maps indicates minimal wetland impacts are expected within the Transmission Project area. If wetland impacts do occur, the proposed mitigation measures would be implemented during construction, as required by the Minnesota WCA, US Army Corps of Engineers and MNDNR.

Mitigation Measures

Existing wetlands will be avoided to the extent feasible for the project. If any wetland

impacts are required during the construction phase, a wetland sequencing and replacement plan report and permit application will be completed as required by the MNWCA and US Army Corps of Engineers prior to construction. If any public waters impacts are proposed a public waters permit application will be completed and submitted to the MNDNR prior to construction. All proposed wetland impacts will be mitigated and replaced offsite through direct wetland replacement or purchase of wetland credits from an approved wetland bank as required by the Minnesota WCA and the US Army Corps of Engineers.

5.4.5 Wildlife

A desktop analysis was completed for the proposed Transmission Project area identifying existing wildlife and rare animals encountered within the Transmission Project. The area where the Transmission Project is located is more than 98 percent cropland leaving little land for wildlife. Deer, turkeys, pheasants, Canada geese, ducks, squirrels, rabbits and coyotes were formerly abundant and still occur in the area, but hunting is limited to field edges, waterways, farm sites and stream corridors. The Project area is not within a migratory flyway and use of the area by migratory birds is limited due to the dominance of row crops and the lack of suitable foraging and breeding habitat. According to a correspondence letter dated February 11, 2009 from the MNDNR, there are no major goose concentration areas within the Project area.

The only big game animal in the area is the white tailed deer, which is hunted by local sportsmen from September through January. The firearm deer season, in November of each year, only allows the use of shotguns. Wild turkeys are hunted in the spring and fall seasons; however, the turkey habitat in the Transmission Project area is limited to the wooded areas where oak trees produce an acorn mast crop that is essential to winter survival of the wild turkey.

A MNDNR Natural Heritage Information System (NHIS) review was completed and results indicate there are no rare animals, reptiles, fish or freshwater mussels identified within the Transmission Project.

5.4.5.1 Wildlife Management Areas

State owned and managed Wildlife Management Areas (WMAs) are important outdoor recreational areas but none were located within the area where the transmission line routes or substations will be located. Several WMAs are located in Mower County beyond the Transmission Project area. The WMAs were established to protect wildlife habitat for future generations, along with land and water resources that have a high potential for wildlife production, public hunting, trapping, fishing, and other uses.

5.4.5.2 Avian and Bat Surveys

Avian and Bat surveys are currently being conducted at the Project area. The objective of these surveys is to gather data to characterize avian and bat use within the Transmission Project. Once the data is collected it will be analyzed to determine if there are significant risks to birds and bats in the area. Data collected to date suggest the proposed project does not have high amounts of use by avian and bat species and will not have significant impacts.

Impacts

The substations and transmission lines will be located in areas of agricultural use, or within road ROW minimizing impacts to areas of suitable wildlife habitat. Temporary impacts will result to local wildlife during the construction phase. The Applicant does not anticipate impacts to wildlife will occur. If impacts occur mitigation measures will follow in accordance with MNDNR and other applicable regulations.

Mitigation Measures

The location of the Transmission Project was selected due to the available wind resources. Due to the existing agricultural practices, minimal habitat for wildlife is encountered within the region. The proposed substations, transmission lines, access roads, and utilities will be designed to avoid critical habitats. Impacts to these habitats are minimal resulting in no necessary mitigation measures.

5.4.6 Rare and Unique Natural Resources

An inventory of rare and unique natural features was compiled for the Transmission Project by contacting Federal and State agencies that have information about or vested interests in conserving Minnesota's ecological resources.

The United States Fish and Wildlife Service (FWS) responded to an inquiry letter dated November 19, 2008, indicating there are currently no Federally Endangered or Threatened Species known to occur within the area.

