Noble Flat Hill Windpark I

Route Permit Application for the Noble Flat Hill Windpark I 230 kV Transmission Line Project

August 29, 2008

Submitted to:

Minnesota Public Utilities Commission

PUC Docket No: IP6687/TL-08-988

Prepared by:

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For

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1.0 SUMMARY OF PROPOSED PROJECT

Noble Flat Hill Windpark I, LLC ("Noble" or the Applicant) is submitting this application for a Route Permit to the Minnesota Public Utilities Commission (PUC) as required by Minnesota Rules (Minn Rules) Chapter 7849 and Minnesota Statutes Chapter 216E. The proposed Flat Hill transmission line and associated facilities (Proposed Project) for which a permit is being requested include:

- A new single circuit 230 kilovolt (kV) transmission line to capture energy generated by the Noble Flat Hill Windpark I located in Clay County, Minnesota, and connect to the Otter Tail Power Company (OTP) Sheyenne-Audubon 230 kV transmission line southeast of Glyndon, Minnesota;

- The new project substation within the Noble Flat Hill Windpark I at 70th Avenue North and 120th Street North, northeast of Glyndon in Clay County, Minnesota; and

- The new switching station along the existing OTP Sheyenne-Audubon 230 kV transmission line southeast of Glyndon, Minnesota.

Depending on the final route for the Proposed Project, the transmission line will be between 9.5 and 11.5 miles long and will extend from the Noble Flat Hill Windpark I to the existing OTP Sheyenne-Audubon 230 kV transmission line southeast of Glyndon, Minnesota. The proposed switching station that will be constructed along the existing OTP Sheyenne-Audubon 230 kV transmission line will be located at one of two alternative locations, based on the final determine route for the Proposed Project.

1.1 Full Permitting Process

Minn. Stat. § 216E.03, subd. 2, provides that "[n]o person may construct a high voltage transmission line without a Route Permit from the commission. A high voltage transmission line may be constructed only along a route approved by the Commission." A high voltage transmission line is any transmission line "designed for and capable of operation at a nominal voltage of 100 kilovolts or more…" (Minn. Stat. § 216E.01, subd. 4; Minn. R. 7849.5010, subp. 9).

The Project is a 230 kV line that would be between 9.5 and 11.5 miles long, and therefore a Route Permit from the PUC is required. Therefore, this permit application has been prepared in conformance with PUC full permit application requirements defined in Minn. Rules 7849.5200 to 7849.5340.

1.2 Full Permitting Process Submission Requirements Checklist

The contents required for an application with the PUC under the Full Permitting Process are outlined in Minnesota Rules 7849.5220. The PUC submittal requirements are listed on Table 1-1 with cross-references indicating where the information can be found in this application.

Table 1-1
Full Permitting Process Submission Requirements Checklist

Rule/Statute	Information Required	Location in Permit Application
Minn. R. 7849.5220, Subp. 2	**Route Permit for High Voltage Transmission Line (HVTL)** (a) a statement of proposed ownership of the facility at the time of filing the application and after commercial operation	Section 2.1
	(b) the precise name of any person or organization to be initially named as permittee or permittees and the name of any other person to whom the permit may be transferred if transfer of the permit is contemplated	Section 2.2
	(c) at least two proposed routes for the proposed high voltage transmission line and identification of the applicant's preferred route and the reasons for the preference	Sections 3.2 and 5.3
	(d) a description of the proposed high voltage transmission line and all associated facilities including the size and type of the high voltage transmission line	Sections 2.5 and 4.1
	(e) the environmental information required under 7849.5220, Subp. 3	See Minn. Rules 7849.5220, Subp.3 (a) – (h) entry in this table
	(f) identification of land uses and environmental conditions along the proposed routes	Section 5.0
	(g) the names of each owner whose property is within any of the proposed routes for the high voltage transmission line	Appendix D
	(h) United States Geological Survey topographical maps or other maps acceptable to the chair showing the entire length of the high voltage transmission line on all proposed routes	Appendix A
	(i) identification of existing utility and public rights-of-way along or parallel to the proposed routes that have the potential to share right-of-way with the proposed line	Sections 4.2
	(j) the engineering and operational design concepts for the proposed high voltage transmission line, including information on the electric and magnetic fields of the transmission line	Sections 4.1 through 4.5
	(k) cost analysis of each route, including the costs of constructing, operating, and maintaining the high voltage transmission line that are dependent on design and route	Section 4.6
	(1) a description of possible design options to accommodate expansion of the high voltage transmission line in the future	Section 4.1.1
	(m) the procedures and practices proposed for the acquisition and restoration of the right-of-way, construction, and maintenance of the high voltage transmission line	Sections 4.3 and 4.4
	(n) a listing and brief description of federal, state, and local permits that may be required for the proposed high voltage transmission line	Section 4.7
	(o) a copy of the Certificate of Need or the certified HVTL list containing the proposed high voltage transmission line or documentation that an application for a Certificate of Need has been submitted or is not required	Section 2.3
Minn. R. 7849.5220, Subp. 3	**Environmental Information** (a) a description of the environmental setting for each site or route	Section 5.1.1 and 5.2.1
	(b) a description of the effects of construction and operation of the facility on human settlement, including, but not limited to, public health and safety, displacement, noise, aesthetics, socioeconomic impacts, cultural values, recreation, and public services	Section 5.1.2 and 5.2.2
	(c) a description of the effects of the facility on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining	Section 5.1.3 and 5.2.3
	(d) a description of the effects of the facility on archaeological and historic resources	Section 5.1.4 and 5.2.4

Rule/Statute	Information Required	Location in Permit Application
	(e) a description of the effects of the facility on the natural environment, including effects on air and water quality resources and flora and fauna	Section 5.1.5 and 5.2.5
	(f) a description of the effects of the facility on rare and unique natural resources	Section 5.1.6 and 5.2.6
	(g) identification of human and natural environmental effects that cannot be avoided if the facility is approved at a specific site or route	Section 5.1.7 and 5.2.7
	(h) a description of measures that might be implemented to mitigate the potential human and environmental impacts identified in items (a) to (g) and the estimated costs of such mitigative measures	Sections 5.1.2.11, 5.1.3.5, 5.1.4.2, 5.1.5.9, 5.1.6.3, 5.2.2.11, 5.2.3.5, 5.2.4.2, 5.2.5.9, and 5.2.6.3
Minn. R. (7849.5240, Subp. 2	**Notice of Project** Notification to persons on Commission's general list, to local officials, and to property owners	Will be mailed to required recipients within 15 days of application submission
Minn. R. 7849.5240, Subp. 4	Publication of notice in a legal newspaper of general circulation in each county in which the route is proposed to be located.	Will be published within 15 days of application submission
Minn. R. 7849.5240, Subp. 5	Confirmation of notice by affidavits of mailing and publication with copies of the notices	Will be submitted within 30 days of notice mailing/publication
Minn. R. 7849.5910	**Factors to be Considered in Permitting a HVTL**	
	(a) effects on human settlement, including, but not limited to, displacement, noise, aesthetics, cultural values, recreation, and public services	Sections 5.3
	(b) effects on public health and safety	Section 5.3
	(c) effects on land-based economies, including, but not limited to, agriculture, forestry, tourism, and mining	Section 5.3
	(d) effects on archaeological and historic resources	Section 5.3
	(e) effects on the natural environment, including effects on air and water quality resources and flora and fauna	Section 5.3
	(f) effects on rare and unique natural resources	Section 5.3
	(g) application of design options that maximize energy efficiencies, mitigate adverse environmental effects, and could accommodate expansion of transmission or generating capacity	Section 4.1.1 and 5.3
	(h) use or paralleling of existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries	Section 5.3
	(i) use of existing large electric power generating plant sites	Section 5.3
	(j) use of existing transportation, pipeline, and electrical transmission systems or rights-of-way	Section 5.3
	(k) electrical system reliability	Section 5.3
	(l) costs of constructing, operating, and maintaining the facility which are dependent on design and route	Section 5.3
	(m) adverse human and natural environmental effects which cannot be avoided	Section 5.3
	(n) irreversible and irretrievable commitments of resources	Section 5.3
Minn. R. 7849.5930, Subps. 1 and 2	Prohibited Routes **Wilderness areas.** No high voltage transmission line may be routed through state or national wilderness areas **Parks and natural areas.** No high voltage transmission line may be routed through state or national parks or state scientific and natural areas unless the transmission line would not materially damage or impair the purpose for which the area was designated and no feasible and prudent alternative exists. Economic considerations alone do not justify use of these areas for a high voltage transmission line	Not applicable

Rule/Statute	Information Required	Location in Permit Application
Minn. Stat. §216E.03 Subd. 7(b) (applicable per Minn. Stat. §216E.04, Subd. 8)	**Considerations in designating sites and routes** (1) Evaluation of research and investigations relating to the effects on land, water and air resources of large electric power, generating plants and high voltage transmission lines and the effects of water and air discharges and electric and magnetic fields resulting from such facilities on public health and welfare, vegetation, animals, materials and aesthetic values, including baseline studies, predictive modeling, and evaluation of new or improved methods for minimizing adverse impacts of water and air discharges and other matters pertaining to the effects of power plants on the water and air environment	Sections 4.5, 5.1.5, 5.2.5, and 5.3
	(2) Environmental evaluation of sites and routes proposed for future development and expansion and their relationship to the land, water, air and human resources of the state	Section 4.1.1
	(3) Evaluation of the effects of new electric power generation and transmission technologies and systems related to power plants transmission - designed to minimize adverse environmental effects	Not required for/applicable to transmission projects
	(4) Evaluation of the potential for beneficial uses of waste energy from proposed large electric power generating plants	Not required for/applicable to transmission projects
	(5) Analysis of the direct and indirect economic impact of proposed sites and routes including, but not limited to, productive agricultural land lost or impaired	Sections 5.1.3.5, 5.2.3.5, and 5.3
	(6) Evaluation of adverse direct and indirect environmental effects that cannot be avoided should the proposed site and route be accepted	Sections 5.1.5, 5.2.5, and 5.1.7
	(7) Evaluation of alternatives to the applicant's proposed site or route proposed pursuant to subdivisions 1 and 2	Sections 3.2, 5.2, and 5.3
	(8) Evaluation of potential routes that would use or parallel existing railroad and highway rights-of way	Sections 3.2, 4.2, and 5.3
	(9) Evaluation of governmental survey lines and other natural division lines of agricultural land so as to minimize interference with agricultural operations	Sections 5.1.3.2 and 5.2.3.2
	(10) Evaluation of the future needs for additional high voltage transmission lines in the same general area as any proposed route, and the advisability of ordering the construction of structures capable of expansion in transmission capacity through multiple circuiting or design modifications	Section 4.1.1
	(11) Evaluation of irreversible and irretrievable commitments of resources should the proposed site or route be approved	Section 5.3
	(12) When appropriate, consideration of problems raised by other state and federal agencies and local entities	Section 6.0

2.0 INTRODUCTION

2.1 Ownership

The Noble Flat Hill Windpark I and the associated transmission facilities described as the Proposed Project in this permit application are being developed by Noble, an indirect wholly-owed subsidiary of Noble Environmental Power, LLC ("NEP"). NEP is an independent power developer and leading renewable energy company founded in 2004 in response to growing demand for clean, renewable sources of energy. NEP has approximately 3,850 megawatts (MW) of wind parks in operation or under development in eight states, including New York, New Hampshire, Vermont, Maine, Michigan, Minnesota, Texas, and Wyoming. NEP is based in Essex, Connecticut, and is majority-owned by JPMorgan Partners Fund, which is managed by CCMP Capital.

The standard practice that has been utilized by NEP on previous, similar projects has been to transfer ownership of the new transmission line to the local utility company upon the completion of construction. For the Proposed Project, Noble would pursue transferring ownership of the 230 kV transmission line to OTP for the entire length from the Noble Flat Hill Windpark I substation to the point of interconnection. Discussions have been initiated between the Applicant and OTP, but no ownership agreement has been reached. An ownership arrangement for the transmission line will be pursued by the Applicant as part of the Interconnection Agreement once the final route has been determined for the Proposed Project.

OTP is an investor-owned electric utility that began operations in 1909, and is headquartered in Fergus Falls, Minnesota. The company provides electric service to approximately 129,000 customers in North Dakota, South Dakota, and Minnesota, of which about 61,000 reside in the latter. The Proposed Project would be located in OTP's service area.

2.2 Permittee/Contact Information

The permittee and contact for the Proposed Project is:

Permittee: *Noble Flat Hill Windpark I, LLC*
8 Railroad Avenue
Essex, CT 06426

Contacts: *Mike Beckner*
Project Manager
Noble Flat Hill Windpark I, LLC
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2.3 Certificate of Need and Route Permit– Process Summary

Certificate of Need

The Noble Flat Hill Windpark I is a "large energy facility," as defined by Minn. Stat. § 216B.2421, Subd. 2(1) (2008). The proposed 230 kV transmission line that is the subject of this application is a generator outlet necessary to interconnect the wind farm with existing transmission facilities owned by OTP. Accordingly, consistent with the definition of a "large energy facility" under Minn. Stat. § 216B.2421 Subd. 2(1), a separate Certificate of Need is not required for the transmission line, as the line is "directly associated with the plant that are necessary to interconnect the plant to the transmission system." In this respect, Noble filed a Petition with the PUC on August 13, 2008, requesting confirmation of this fact in Docket No. IP-6687/CN-08-951, which remains pending. A copy of the petition is included in Appendix C.

Pursuant to Minn. Stat. § 216B.243, subd. 2, and Minn. R. Part 7849.0200, Subp. 6, the Applicant also filed a Petition for Exemption from Certain Certificate of Need Filing Requirements for the Noble Flat Hill Windpark I with the PUC on August 8, 2008, in Docket No. IP-6687/CN-08-951. A copy of the petition is included in Appendix C. A Certificate of Need application will be filed with the PUC after the passage of 45 days from the filing of the petition.

Route Permit

Upon filing, the applications will be reviewed by the Commission for completeness. Minn. R. 7849.0200, subp. 5 and 7849.5230, subp. 1. Within 60 days of the Commission finding the Route Permit application to be complete, it will hold a public meeting on the Route Permit. The purpose of the meeting is to obtain public opinion on 1) alternative transmission routes; and 2) the appropriate scope of the EIS that the Department of Commerce will prepare. Minn. R. 7849.5260, subp. 1 and 7849.5300, subps.2-3.

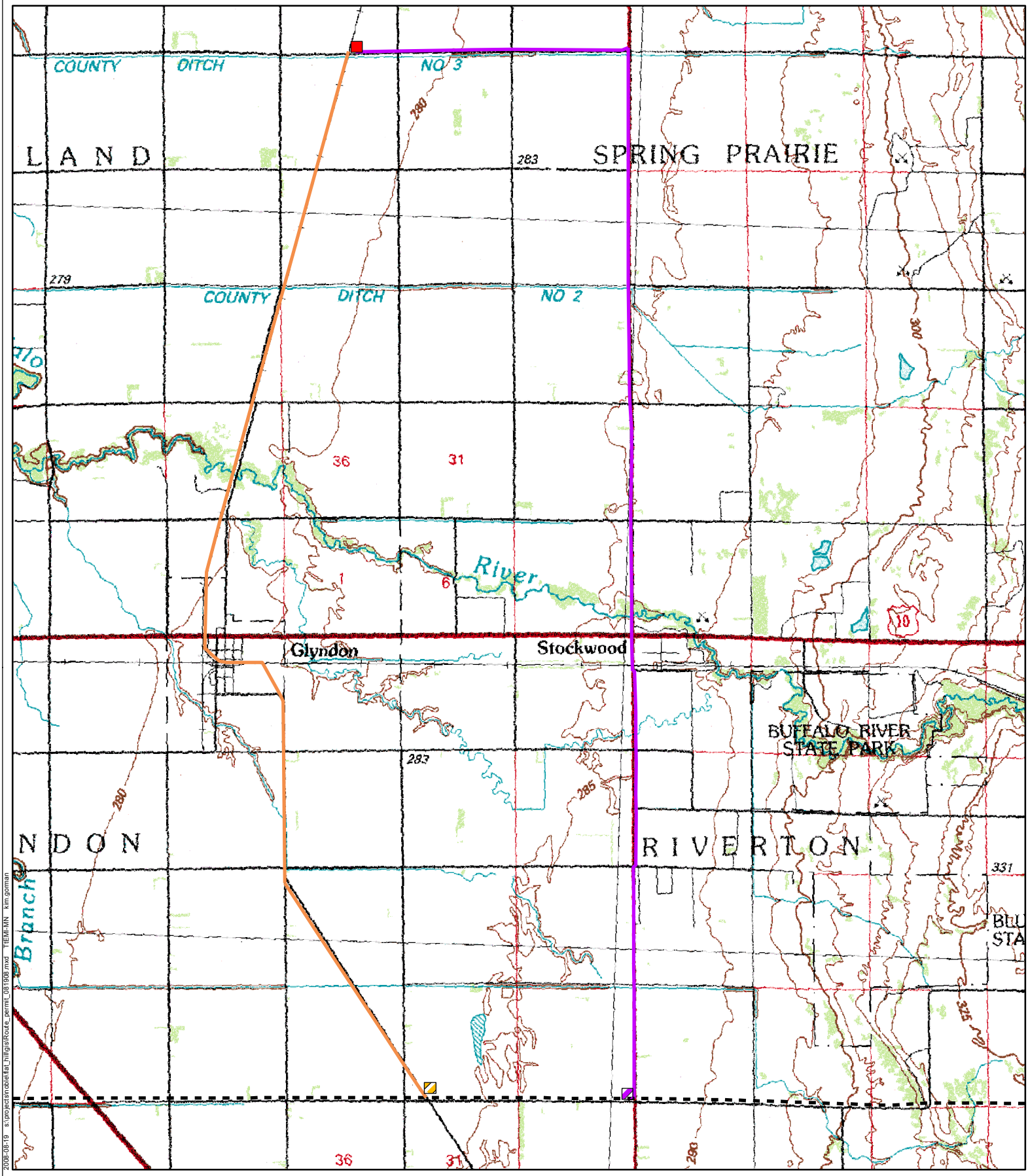
An administrative law judge (ALJ) would also hold a contested case hearing on the Route Permit application, during which interested persons can submit evidence supporting or challenging the Proposed Project. The Certificate of Need application for the Facility may proceed through an informal hearing procedure or a more formal contested case procedure if such a procedure is warranted. If the Certificate of Need proceeds through a more formal contested case process, a joint hearing on routing and need may be held. Upon closing the record for the contested case, the ALJ will submit a report and recommendation to the PUC on the applications. Minn. Stat. §§ 216B.243, subd.4 and 2l6E.03, subd.6; Minn. R. 7849.0230, subp.2 and 7849.5330. The PUC will consider the ALJ's report and recommendation in reaching its determination on whether to grant the applications with or without modifications, or to deny them (Minn. R. 7849.5340).