A request was made to the MNDNR National Heritage Information System (NHIS) to determine if any rare plants, animals, native plant communities, unique geologic features or other rare natural features were located within the Project area. The NHIS results indicate several rare plant species such as Cowbane (*Oxypolis rigidior*), Rattlesnake-master (*Eryngium yuccifolium*), Sullivant's Milkweed (*Asclepias sullivantii*), and Tuberous Indian-plantain (*Arnoglossum plantagineum*), all state-listed threatened species that have been documented in native prairie remnants and road ROWs within the Transmission Project, as shown in Map 11 "Natural and Cultural Resources."

The publication of exact location information, however, may threaten the continued existence of some rare species and is not included in the data query results. The data represented in the NHIS Database is not an exhaustive inventory and does not represent all of the occurrences of rare features within the Transmission Project. Appendix L "Natural Heritage Information System Data" summarizes the vascular species found in the vicinity of the Transmission Project area. Most commonly the prairie remnants observed were located in publicly owned areas, such as road ROWs.

Vascular plant species listed on Minnesota's List of Endangered, Threatened, and Special Concern Species, the Federally Endangered, Threatened, Proposed, and Candidate Species, and results from the MNDNR Rare Features Database known to occur in Mower County are listed below in Table 5.4.6.

Table 5.4.6: State and Federal Endangered and Threatened Vascular Plant Species.

<u>Species</u>	<u>State Status</u>	<u>Federal Status</u>
Dwarf Trout lily (<i>Erythronium propullans</i>)	E	E
Wild Quinine* (<i>Parthenium integrifolium</i>)	E	NL
Prairie bush-clover (<i>Lespedeza leptostachya</i>)	THR	THR
Sullivant's Milkweed* (<i>Asclepias sullivantii</i>)	THR	NL
Tuberous Indian-plantain* (<i>Arnoglossum plantagineum</i>)	THR	NL
Valerian* (<i>Valeriana edulis ssp.</i>)	THR	NL
Western prairie fringed orchid (<i>Platanthera praeclara</i>)	THR	THR
Rattlesnake-master* (<i>Eryngium yuccifolium</i>)	SPC	NL
Small White Lady's-slipper (<i>Cypripedium candidum</i>)	SPC	NL
Yellow-fruited Sedge (<i>Carex annectens</i>)	SPC	NL
Plains Wild Indigo (<i>Baptisia bracteata var. leucophaea</i>)	SPC	NL
Cowbane* (<i>Oxypolis rigidior</i>)	T	NL

E = Endangered, THR = Threatened, SPC = Special Concern Species, NL = Not Listed, T = Tracked by State, but no legal status, *Denotes species observed in within the Project.

The NHIS results do not indicate any rare features, birds, reptiles, or amphibians were identified within the Transmission Project area. Due to environmental degradation from agricultural land conversion, significant migratory bird paths were not encountered.

It is unlikely that any activities for the implementation of the Transmission Project will affect aquatic organisms. However, stormwater management plans for construction will be required to address protective measures, or a license for crossing public lands may be required in the event any construction activities are planned in locations where publicly owned native prairie remnants have been documented.

Impacts

Impact of any Federal or State-listed threatened or endangered species are not expected. The desktop analysis, site reconnaissance, consultations with the MNDNR, FWS, and the query of the NHIS database indicate that there are no occurrences of documented federal endangered species within the Project boundary. State-listed or rare species that occur within the Transmission Project area are species dependent on wetlands and aquatic areas. Any impacts proposed in these areas will be minimized or avoided when feasible. Wildlife areas that could be potentially directly or indirectly impacted will be minimized or avoided.

State management areas and recreation areas will not be directly impacted.

Mitigation Measures

The Applicant does not anticipate any impacts to rare and unique natural resources in the Transmission Project area. In the event state-listed threatened plant species are encountered, the Applicant will work the MNDNR to ensure that all rare and unique resources in the area are protected.

5.5 Effects on Cultural, Archaeological, and Historic Resources

A desktop review has been conducted of cultural and archaeological resources with data requests from the Minnesota Archaeological Inventory, Historic Structures Inventory, the State Historic Preservation Office (SHPO), as well as interviews with local residents. Archaeological sites, cemeteries and historic structures are regulated under state and federal laws.