2.4 Project Location

The Applicant proposes constructing a 230 kV transmission line from the Noble Flat Hill Windpark I project substation located at 70th Avenue North and 120th Street North, northeast of Glyndon in Clay County, Minnesota, to a new switching station along 50th Avenue South (Highway 12), southeast of Glyndon, Minnesota, on the OTP Sheyenne-Audubon 230 kV transmission line. The Proposed Project area includes portions of the Townships of Moland, Spring Prairie, Glyndon, and Riverton in Clay County, Minnesota (see Figure 1). The township, range and section locations within the Proposed Project area for each of the route alternatives (Route 1 and Route 2) are summarized in Table 2-1. Detailed descriptions of the proposed routes are included in Section 3.2.

Table 2-1
Proposed Project Location

Label	Township	Range	Section		Label	Township	Range	Section
Route 1					**Route 2**			
T139N R46W S16	T139N	R46W	S16		T139N R46W S19	T139N	R46W	S19
T139N R46W S17	T139N	R46W	S17		T139N R46W S30	T139N	R46W	S30
T139N R46W S20	T139N	R46W	S20		T139N R46W S31	T139N	R46W	S31
T139N R46W S21	T139N	R46W	S21		T139N R47W S10	T139N	R47W	S10
T139N R46W S28	T139N	R46W	S28		T139N R47W S11	T139N	R47W	S11
T139N R46W S29	T139N	R46W	S29		T139N R47W S13	T139N	R47W	S13
T139N R46W S32	T139N	R46W	S32		T139N R47W S14	T139N	R47W	S14
T139N R46W S33	T139N	R46W	S33		T139N R47W S15	T139N	R47W	S15
T139N R46W S4	T139N	R46W	S4		T139N R47W S2	T139N	R47W	S2
T139N R46W S5	T139N	R46W	S5		T139N R47W S23	T139N	R47W	S23
T139N R46W S8	T139N	R46W	S8		T139N R47W S24	T139N	R47W	S24
T139N R46W S9	T139N	R46W	S9		T139N R47W S25	T139N	R47W	S25
T140N R46W S16	T140N	R46W	S16		T139N R47W S26	T139N	R47W	S26
T140N R46W S17	T140N	R46W	S17		T139N R47W S3	T139N	R47W	S3
T140N R46W S18	T140N	R46W	S18		T139N R47W S36	T139N	R47W	S36
T140N R46W S20	T140N	R46W	S20		T140N R46W S18	T140N	R46W	S18
T140N R46W S21	T140N	R46W	S21		T140N R46W S7	T140N	R46W	S7
T140N R46W S28	T140N	R46W	S28		T140N R47W S12	T140N	R47W	S12
T140N R46W S29	T140N	R46W	S29		T140N R47W S13	T140N	R47W	S13
T140N R46W S32	T140N	R46W	S32		T140N R47W S14	T140N	R47W	S14
T140N R46W S33	T140N	R46W	S33		T140N R47W S23	T140N	R47W	S23
T140N R46W S7	T140N	R46W	S7		T140N R47W S24	T140N	R47W	S24
T140N R46W S8	T140N	R46W	S8		T140N R47W S25	T140N	R47W	S25
T140N R46W S9	T140N	R46W	S9		T140N R47W S26	T140N	R47W	S26
T140N R47W S12	T140N	R47W	S12		T140N R47W S34	T140N	R47W	S34
T140N R47W S13	T140N	R47W	S13		T140N R47W S35	T140N	R47W	S35
					T140N R47W S36	T140N	R47W	S36



Noble Flat Hill Windpark I Substation

Route 1 Switch Station

Route 2 Switch Station

Existing Otter Tail Power Line

Route 1

Route 2

0 1 Miles

N

Figure 1
Overview Map
Flat Hill Transmission Line Route Alternatives
Noble Flat Hill Windpark I, LLC

TETRA TECH

Noble ENVIRONMENTAL POWER

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Source: Map adapted from LMIC Webserver USGS Topographic 100K Quadrangles and data provided by Noble Flat Hill Windpark I, LLC.

2.5 Proposed Project

The Applicant proposes to construct the Noble Flat Hill Windpark I 230 kV transmission line, substation and switching station in Clay County, Minnesota. Depending on the final determined route, the proposed transmission line will cover a distance of approximately 9.9 to 11.5 miles, and utilize existing roadway right of way where possible, consistent with the Minnesota PUC routing recommendations for corridor-sharing. The Proposed Project would be constructed to capture energy generated by the Noble Flat Hill Windpark I, a 201 MW facility located in Clay County, Minnesota, and connect to the existing OTP Sheyenne-Audubon 230 kV transmission line southeast of Glyndon, Minnesota. The Proposed Project area includes portions of the Townships of Moland, Spring Prairie, Glyndon, and Riverton, east and southeast of the City of Glyndon.

The typical right-of-way for a 230 kV transmission line is approximately 125 feet wide. Ultimately, the right-of-way width depends upon the recommended clearances between the conductors and other facilities along the route. The width of the right-of-way may be reduced in high-density, developed areas with the use of single-pole construction. The width of the right-of way may also be reduced where the new transmission line follows an existing linear corridor, such as another utility line or roadway. On the other hand, a wider right-of-way may be required for longer spans of the transmission line or where special design requirements are dictated by topography. The Applicant would seek permanent easements providing the right to construct, operate, and maintain the transmission line along the full width and length of its right-of-way, as necessary. Details of the right-of-way requirements for the Proposed Project are described in Section 4.3

While final engineering and design have not been completed, the Proposed Project's construction would likely use either two-pole H-frame structures or single-pole structures for a majority of the route. Two-pole H-frame structures are the typical structures used for a 230 kV transmission line located on wooded or rugged topography. They are also suited for areas requiring longer spans to avoid or minimize the placement of structures in wetlands or waterways. Each H-frame structure would range in height from 70 to 90 feet, and be placed 600 to 1,000 feet apart (see H-frame structure illustrations in Appendix B).

Where conditions warrant, single-pole structures may be used. For the Proposed Project, single pole structures would typically be used in areas where the available right-of-way is limited, such as along roads in developed areas, or where landowner concerns preclude additional right-of-way. The height of single-pole structures ranges from 80 to 100 feet, with the span between structures from 300 to 600 feet (see single-pole structure illustrations in Appendix B).

We anticipate that the project would use 795 ACSR (aluminum conductor, steel reinforced, non-bundled), with a capacity of approximately 440 Mega Volt Amperes (MVA). The conductor size may need to be modified once the ultimate route is selected and additional electrical optimization studies are completed.

There is an opportunity within Route 1 for the Proposed Project to be located in existing utility right-of-way and "double-circuited" with an existing 23.5 kV line owned by Xcel Energy along an approximately five-mile long segment of this proposed route. That means the structures for the proposed 230 kV transmission line would be designed to also carry the lower voltage transmission line already located in the right-of-way. The Applicant has initiated discussions with Xcel Energy to build the proposed 230 kV structures in the same locations as the existing 23.5 kV line, and hang the existing 23.5 kV line on one side of the new single-pole structures. A formal agreement to collocate the new 230 kV transmission line with the existing 23.5 kV will be pursued between Xcel Energy and the Applicant once the final route for the Proposed Project has been determined.