The SHPO Archaeological Site Location Database identified the following historic or architectural significant sites within the proposed Transmission Project area, as identified on Map 11:

- Austin and LaCrosse Road Section located in Section 25 of Sargeant Township just off of County Highway 1.

A detailed report from the SHPO is included in Appendix M “State Historic Preservation Office Data.” According to the available information, the historic 19th Century buildings and structures that still exist within or near the Project area are churches, schools, Town Halls, warehouses, general stores, barns and homesteads that date to the early settlement of the area in the 1850’s.

One (1) bridge located in Sargeant Township on 670th Avenue was identified in Mower County as having historical and architectural integrity. The bridge identified in the historic structures inventory will not impact the proposed location for siting the substations or transmission lines.

Human prehistory of the Project area extends to the end of the last glaciation approximately 10,000 years Before Christ (BC). The retreat of the last continental ice sheet, the Des Moines Lobe, left a retreating margin of glacial debris, termed till, within six (6) to ten (10) miles west of the Project. The Cedar River is now the location of the terminal outwash margin. The regional Native American pre-history is broken down into five (5) ages:

- Paleo-Indian culture, 10,000 - 6,000 BC: Small groups of Native Americans migrated along the retreating ice margin and pursued the mega-fauna that inhabited the windswept prairies, wetlands and streams of the outwash plain. Recorded habitation sites are extremely rare in the region and are known from the sandstone bluffs in the headwaters of Silver Creek near Rochester, from cache sites in Fillmore and Houston Counties and from rock shelter sites along the Mississippi River, but, none have been found in the Project area. Three (3) to four (4) miles west of the Project, north of Grand Meadow on the south side of Interstate 90, lays a significant pre-historic chert quarry that was used for over 9,000 years by Native Americans as a source of the stone used for lithic spears, arrows, scrapers, knives and other tools. Tools made of Grand Meadow Chert are found throughout the Upper Midwest and eastern Great Plains. In the Project area there is a low probability of having similar chert quarry sites because more than fifty (50) feet of glacial till covers the chert-containing bedrock. There is no exposed bedrock within the Transmission Project. The Wapsipinicon/Grand Meadow Wind Project (MPUC docket No IP6646/WS-07-839, issued July 26, 2007) located four (4) miles southeast of the Project encompasses the Grand Meadow Chert Quarry and the Public Utilities Permit specifies measures for identifying and protecting cultural

resources within the Wapsipinicon/Grand Meadow Project area.

- Archaic Indian Tradition, 6,000 - 1,000 BC: Small nomadic groups of Native Americans adapted to the disappearance of the mega-fauna, the changing climate and changing regional vegetation. In Wisconsin, Archaic burial sites are known from burial pits that are clustered and believed to roughly mark territorial boundaries.

Archaic culture artifacts such as spear points and knives are uncommon isolated surface finds and are best known from rock shelter sites along forested valleys in areas to the east and lakes to the north. In the Project area the probability of archaic habitation or burial sites is low and most probable in the valleys along rivers and streams. Archaic artifacts are present in the area of the Grand Meadow Chert Quarry a few miles to the east.

- Woodland Tradition, 1,000 BC - 900 AD: The Woodland Tradition is marked by evidence of horticulture with the domestication of maize, squash and beans of tropical origin. Woodland culture marks the first manufacture of pottery and the occurrence of earthen burial mounds. Woodland cultures are also known as “mound builders” responsible for the creation of large earthen burial and ceremonial mounds in a variety of geometric shapes. Some of the mounds were seventy (70) feet high covering several acres at their base and required skill and organized labor. Late Woodland cultures constructed elaborate effigy mounds representing birds, bears and spirits. Larger population centers of Woodland Indians are known from habitation sites in Fillmore, Houston, Wabasha and Goodhue Counties, but are not known in the Project area. Woodland artifacts, including pottery are known from the Grand Meadow Chert Quarry.
- The Mississippian Traditions 900 - 1,450 AD: The Mississippian Tradition is marked by the Oneonta culture that shows archaeological evidence of intensified agriculture and shell-tempered pottery. Artifacts include ceramics, pottery vessels, bone tools used for agriculture, grinding stones and a variety of more exotic trade items such as ornamental marine shells and catlinite (pipestone) pipes. Large, complex Oneonta habitation sites are known from up and down the Mississippi, Minnesota, Root and Cannon River valleys, however, there are no known Oneonta villages in the Project area. Mississippian artifacts, including pottery are known from the Grand Meadow Chert Quarry.
- Historic Post Contact 1450 AD - present: The tribal cultures of the Winnebago (Ho-Chunk), Dakota, and Chippewa were encountered by the first white explorers of the region. Historic records are not precise enough to determine the territorial range of the tribes, but the headwaters of small creeks and rivers are often noted as historic Native American campsites. Diseases spread by white settlers decimated Native American populations in the decades before Dodge, Mower and Olmsted Counties were settled.