The height of single-pole double-circuit structures ranges from 95 to 115 feet, with the span between structures from 300 to 800 feet (see single-pole, double-circuit structure illustrations in Appendix B). Double-circuiting, however, can raise transmission reliability concerns. For example, a single weather-

related event could result in the outage of two circuits rather than just one. Double-circuiting can also affect the constructability and costs of the Proposed Project.

The new project substation within the Noble Flat Hill Windpark I in Clay County, Minnesota, would occupy approximately 2.5 acres in the southwest corner of a ten-acre parcel currently used by Daniel and Sandra Skolness for agricultural purposes. The 230/34.5 kV substation will be designed to accommodate the incoming 34.5 kV collector lines and the outgoing 230 kV line. The ten-acre parcel would be acquired by Noble for the facility.

The location of the proposed switching station that will be constructed along the existing OTP Sheyenne-Audubon 230 kV transmission line will be located at one of two alternative locations, based on the final determine route for the Proposed Project. Following Route 1, the switching station would occupy six acres of a ten-acre private property on 50th Avenue South (Highway 12) and MN Highway 9, southeast of Glyndon, Minnesota. The parcel is currently used by Ronald and John Bekkerus for agricultural purposes. The parcel would be acquired by Noble for the facility. Following Route 2, the switching station would occupy six acres of a ten-acre private property east of 120th Street South (CR-72) on 50th Avenue South (Highway 12), southeast of Glyndon, Minnesota. The parcel is currently used by Ardis Johnson for agricultural purposes. The parcel would be acquired by Noble for the facility.

2.6 Project Schedule

Noble proposes an in-service date of December 1, 2010, for the 230 kV route. A permitting and construction schedule for connecting the Noble Flat Hill Windpark I Substation to the Flat Hill Switchyard is provided below:

Submit PUC Route Permit Application	August 29, 2008
PUC Review Process Complete	September 2009
Right-of-Way Acquisition	September 2007 to September 2008
Line and Substation Design	January 2009 to March 2009
Survey Route	April 2009 to June 2009
Completion of the Interconnection Study	October1, 2009
Transmission Line, Substation, and Switching Station Construction	April 2010 to September 2010
Final Right-of-Way Contacts, Damage Settlements & Cleanup	September 2010 to November 2010

If Route 2 is chosen for the Proposed Project, the in-service date proposed above could not be met, and would be delayed to at least December 2011. The delayed in-service date is due to the need of acquiring additional right-of-way along the former Burlington North railway. Please see Sections 4.2 and 4.3 for more detail on this issue and Section 5.2.2.11 for a discussion of the socioeconomic impacts associated with this delay.

3.0 PROPOSED ACTION AND ALTERNATIVES

3.1 Route and Substation Site Location Rationale

Transmission planning, designing, engineering, and environmental criteria were used to develop a preferred and alternate route for the Proposed Project. State and local regulatory requirements as well as input from stakeholders were also considered. Preliminary routes for the Proposed Project were developed by considering the following:

- Follow existing rights-of-way, survey lines, natural division lines, and agricultural field boundaries when feasible – A primary factor in identifying routes is Minnesota's policy that new right-of-way for a project should be avoided where existing right-of-way can be used. The PUC's rules recognize that nonproliferation is an important consideration in selecting final routes for new transmission (Minn. R. 7849.5910 H and J). Selecting a route that would result in completely new right-of-way would run counter to the nonproliferation policy. The Applicant used geographic information system (GIS) mapping and field verification to identify existing rights-of-way (transmission lines, pipelines, railroads, roads, etc.), and natural division and field boundaries.
- Minimize length – Minimizing the length of a route generally decreases its impacts on the environment. In some situations, however, a longer route or route segment is chosen to avoid specific, undesirable impacts.
- Avoid populated areas where feasible – One of the most common comments received at the Applicant's public meetings was that residences should be avoided where possible.
- Avoid major environmental features where feasible – Major natural features such as non-fragmented forest land, threatened and endangered species, water bodies and wetlands, and biodiversity areas identified by the Minnesota County Biological Survey (including Wildlife Management Areas (WMAs), Scientific and Natural Areas (SNAs), and State Game Refuges (SGRs)) were identified, mapped, and avoided.
- Avoid airports and other conflicting land uses – The Applicant worked with federal and state agencies, and local governments to identify and map land uses that could conflict with the Proposed Project. These included airports, WMAs, SNAs, SGRs, State Parks, trails, and sensitive Nature Conservancy management areas. These land uses were avoided.

In addition, consideration was given to comments received during a meeting with PUC and Minnesota Department of Commerce (DOC), a meeting with state and federal environmental agencies, and numerous agency communications which echoed many of the points discussed above. These comments included:

- Utilize existing rights-of-way where feasible.
- Avoid or minimize impacts to water resources and wildlife.
- Avoid or minimize conflicts with adjacent land uses such as forestry and sensitive species.
- Avoid or minimize impacts to cultural resources.
- Avoid or minimize impacts to businesses.

The proposed Noble Flat Hill Windpark I project substation location was chosen due to its central location within the proposed windpark development area, and the relationship of the site to the anticipated point of interconnection with the OTP Sheyenne-Audubon 230 kV transmission line (see Figure 1).

Section 5 provides an evaluation of the potential environmental impacts for each route under consideration.

3.2 Proposed Transmission Line Route Descriptions

The Applicant is proposing two alternative routes for the Proposed Project, as described below. Both routes would begin at the Noble Flat Hill Windpark I substation near Glyndon, Minnesota (the northern end of the Proposed Project), and terminate at the existing OTP Sheyenne-Audubon 230 kV transmission line southeast of Glyndon, Minnesota (the southern end of the Proposed Project).

The specific route segments are described in Section 3.2.1 and 3.2.2. The routes are depicted on the overview and detailed route maps in Appendix A. The township/section/range locations are identified in Table 2-1.

The PUC may grant a permit for a route that is up to 1.25 miles wide, within which the right-of-way for the proposed transmission line would be located (Minn. Stat. 116C.52, subd. 8). The Applicant request that the PUC approve a narrower route of 300 feet wide, within which the Project would be located. The Applicant believes this width will enable them to minimize environmental impacts during the design and construction of the Proposed Project, as well as address any landowner and adjacent linear facility owner routing issues that may occur along the proposed route alignment. The 300-foot wide routes are shown on the route maps in Appendix A.

The Applicant intends to use H-frame structures for the Proposed Project; however, certain transmission design considerations (such as double-circuiting), geographical constraints (e.g., points-of-inflection, narrow rights-of-way in developed areas, etc.), and/or landowner concerns may arise where single-pole, steel structures would be necessary.

The route descriptions have been divided into segments based on the associated facilities and adjacent rights-of-way. Appendix A provides the segment maps.

3.2.1 Route 1 (Applicant's Preferred Route)

The Applicant is requesting that the PUC consider Route 1 for a route permit, as described below and shown in detailed route maps in Appendix A and on overview map Figure 1. The Applicant requests that an 11.4-mile route be approved for Route 1 that has, on average, a 150-foot width from the centerline of the designated route (a total corridor width of 300 feet). This will give Noble reasonable flexibility in locating the transmission line. This 300-foot width has been identified on the segment maps in Appendix A. Typical right-of-way for a 230 kV transmission line would be 62.5 feet on either side of the project centerline, but actual right-of-way acquired from landowners for the Proposed Project may vary depending upon where the line is located.

Route 1 generally follows MN Highway 9 road right-of-way from the Noble Flat Hill Windpark I substation to the existing OTP Sheyenne-Audubon 230 kV transmission line located on the north side of 50th Avenue South (Highway 12) southeast of Glyndon, Minnesota. Route 1 includes the following segments, which are described in Table 3-1 below from north to south: 1-1, 1-2, 1-3, 1-4, and 1-5.