5.5.1 Cemeteries

We found no official State record of Mower County cemeteries. However, all cemeteries and human remains are protected under Minnesota Statute 307, the Private Cemeteries Act. Cemeteries or human remains are highly regulated and disturbance of these areas will be avoided within the Transmission Project.

Impacts

The probability of discovering archaeological sites or pre-historic human remains is small and no impacts are expected. If artifacts are discovered on public land, including within the public ROW, the State of Minnesota reserves the “right and privilege” of conducting the archaeological investigations. If artifacts are found on private property the landowner and the parties discovering the materials are encouraged to report the findings to the State. In other nearby wind farm projects the MPUC Permit requires all archaeological finds to be reported and work in the area of the artifacts must stop for a period of up to three (3) days to allow the State Archeologist time to investigate and to recover artifacts and information. Any human remains discovered must be reported and left undisturbed in accordance with Minnesota’s Private Cemeteries Act.

Mitigation Measures

The Applicant does not anticipate the need for a comprehensive archaeological assessment of the potential to impact archaeological sites or historic architectural properties. However, currently a Phase I archaeological survey is in progress targeting areas with proposed land disturbance within the Project boundary. In addition the Applicant will require a systematic means of training personnel to identify and report the occurrence of artifacts. If any should be discovered during construction, the MPUC and Minnesota Historical Society will be contacted and construction will cease in accordance with the MPUC and local permits.

6 Engineering

6.1 Use of Existing Utilities and Public Right-of-Ways

6.1.1 Right-of-way Acquisition

The Applicant proposes to site the Transmission Project so the transmission line routes parallel existing township and county road ROW. The existing ROW widths along the proposed routes for township roads are thirty-three feet (33) and forty-five feet (45) for county roads from centerline to property line. The Applicant will secure a 100-foot wide route corridor along the proposed transmission line routes.

Only one (1) segment along the Preferred North Route (PN-6) and two (2) segments along the Preferred South Route (PS-4 and PS-8) will be located within existing county road ROW. For the siting of PN-6, PS-4, and PS-8, the Applicant will secure a 100-foot wide easement that will overlap forty-five (45) feet with the existing county road ROW, where the easement rights will be shared. The remaining fifty-five (55) foot easement will blanket the adjacent agricultural land, where the Applicant will be the sole holder of the easement. Within the forty-five (45) foot easement the Applicant plans to place the structures forty (40) feet from the property line, just inside of the existing County ROW, as depicted in Figure 4.2.2.2 “Typical ROW Corridor along County Roads”.

All the remaining segments of the Preferred North Route and the Preferred South Route will be located within existing township road ROW. For the siting of segments along township road ROW the Applicant will secure a 100-foot wide easement that will overlap thirty-three (33) feet with the existing township road ROW, where the easement rights will be shared. The remaining sixty seven (67) foot easement will blanket the adjacent agricultural land, where the Applicant will be the sole holder of the easement. Within the sixty-seven (67) foot easement the Applicant plans to place the structures forty (40) feet from the property line, just outside of the existing township road ROW, as depicted in Figure 4.2.2.1 “Typical ROW Corridor along Township Roads”.