Table 3-1
Route 1 Segments

Segment ID	**Length (Miles)**	**Associated Right-of-Way (% of segment)**	**Figure**	**Description**
1-1	2.35	Roadway (100%)	Fig 2	Begins at the Noble Flat Hill Windpark I project substation – line runs east paralleling the 70th Avenue North right-of-way for 2.35 miles to MN Highway 9. At MN Highway 9, Segment 1-1 meets the existing Xcel 23.5 kV transmission line on the west side of MN Highway 9.
1-2	5.05	23.5 kV line & Roadway (100%)	Fig 3	Follows Xcel 23.5 kV transmission line right-of-way just west of MN Highway 9, south for 5.0 miles, crossing the Buffalo River and US Highway 10.
1-3	0.15	Roadway (100%)	Fig 3	Follows MN Highway 9 right-of-way south for 0.2 miles to the intersection of the line and the Burlington North railway.
1-4	0.15	Roadway (100%)	Fig 3	Follows the MN Highway 9 right-of-way south for 0.15 miles. Segment 1-4 will be bored beneath the Burlington Northern railway.
1-5	3.70	Road way (100%)	Fig 4	Follows the MN Highway 9 right-of-way south for 3.7 miles to the point of interconnection with the Sheyenne-Audubon 230 kV transmission line located on the north side of 50th Avenue South (Highway 12).

3.2.2 Route 2

The Applicant is requesting that the PUC consider Route 2 for a route permit, as described below and shown in detailed route maps in Appendix A and on overview map Figure 1. The Applicant requests that a 9.9-mile route be approved for Route 2 that has, on average, a 150-foot width from the centerline of the designated route (a total corridor width of 300 feet). This will give Noble reasonable flexibility in locating the transmission line. This 300-foot width has been identified on the segment maps in Appendices A. Typical right-of-way for a 230 kV transmission line would be 62.5 feet on either side of the project centerline, but actual right-of-way acquired from landowners for the Proposed Project may vary depending upon where the line is located.

Route 2 generally follows the former Burlington North railroad right-of-way from the Noble Flat Hill Windpark I substation, through the town of Glyndon, Minnesota, to the existing OTP Sheyenne-Audubon 230 kV transmission line located on the north side of 50th Avenue South (Highway 12) southeast of Glyndon, Minnesota. Route 2 includes the following segments, which are described in Table 3-2 below from north to south: 2-1, 2-2, and 2-3.

Table 3-2
Route 2 Segments

Segment ID	Length (Miles)	Associated Right-of-Way (% of segment)	Figure	Description
2-1	4.1	Railway & Roadway (23%) New Corridor (77%)	Fig 5	Begins as the Noble Flat Hill Windpark I project substation – line runs southwest following the former Burlington Northern railroad right-of-way for 2.0 miles where it meets and runs parallel to 110th Street North (CR-93) for 2.1 miles, crossing the Buffalo River, to where it crosses 15th Avenue N (CR85).
2-2	3.6	Railway & Roadway (64%) New Corridor (36%)	Fig 6	From the crossing of 15th Avenue N (CR85) it follows the former Burlington Northern railroad right-of-way south for approximately 1.0 mile, through the western edge of the town of Glyndon, crossing US Highway 10. It then runs for approximately 0.7 miles along the existing Burlington Northern railroad right-of-way which turns east out of Glyndon. It then runs cross-country for approximate 0.3 miles until it reaches the intersection of 7th Street SE and 110th Street S (CR71). It then runs south paralleling the 110th Street S (CR71) right-of-way for approximately 1.6 miles to where it intersects the former Burlington Northern railroad right-of-way.
2-3	2.2	Railway (84%) New Corridor (16%)	Fig 7	Follows the former Burlington Northern railroad right-of-way southeast for 2.2 miles to the point of interconnection with the Sheyenne-Audubon 230 kV transmission line located on the north side of 50th Avenue South (Highway 12).

3.3 Proposed Substation Description

The new project substation within the Noble Flat Hill Windpark I in Clay County, Minnesota would occupy approximately 2.5 acres in the southwest corner of a ten-acre parcel currently used by Daniel and Sandra Skolness for agricultural purposes. The 230/34.5 kV substation will be designed to accommodate the incoming 34.5 kV collector lines and the outgoing 230 kV line. The parcel would be acquired by Noble for the facility.

The substation would include the following components:

- Two 125 MVA 230/34.5 kV transformers;
- Control house for the substation control, relaying and communications equipment;
- Concrete foundations to support the control house and electrical equipment
- Crushed rock for surfacing on the portion of the site not occupied by equipment or structures;
- Fencing around the facility, to restrict public access.

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

4.1 Transmission Structures

The Applicant proposes to construct single-circuit portions of the transmission line using predominantly H-frame 230 kV structures embedded in a 24-inch to 36-inch diameter holes augured to a depth of approximately 10 to 15 feet. The H-frame's poles would be set approximately 20 feet apart in the augured holes, which would then be backfilled with native soils or granular material.

H-frame structures are suitable for single-circuit construction in areas requiring longer spans to avoid or minimize the placement of structures in wetlands or waterways. Each H-frame would range in height from approximately 70 to 90 feet and be placed approximately 600 to 1,000 feet apart. Corner structures would either be on reinforced concrete drilled shaft foundations or would be direct embedded with guy wires, depending on soil types and route angles. Either single or multiple pole structures may be utilized as angle structures.

The Applicant proposes to use single-pole self-supporting structures set on reinforced concrete drilled shaft foundations for double-circuit portions of the transmission line. Single-pole self-supporting structures may also be used for single-circuit portions of the transmission line in areas where the available width of the right-of-way is limited by existing infrastructure or development. The height of single-pole single-circuit structures would range from approximately 80 to 100 feet, with the span between structures approximately 300 to 600 feet apart. Double-circuit single pole structures would range in height from approximately 95 to 115 feet with the span between structures approximately 350 to 700 feet.

Graphics depicting the likely structures to be used for the Proposed Project are included in Appendix B. Graphic 4-1 illustrates the typical 230 kV H-frame structures being considered for the route alternatives. Graphic 4-2 illustrates the typical 230 kV single-pole structure. Graphic 4-3 illustrates a conceptual design for a 230/23.5 kV single-pole double-circuit structure.

General construction procedures are discussed in Section 4.4. However, final decisions on structure types, locations, and construction methodology would not be made until final design.

For each phase of the 230 kV circuit, the Applicant proposes 795 thousand circular mil (KCmil) ACSR. The Applicant proposes to use 3/8-inch diameter extra high strength steel (EHS) and fiber optic ground wire (OPGW) for the shield wires. Conductor size and shield wire selection are subject to change pending completion of additional electrical optimization studies. The typical right-of-way for a 230 kV line is 125 feet wide.

Table 4-1 summarizes the potential structure design for the line:

Table 4-1
Structure Design Summary

Line Voltage	Structure Type	Pole Type	Conductor	Foundation	Double Circuit/Single Circuit	Average Span (feet)	Average Height (feet)
230 kV	H-Frame	Wood	795 ACSR	Direct Embedded or Concrete Foundation	Single	600	80
230 kV	Single-Pole	Wood	795 ACSR	Concrete Foundation	Single	400	90
230 kV	Single-Pole	Steel	795 ACSR	Concrete Foundation	Double	400	105

The proposed transmission line will be designed to meet or surpass all relevant local and state codes and North American Electric Reliability Council (NERC) standards. Appropriate standards will be met for construction and installation, and all applicable safety procedures will be followed during and after installation.

4.1.1 Design Options

There are no future design accommodations being made for this transmission line or substation.

4.2 Existing Utility and Other Public Rights-of-Way

As part of the route selection process discussed in more detail in Section 3.1, the use of existing utility and public rights-of-way is considered to help decrease impacts of the new line. This gives the Applicant the ability to reduce the width of new right-of-way required by using a part or sharing the entire existing corridor.

Route 1 will utilize existing utility and public right-of-way for the entire length of the route (11.4 miles). The majority of the right-of-way that is shared is along MN Highway 9. In addition to MN Highway 9, a portion of this route also shares right-of-way with an existing 80-foot wide right-of-way for a 23.5 kV transmission line, and the remainder of the transmission line shares right-of-way with a county/township road. Graphic 4-1 illustrates the typical 230 kV H-frame structures being considered for the route alternatives. Graphic 4-2 illustrates the typical 230 kV single-pole structure. Graphic 4-3 illustrates a conceptual design for a 230/23.5 kV single-pole double-circuit structure. When possible, the structures will be placed within, or immediately outside of the existing road or utility line right-of-way, with additional right-of-way acquired on private land beyond the current right-of-way boundary where it is necessary. Typical right-of-way for a 230 kV transmission line would be 62.5 feet on either side of the project centerline, but actual right-of-way acquired from landowners for the Proposed Project may vary depending upon where the line is located.

Route 2 shares existing utility and public rights-of-way for approximately 51 percent of the entire 9.9-mile length. The majority of the proposed shared right-of-way for this project is with the former Burlington Northern railroad right-of-way. This route will also share right-of-way with a county/township road. Approximately 4.8 miles of new ROW that does not parallel existing facilities will be needed for Route 2. When possible, the structures will be placed within, or immediately outside of the existing railroad or road right-of-way, with additional right-of-way acquired on private land beyond the current right-of-way boundary where it is necessary. Typical right-of-way for a 230 kV transmission line would be 62.5 feet on either side of the project centerline, but actual right-of-way acquired from landowners for the Proposed Project may vary depending upon where the line is located. Table 4-2 summarizes the corridor sharing along the Route 1 and Route 2.