ROW acquisition will begin in the design phase of the Transmission Project to accommodate and access the facilities for operations and maintenance. The Applicant does not have the power of eminent domain to acquire land or wind rights for the project. Wind and land rights necessary to build the facility must be in the form of voluntary easements or lease agreements between individual landowners and the Applicant. The Applicant will follow standard operating procedures when acquiring the easements. The typical evaluation and acquisition process involves title examination, initial landowner contacts, surveying, document preparation, and easement acquisition and execution.

To acquire ROW, the Applicant has identified all persons and entities that have a real estate interest or ownership on properties located within the areas where structures are proposed. A third party was contracted to compile the list of names and complete the public records search for all land within the Transmission Project. Title reports for all properties were obtained which describes the legal boundaries of each property. The legal descriptions were then used to prepare the metes and bound legal description that describes the 100-foot wide corridor as it relates to each property that extends along the length of each transmission line route. The title reports will provide information related to lands that are already bound by liens, restrictions, encumbrances or existing utility easements. The terms and conditions will be reviewed for each parcel with existing restrictions.

The property owners identified along each route are listed in Appendix N “Proposed Transmission Project Landowner List” were contacted to discuss the Transmission Project and the need for constructing the proposed transmission line structures. Discussions included a description of how each individual parcel may be impacted, addressed specific construction concerns the landowner may have, and discussed the potential construction schedule.

With landowner consent, each parcel will be evaluated via a preliminary field survey, where soil borings, a topographic survey, identification of ROW corridors, and identification other additional features will be completed. The preliminary field work is necessary to provide key information for the design phase, such as characterization of soil conditions, through geotechnical testing to select the appropriate foundation design.

The Applicant believes they will be able to address landowners concerns in a manner that leads to securing an easement agreement for the utility’s purchase of land rights. Documents will be prepared and easements will be executed.

Special considerations, including the location of fences, crops or livestock may be temporarily impacted during construction, requiring additional accommodations such as, harvesting crops early or removing fencing. Under all special circumstances the Applicant will work with the landowner to make these accommodations.

6.1.2 Easement Agreements

Easement agreements are legal binding documents that affect personal property rights. Landowners should be fully aware how these agreements will impact their property rights through terms and conditions which may restrict certain activities. The Applicant will acquire easement agreements for areas where the Transmission Project will be located. Along township and county road ROWs the width of the route corridor will be 100 feet from each property line. However, once the Transmission Project is finalized and the exact location of structures has been determined, the actual corridor width recorded on property deeds may only be 80 feet, or encompass a total of 171 acres of land.

6.1.3 Construction Procedures

Construction will commence after the necessary approvals have been obtained from state and local officials, and required permits have been issued. Construction practices will follow the Applicant's standard operation procedures and mitigation practices to comply with all state and local laws. To minimize impacts specific construction and mitigation measures will be developed in the Construction Plan. Typical construction equipment will be used for the installation of the proposed structures and will include the use of tree or stump removal equipment, mowers, cranes, backhoes, drill rigs, dump trucks, front end loaders, bulldozers, flatbed trailers, pickup trucks, and other various equipment. Poles will be delivered on trailers and held in the staging area. Pole locations will be surveyed and flagged. Access to these locations will be obtained from the existing ROW. In areas where access is difficult, field roads will be utilized with landowner consent. Use of heavy equipment for pole installation may require road upgrades, or construction of new roads to allow cranes, and other heavy equipment access. If no access is available, new roads may be constructed.

Poles will be placed in 1 foot to 2 foot diameter holes and filled with granular material. To ensure the pole is stable, culverts may also be installed. Once the poles are set, three (3) conductors and shield wire will be strung between poles in two (2) mile sections. Temporary guard structures will be used to keep the wires off the crossings.

All construction work will be completed in accordance with the issuance of required permits. Installation of silt fence and other Best Management Practices (BMPs) for erosion control measures will be used on areas subject to disturbance. A Stormwater Discharge Permit for construction activities under the National Pollutant Discharge Elimination System (NPDES), administered by the MPCA is required and will be completed prior to onsite construction. In addition a Stormwater Pollution Protection Plan (SWPPP) will be developed to minimize soil erosion and identify BMPs to be employed during construction to protect existing site conditions and adjacent resources by minimizing soil erosion. The construction management team will be responsible to ensure implementation and compliance with the permit conditions.

6.1.4 Restoration Procedures

Construction crews will attempt to minimize ground disturbance when possible. However, soil disturbance is likely to occur. Therefore the Applicant will restore lands to their original condition to the maximum extent practicable. Any damage to landowner(s) properties or road ROW during construction will be repaired, replaced, or compensated by the Applicant.

In areas where construction has significantly compacted soils and reestablishing vegetation is difficult, the Applicant will promptly seed the areas and install silt fences, and erosion control blankets, which will protect the soil until the vegetation reestablishes. Specific restoration procedures will be identified and addressed by Mower County representatives in the Conditional Use Permit.

6.1.5 Maintenance Procedures

Transmission lines and substations are designed to operate for several years with minimal maintenance. However, it is common that annual maintenance will be required during the first few years of operation. To complete maintenance on the transmission lines and facilities, the Applicant will hire an experienced contractor to perform these duties through a long-term service agreement. Ongoing monitoring of vegetation will occur to ensure unwanted species are managed and safe operation of the lines is protected.

Substations will be monitored on an annual basis to keep them functioning in accordance with accepted operating procedures adopted by NECS requirements.

6.2 Description of Design Options to Accommodate Future Expansion

There are no design options being considered to accommodate future expansion. The proposed transmission lines are intended to serve the proposed Pleasant Valley Wind Project. The transmission lines will transmit electricity from the wind farm to two (2) collector substations to a third East Substation where it will interconnect into the grid, the POI (“the point of interconnection”) via one of the following two options:

- POI Option 1: For this option energy will be transmitted to the Preferred East Substation (POI Option 1) located Section 18 of Pleasant Valley Township, approximately 0.3 miles (1,730 feet) east of the 680th Avenue and 310th Street intersection. At this intersection the two (2) overhead transmission lines (Preferred North and South Transmission Lines) will be double circuited, or co-located on the same structures for a distance of 0.3 miles (1,726 feet) before the energy is transmitted into the East Substation. Here, the voltage will be stepped up to 345 kV with a 138/345 kV autotransformer. The energy will then be connected into the grid with a “tap” directly into the existing Xcel Energy 345 kV transmission line, (the “Point of Interconnection Option 1”).
- POI Option 2: For this option energy will be transmitted to the Preferred East Substation (POI Option 2) located approximately 1,300 feet west of the existing Great River Energy Pleasant Valley Substation in the SE ¼ of the NE ¼ of Section 24 of Sargeant Township. Here, the voltage will be stepped up to 345kV with a 138/345kV autotransformer. The energy will then be transmitted

through a short proposed East Transmission Line that extends approximately 3,600 feet where it interconnects to Xcel Energy's 345kV bus, (the "Point of Interconnection Option 2") within the Pleasant Valley Substation.

Depending on the final selected Preferred East Substation (POI Option 1 or 2) each of the two (2) 138 kV lines will be designed to convey up to 180 MW of electrical energy between these facilities. The Pleasant Valley Wind Project will be permitted and constructed as a 301 MW project. Any future wind project development near or adjacent to this project would require a separate transmission line. Therefore, the Applicant does not anticipate the transmission route ROWs or carrying capacity of the two 138 kV transmission lines for this 301 MW Project would need to be expanded in the future.

7 Additional Matters Identified in the Scoping Process

Issues that were specifically addressed or identified as a result of the public scoping meeting hosted by the Mower County Board of Commissioners on June 1, 2010 are presented in the table below. Please note that all issues identified by the public are represented in the table.