Table 4-2
Summary of Utility and Public Right-of-Way Corridor Sharing

Route	Length (miles)	Existing Transmission right-of-way (miles)	Railroad right-of-way (miles)	Highway right-of-way (miles)	County/Township Road right-of-way (miles)	No Corridor Sharing (miles)
Route 1	11.4	5.0	0	4.05	2.35	0
Route 2	9.9	0	3.5	0	1.6	4.8

4.3 Rights-of-Way Acquisition

The project substation within the Noble Flat Hill Windpark I would occupy approximately 2.5 acres in the southwest corner of a ten-acre parcel currently used by Daniel and Sandra Skolness for agricultural purposes. The parcel – located in the Southeast quarter of Section 12, Township140 North, Range 47 West in Clay County – would be acquired by Noble for the facility. The land adjoins 70th Avenue North.

The new switching station for the Proposed Project would be located at one of two alternative locations, based on the final determine route. Following Route 1, the switching station would occupy six acres of a ten-acre private property on 50th Avenue South (Highway 12) and MN Highway 9, southeast of Glyndon, Minnesota. The parcel is currently used by Ronald and John Bekkerus for agricultural purposes. The parcel would be acquired by Noble for the facility and would contain the proposed interconnection point to the OTP Sheyenne-Audubon line. Following Route 2, the switching station would occupy six acres of a ten-acre private property east of 120th Street South (CR-72) on 50th Avenue South (Highway 12), southeast of Glyndon, Minnesota. The parcel is currently used by Ardis Johnson for agricultural purposes. The switching station parcel would be acquired by Noble for the facility and would contain the proposed interconnection point to the OTP Sheyenne-Audubon line.

Route 1 (Applicant's Preferred Route)

The proposed Route 1 corridor as described in Section 3.2.1 is located in or adjacent to existing roadway areas, resulting in minimal right-of-way impacts that would not affect existing or future use of adjacent parcels. Where possible, the transmission line structures will be constructed within the existing road right-of-way avoiding the need to create new right-of-way for the transmission line. The Applicant will continue to collaborate with the County and State road authorities to facilitate usage of the existing road right-of-way.

In addition, easements of approximately ½-mile wide have been acquired along approximately seven miles of the proposed route. These easements would allow for new right-of-way to be established on land adjacent to the existing road right-of-way to accommodate overhang from structures within the road right-of-way, or to allow structures to be placed on private land if construction within the road right-of-way is infeasible or not supported by the respective road authority. Typical right-of-way for a 230 kV transmission line would be 62.5 feet on either side of the project centerline, but the actual width of new right-of-way will be determined once the final route for the Proposed Project is decided. As part of the acquisition/coordination process, affected property owners will be notified of the construction schedule, site access requirements and vegetation clearing (and maintenance) requirements for construction and maintenance of the line.

The route will also utilize an existing 80-foot wide Xcel Energy utility line right-of-way along an approximately five mile long segment of MN Highway 9, as discussed in Section 2.5 and Section 3.2.1.

A 50-foot wide by 100-foot long easement would also be acquired from Burlington Northern Railroad to accommodate burying the new 230 kV line and boring beneath the existing railroad bed located south of Highway 10.

There would be overhang easements across US Highway 10; across MN Highway 9; and across County roads 120th Street North (CR-19), 130th Street North (CR-92), 70th Avenue North (CR-93), 57th Avenue North (CR-91), 12th Avenue South (CR-72), 17th Avenue South, and 40th Avenue South.

Route 2

The proposed Route 2 corridor is located mainly along a former railroad bed and 150-foot wide railroad right-of-way. Where possible, this existing right-of-way would be utilized. However, portions of the former railroad right-of-way have been sold to adjacent landowners, and the therefore this is no longer an intact corridor. New right-of-way would need to be created to accommodate this route along portions of the former railroad, which could affect existing or future use of adjacent parcels. Upon permit approval and final determination of the route, the Applicant will initiate contact with landowners along Route 2 to negotiate acquisition. Where new right-of-way is necessary, the Applicant would seek easements from private landowners to accommodate the transmission structures. Typical right-of-way for a 230 kV transmission line would be 62.5 feet on either side of the project centerline, but the actual width of new right-of-way will be determined once the final route for the Proposed Project is decided. As part of the acquisition/coordination process, affected property owners will be notified of the construction schedule, site access requirements and vegetation clearing (and maintenance) requirements for construction and maintenance of the line.

There would be an overhang easement across US Highway 10; and across County roads 70th Avenue North (CR-93), 57th Avenue North (CR-91), 28th Avenue North (CR-18), 18th Avenue North, 15th Avenue North (CR-85), 12th Avenue South (CR-72), 28th Avenue South (CR-79), 110th Street South (CR-71), and 120th Street South (CR-72).

Appendix D provides a list of all property owners adjacent to the proposed routes. These property owners will be notified of the proposed routes, as required by Minn Rules 7849.5220, subp.2 (g) and Minn. Rules 7849.5240, subp.2.C.

4.4 Construction, Restoration, and Maintenance Methods

4.4.1 Transmission Line

Construction is planned to begin once the acquired approvals are obtained and easement acquisition is completed. A detailed construction schedule will be developed based upon availability of crews, outage restrictions for lines that may be affected, weather conditions, and any restrictions placed on certain areas for minimizing permanent impacts from construction.

Prior to initiating construction, the Applicant will advise affected property owners of the construction schedule, needed access to the site, and any vegetation clearing required for the Proposed Project. Once access to the land is granted, preparation of the right-of-way for construction begins in coordination with landowners. Underground utilities would be identified and located in cooperation with local utility companies to minimize conflicts to the existing utilities along the route. The right-of-way will be cleared of the amount of vegetation necessary to construct, operate and maintain the proposed transmission route, consistent with standard vegetation management guidelines. Generally, these guidelines require removal of existing vegetation with a mature height of greater than 25 feet from within the area 25 feet either side of the centerline of transmission poles, but the amount of clearing may vary depending upon the ultimate structure type used for the transmission line.

Efforts will be made to stage construction within the right-of-way areas and in previously-disturbed areas, to the extent possible. If additional areas are needed temporarily for construction, temporary easements would be obtained from affected landowners.

Construction methods and practices utilized during line installation will be consistent with local utility, as well as local, state, NESC and Noble standards for line construction, setbacks, erosion control, etc. During construction, efforts will be made to limit vegetation removal and ground disturbance, to minimize erosion and runoff. Temporary silt fence, sedimentation ponds, and other measures may be utilized to prevent sediment from running off into wetlands or other surface waters.

Restoration of the route corridor following construction will include restoration of vegetative cover and installation of permanent erosion control measures, if needed. Permanent soil erosion control measures may include permanent seeding, mulching, erosion control mats, or other measures depending on site conditions. Current land use along each of the propose line route segments are rural or agricultural in nature. Therefore woody vegetation for landscaping will not be needed. Revegetation along agricultural segments will be performed by the farmer (landowner or renter) as part of seasonal field tillage and crop planting. Construction debris will be removed, and all temporary construction facilities will be removed.

A stable working surface is required at structure locations. Timber mats are commonly used to provide a working surface in unstable soils. Structures are normally assembled on the ground along with insulator assemblies and single-leader p-line ropes and then raised into position. For direct embedment type structures, the poles are set in augured holes with large rubber-tired or tracked cranes. The annular space between the pole and the augured hole is backfilled with native soils if suitable or with granular materials.

Where reinforced concrete foundations are required, large rubber tired or track mounted auger equipment is used to excavate a circular hole of the appropriate diameter and depth. In upland areas, excavated material would be spread evenly around the structure base to promote site drainage. Reinforcing steel and anchor bolts are set in position. Ready-mixed concrete is then placed in the excavation. In wetland areas, a telescoping temporary steel caisson would be placed in the foundation hole to stabilize the soil walls. Concrete is placed in the excavation using the tremie method. Water pumped from the excavation would be discharge into a controlled or vegetated upland area. Concrete truck wash water would be discharged only in specially designated upland disposal areas or at the concrete batch plant.

After the concrete is poured, the steel caisson is removed. In some situations, a permanent caisson may be required to stabilize the excavation. During drilling, a minimal amount of granular material (from an outside source) would be placed in the area between the caissons and the timber mats (if required at that location) to provide safe footing for construction personnel. During final restoration, the granular material is leveled or removed to restore the original ground contours for re-vegetation of native species. After the foundation concrete is placed, excess excavated materials would be transported to a suitable upland site by truck for disposal. After allowing adequate curing time, the steel pole structure base plates are bolted to the concrete foundations.

The wire stringing process starts in a setup area prepared to accommodate the stringing equipment and materials, normally located mid-span on the centerline of the right-of-way. The rope machine, new conductor wire trailers, and tensioner are located at the wire stringing set-up area. This phase of construction occurs after the structures have been erected, and fitted with stringing blocks (also called dollies or sheaves) and with single-leader “p-line” ropes that reach the ground. Stringing blocks are a type of pulley that attaches to the insulator assembly and temporarily support a pulling rope or “p-line” and a wire rope or “hard line,” which in turn supports the conductor before it is permanently “clipped in.”

The process starts as the construction crew pulls the p-lines toward the first structure beyond the setup area. The p-lines are normally pulled down the right-of-way with a small wide-track bombardier or other small equipment. At each structure, the ropes are detached from the bombardier and attached to the single leader p-line to lift the ropes up into the dollies. Then the ropes are reattached to the bombardier and driven to the next structure for the same process. After the p-line has been strung through all the structures for all phases within the stringing interval, the pulling ropes are attached to a hard line and pulled, one at a time, back through the dollies to the beginning of the interval. A hard line set-up is located at the opposite end of the interval from the wire stringing setup area. Each hard line is then attached to the conductor wire with an attachment called a "sock," which is pulled back through the dollies to the end of the interval. Crewmembers travel along the access route in a pickup truck, follow the "sock" as it is being pulled to make sure it does not get hung up in the dollies. One at a time, the conductor wires are then pulled to the appropriate tension and clipped into place utilizing permanent suspension hardware. Wire stringing and hard line setup areas are normally located in upland areas during spring, summer or fall conditions. During winter when frozen conditions provide a stable working surface, set-ups may be located in wetland areas. If set-ups in wetlands are required when surface conditions are not stable, extensive use of timber matting is required.

The most effective means to minimize impacts to water areas during construction is to span streams and rivers by placing structures above the normal high water level. In general, construction equipment is permitted to be driven across waterways except under special circumstances. If such circumstances occur, discussions with the appropriate resource agency will be pursued. Where waterways must be crossed by construction equipment the Applicants would use temporary wood mats and culverts to minimize the impact on the waterway. For those waterways which cannot be crossed with construction equipment, workers might walk across or use boats during wire stringing operations to pull in the new conductors and shield wires or in the winter drive equipment across the ice. In areas where construction occurs close to waterways, appropriate measures would be employed to minimize soil erosion and prevent sedimentation of the waterways. The applicants would ensure that equipment fueling and lubricating occur at a reasonable distance from the waterways.

Maintenance of the line would require access to the transmission line's right-of-way to perform periodic inspections, conduct maintenance, and repair damage. Regular maintenance and inspections would be performed during the life of the transmission line to ensure its continued integrity. Inspections would be limited to the right-of-way and to areas where obstructions or terrain may require off-right-of-way access. If problems are found during inspection, repairs would be performed and the landowner would be compensated for any loss.

The right-of-way would be managed to control vegetation that interferes with the operation and maintenance of the transmission line. Portions of the Proposed Project route would be in wooded areas, requiring tree maintenance to maintain the integrity of the transmission line. Native shrubs that would not interfere with the safe operation of the transmission line would be allowed to reestablish in the right-of-way. The Applicant would implement a standard practice of inspecting the transmission line on a two-year cycle to determine if clearing is required. Right-of-way clearing practices include a combination of mechanical and hand clearing, along with herbicide application where allowed, to remove or control vegetation growth. Noxious weed control with herbicides would be conducted on a two-year cycle around structures and anchors, where approved for use.

4.4.2 Substation

A ten-acre parcel has been identified for the Noble Flat Hill Windpark I substation as described in Section 3.3 and Section 4.3. The Applicant has entered into preliminary negotiations to purchase the identified parcel – located in the Southeast quarter of Section 12, Township140 North, Range 47 West in Clay County. However, once the PUC issues a permit, Noble will contact the owner of the site to discuss the Proposed Project in detail and enter into a purchase agreement for the parcel.

During the substation construction phase, any affected property owners will be advised as to the construction schedules or needed access to the site. To construct, operate and maintain the proposed substation, all vegetation will be cleared from the substation footprint area, from the substation driveway area, from additional identified lay-down areas, and from a buffer area of 15 feet outside the substation fence. Vegetation on the property outside of the substation footprint, driveway, lay-down, and buffer will be left undisturbed, except where it must be impacted to allow for transmission line access to the substation.

Construction will begin once the final design is complete and any necessary property is acquired. A detailed construction schedule will be developed based upon availability of crews, weather conditions, spring load restrictions on roads, and any restrictions placed on certain areas for minimizing permanent impacts from construction. Approximately 10 acres of land will be disturbed to construct the Noble Flat Hill Windpark I substation. Once the site is graded, a perimeter fence will be installed to secure the site and concrete foundations will be poured to support the substation equipment and control house. At that point, erection of the control house and substation equipment would commence. The Applicant provides erosion control methods to be implemented to minimize runoff during substation construction and since the project will impact more than one acre, a NPDES permit will be acquired. Noble construction crews or a Noble contractor will comply with local, state, and NESC standards regarding clearance to ground, clearance to crossing utilities, clearance to buildings, right-of-way widths, erection of power poles and stringing of transmission line conductors. Additionally, a Stormwater Pollution Prevention Plan (SWPPP) will be implemented incompliance with the National Pollutant Discharge Elimination System (NPDES).

Upon completion of construction activities, the Applicant will restore the remainder of the site. Post-construction reclamation activities include the removing and disposing of debris, dismantling all temporary facilities (including staging areas), employing appropriate erosion control measures and reseeding areas disturbed by construction activities with vegetation similar to that which was removed.

The Applicant will perform periodic inspections, maintain equipment, and make repairs over the life of the substation. Noble will also conduct routine maintenance as required to remove undesired vegetation that may interfere with the safe and reliable operation of the substation.

4.5 Electric and Magnetic Field (EMF)

4.5.1 Electric Fields

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

The intensity of electric fields is associated with the voltage of the line and is measured in kilovolts per meter (kV/M). Power line electric fields near ground are designated by the difference in voltage between two points (usually one meter). Table 4-3 provides the electric fields at maximum conductor voltage for the

proposed 230 kV transmission line. Maximum conductor voltage is defined as the nominal voltage plus five percent.

The proposed 230 kV transmission line will have a maximum magnitude of electric field density of approximately 4.66 kV/M underneath the conductors one meter above ground level. This is significantly less than the maximum limit of 8 kV/M that has been a permit condition imposed by the Minnesota EQB under the authority that it previously held in other HVTL applications. The Minnesota EQB standard was designed to prevent serious hazard from shocks when touching large objects, such as tractors, parked under extra high voltage transmission lines of 500 kV or greater. Therefore, the Project would not have direct or indirect effects associated with electric fields.

Figures 9, 10, 11, and 12, and Table 4.5-1 and Table 4.5-2 in Appendix B show the EMF calculations for a typical 230 kV H-Frame structure and single-pole structure.

4.5.2 Magnetic Fields

Current passing through any conductive material, including a wire, produces a magnetic field in the area around that material. The magnetic field associated with a HVTL surrounds the conductor and decreases rapidly with increasing distance from the conductor. The magnetic field is expressed in units of magnetic flux density, expressed as gauss (G).

The Proposed Project would have a peak magnitude of magnetic field density of approximately 335 milligaus (mG) underneath the conductors. The magnetic field densities drop to less than 50 mG within 80 feet of the center line of the transmission structure. The predictions were calculated using the line amperage maximum capacities. This conservatively over-predicts the magnetic fields that would be generated under normal operation. According to the EPA, these densities represent smaller magnetic fields than those associated with many household appliances. Therefore, the Proposed Project would not have direct or indirect effects associated with magnetic fields.

The question of whether exposure to power-frequency (60 Hertz) magnetic fields can cause biological responses or even health effects has been the subject of considerable research for the past three decades. The most recent and exhaustive reviews of the health effects from power-frequency fields conclude that the evidence of health risk is weak. The National Institute of Environmental Health Sciences (NIEHS) issued its final report, "NIEHS Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields", on June 15, 1999, following six years of intensive research. NIEHS concluded that there is little scientific evidence correlating extra low frequency electric and magnetic field (EMF) exposures with health risk.