Table 7 – Public Scoping Input Comments

Item #	Issue or concern	Covered in EA Document?	Location Covered in EA Document
1	Duplication of transmission lines from various projects. Can lines be combined? Can the County require sharing of infrastructure?	Yes	Section 4.2.2.3
2	Devaluation / salability of property	Yes	Section 5.2.2
3	Possible health issues for people and/or animals (non-specified). Distance from transmission line to residence(s).	Yes	Section 5.2.9
4	KW accumulation to area with additional transmission lines	Yes	Section 5.2.9.2
5	Possibility of eminent domain	Yes	Executive Summary and Section 4.1, and Section 6
6	Possible impacts to organic farming, both produce and livestock	Yes	Section 5.3.1
7	Possible effects to electronic or wireless tools / equipment. i.e. cell phones, television reception, internet	Yes	Section 5.2.8
8	Aesthetics	Yes	Section 5.2.4
9	Noise (buzzing)	Yes	Section 5.2.3

8 Feasibility Analysis

The Applicant used the route selection rationale that was outlined in *Section 4.1 – Route Selection Process* and the environmental information obtained through the analysis of the Transmission Project to identify the preferred transmission line routes (north, south and east) and the preferred substations (north, south, and east). The attributes discussed in *Section 4.1* provided a framework for the Applicant to identify feasible locations for the placement of the Transmission Project facilities while limiting impacts to the environment.

To summarize, the key route selection criteria identified in *Section 4.1* that contributed to the selection of the preferred routes are identified below along with a brief discussion why the preferred routes were selected:

- Landowner participation: Since the Applicant does not have eminent domain authority, voluntary landowner participation is vital to placement of the routes. The Applicant was able to obtain transmission easements for all landowners along the preferred north, south and east and transmission routes and for the north, south, and east substation locations. For the Preferred North Route and the Preferred South Route the Applicant was able to acquire all 18 and 14 landowner easements, respectively.
- Following existing ROW, survey lines, natural division lines, and agricultural field boundaries when feasible: In order to conform to state and local policies that recommend utilizing existing ROW instead of creating new ROW for transmission projects the Applicant followed these guidelines to the maximum extent practicable.. A synopsis of the preferred routes attributes that follow these guidelines is summarized in *Section 4.2.2.5 – Preferred Route Attribute Comparison Matrix* and is described below.
 - North Route: the total length of this route is 6.2 miles long, where 4.4 miles follow section lines and quarter section lines, 6.4 miles follow roads or highway ROW, and 5.7 miles will be co-located with existing overhead or buried transmission/distribution lines.
 - South Route: the total length of the south route is 7.9 miles long, where 6.0 miles follow section lines and quarter section lines, 6.0 miles follow roads or highway ROW, and 1.5 miles will be co-located with existing overhead or underground transmission/distribution lines. A short one (1) mile stretch of this route is located along a quarter section line that is bounded by the natural division of agricultural field boundaries.
- Minimize length: During the selection process the Applicant assessed many route options, with differing lengths, but due to landowner participation the only feasible route options were the preferred north, south and east route locations.
- Avoid populated areas where feasible: Selection of the transmission routes considered proximity to local residences. Along the north, south and east transmission routes a total of 18, 14, and one (1) landowner(s) will be affected by the installation of the proposed transmission lines, respectively; however there are no residential structures within the Applicants 100-foot route corridor and the nearest residences to the proposed line area 140 feet to 150 feet from the proposed structures.

- Avoid major environmental features and other conflicting land uses: The Applicant has performed due diligence for land that surrounds the proposed Transmission Project area and has found no environmental impacts that will have significant effects on human settlement, public health and safety, land use and land-based economics, the natural environment of cultural, archaeological, or historic structures. A detailed discussion of the mitigation measures proposed by the applicant is discussed under *Section 5 - Environmental Information*. Specifically, the preferred north, south and east routes were selected to avoid natural features such as, wetlands, grassed waterways, agricultural land, woodlands, and publically-owned local, state and federal lands.

This EA has reviewed the Transmission Project proposed by the Applicant, including the potential impacts on the human and natural environment, the feasibility of each preferred route, the required permits to construct the Transmission Project, and the additional matters identified in the scoping process. This review is intended to assist the Mower County Board during their review of the CUP applications for the Transmission Project. Where potential impacts have been identified from the proposed Transmission Project, the mitigative measures included throughout this EA may be adopted by the Board through the CUP process to ensure the facilities area constructed and operated in an appropriate manner.