The Minnesota Environmental Quality Board (EQB) under the authority that it previously held has addressed the matter of EMF with respect to new transmission lines in a number of separate dockets. See e.g., Docket Nos. 03-64-TR-Xcel (the Lakefield 161 kV transmission line); 03-73-TR-Xcel (the Buffalo Ridge 345 kV transmission line); 04-84-Tr-Xcel (the Buffalo to White 115 kV transmission line); and 04-81-TR-Air Lake-Empire (a 115 kV transmission line in Dakota County). The findings of the EQB and the discussion in the Environmental Assessments prepared on each of those projects are pertinent to this issue with respect to this Proposed Project. Documents from those matters are available on the PUC webpage.

In Docket No. 03-73-TR-Xcel for the Buffalo Ridge 345 kV transmission line, the EQB made the following findings with regard to EMF:

> *118. No significant impacts on human health and safety are anticipated from the project. There is at present insufficient evidence to demonstrate a cause and effect relationship between EMF exposure and any adverse health effects. The EQB has not established limits on magnetic field exposure and there are no Federal or Minnesota health-based exposure standards for magnetic fields. There is uncertainty; however, concerning long-term health impacts, and the Minnesota Department of Health, the EQB and Xcel all recommend a "prudent avoidance" policy in which exposure is minimized.*
>
> *119. In previous routing proceedings, the EQB has imposed a permit condition on HVTL permits limiting electric field exposure to 8 kV/m at one meter above ground. This permit condition was designed to prevent serious hazard from shocks when touching large objects, such as semi trailers or large farm equipment under extra high voltage transmission lines of 500 kV or greater. Predicted electric field densities are less than half of the 8 kV/m permit condition for both the 345 kV transmission line and the 115 kV transmission line.*

While the general consensus is that electric fields pose no risk to humans, the question of whether exposure to magnetic fields potentially can cause biological responses or even health effects continues to be the subject of research and debate.

4.5.3 Stray Voltage

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

Stray voltage has been raised as a concern on some dairy farms because it can impact operations and milk production. Problems are usually related to the distribution and service lines directly serving the farm or the wiring on a farm. In those instances when transmission lines have been shown to contribute to stray voltage, the electric distribution system directly serving the farm or the wiring on a farm was directly under and parallel to the transmission line. These circumstances are considered in installing transmission lines and can be readily mitigated. Appropriate measures will be taken to prevent stray voltage problems when the Proposed Project parallels or crosses distribution lines.

4.6 Estimated Project Costs

The Applicant completed a preliminary cost estimate for both proposed route alternatives of the project to estimate what the transmission line, substation, and switching station will cost for the two alternatives. The total project costs for Route 1 are approximately $16.8 million. The total project costs for Route 2 are approximately $14.3 million. The estimated costs of each facility for each route are as follows:

Route 1	
230 kV Transmission Line	$4,800,000
Rebuild and double circuit with Xcel Energy line (~5 miles)	$2,500,000
Noble Flat Hill Windpark I Substation	$3,800,000
Switching Station	$5,700,000
Total Project Costs:	$16,800,000

Route 2	
230 kV Transmission Line	$4,800,000
Noble Flat Hill Windpark I Substation	$3,800,000
Switching Station	$5,700,000
Total Project Costs:	$14,300,000

4.7 List of Permits

Table 4-4 summarizes the federal, state and local permits that may need to be obtained prior to construction of the proposed transmission line and substation facilities.

4.7.1 Federal Permits

Section 404 Permit/Preconstruction Notification
U.S. Army Corps of Engineers (USACE) regulates discharges of dredged or fill material into waters of the United States under Section 404 of the Clean Water Act, 33 U.S.C. § 1344. The Applicants would apply for these permits as necessary once a route for the Proposed Project is determined. Activities required for the construction, maintenance, repair, and removal of utility lines and associated facilities would be covered under USACE St. Paul District Regional General Permit (RGP-03-MN) under part G – Structural Discharges.

Permit to Cross Federal Aid Highway
Transmission line crossings of a federal highway require a use and occupancy agreement under 23 CFR §645.213. The Applicant will work with the Minnesota Department of Transportation (MNDOT) (responsible for administering the agreements) to obtain the required approvals.

4.7.2 State Permits

Minnesota Public Utilities Commission (PUC)
As described in Sections 1.0 and 2.0, the Minnesota PUC regulates transmission line construction in Minnesota. The PUC determines whether there is a need for a transmission line through its Certificate of Need process. The PUC determines the route and any conditions on the construction, operation, and maintenance of the transmission line through its route permitting process.

Certificate of Need
The Proposed Project is a "large energy facility," as defined by Minn. Stat. § 216B.2421, Subd. 2(1) (2008). The proposed 230 kV transmission line that is the subject of this application is a generator outlet necessary to interconnect the wind farm with existing transmission facilities owned by OTP. Accordingly, consistent with the definition of a "large energy facility" under Minn. Stat. § 216B.2421 Subd. 2(1), a separate Certificate of Need is not required for the transmission line, as the line is "directly associated with the plant that are necessary to interconnect the plant to the transmission system." In this respect, Noble filed a Petition with the PUC on August 13, 2008, requesting confirmation of this fact in Docket No. IP-6687/CN-08-951, which remains pending. A copy of the petition is included in Appendix C.

Pursuant to Minn. Stat. § 216B.243, subd. 2 and Minn. R. Part 7849.0200, Subp. 6, the Applicant filed a Petition for Exemption from Certain Certificate of Need Filing Requirements for the Noble Flat Hill Windpark I with the PUC on August 8, 2008, in Docket No. IP-6687/CN-08-951. A copy of the petition is included in Appendix C. A Certificate of Need application will be filed with the PUC after the passage of 45 days from the filing of the petition.

Route Permit

Minn. Stat. § 216E.03, subd. 2, provides that "[n]o person may construct a high voltage transmission line without a Route Permit from the commission. A high voltage transmission line may be constructed only along a route approved by the Commission." A high voltage transmission line is any transmission line "designed for and capable of operation at a nominal voltage of 100 kilovolts or more…" (Minn. Stat. § 216E.01, subd. 4; Minn. R. 7849.5010, subp. 9). The Proposed Project is a 230 kV line that would be approximately 11 miles long, and therefore a Route Permit from the PUC is required.

Upon filing, the applications will be reviewed by the commission for completeness. Minn. R. 7849.0200, subp. 5 and 7849.5230, subp. 1. Within 60 days of the commission finding the applications to be complete, it will hold a public meeting on the Route Permit. The purpose of the meetings is to obtain public opinion on 1) alternative transmission routes; and 2) the appropriate scope of the EIS that the Department of Commerce will prepare. Minn. R. 7849.5260, subp. 1 and 7849.5300, subps.2-3.

An ALJ would also hold a contested case hearing on the Route Permit application, during which interested persons can submit evidence supporting or challenging the Project as proposed. The Certificate of Need application for the Facility may proceed through an informal hearing procedure or a more formal contested case procedure if such a procedure is warranted. If the Certificate of Need proceeds through a more formal contested case process, a joint hearing on routing and need may be held. Upon closing the record for the contested case, the ALJ will submit a report and recommendation to the PUC on the applications (Minn. Stat. §§ 216B.243, subd.4 and 2l6E.03, subd.6; Minn. R. 7849.0230, subp.2 and 7849.5330). The PUC will consider the ALJ's report and recommendation in reaching its determination whether to grant the applications with or without modifications, or deny them. Minn. R. 7849.5340.

Site Permit

The Noble Flat Hill Windpark I is a Large Wind Energy Conversion System (LWECS), as defined in the Wind Siting Act, Minn. Stat. § 216F.01. Minn. Stat. § 216F.04, provides that "[n]o person may construct a LWECS without a Site Permit from the commission." A large electric power generating plant may be constructed only on a site approved by the commission. Minn. R. 7849.5040, subp. 1. "A 'LWECS' means any combination of WECS with a combined nameplate capacity of 5,000 kilowatts or more." Minn. Stat. § 216F.01, subp. 2. The Noble Flat Hill Windpark I that is associated with the Proposed Project transmission line will have a nameplate capacity of 201 MW, and therefore a Site Permit from the Commission is required.

Utility Permit

A permit from the MNDOT is required for construction, placement, or maintenance of utility lines that occur adjacent or across the highway right-of-way. These permits will be acquired once the line design is completed.

National Pollutant Discharge Elimination System (NPDES)

The Minnesota Pollution Control Agency (MPCA) requires that a NPDES Storm Water Permit for construction activities be obtained for construction projects that disturb greater than one acre of land surface (Minn. R. 7090.0030). The Proposed Project would qualify for a General Permit under this program. Permit application submittals include submittal of a SWPPP that incorporates Best Management Practices (BMPs) to minimize discharge of pollutants from areas disturbed by construction**.** The transmission line will not cause impacts to surface water quality once it is operational.

License to Cross Public Waters

The Minnesota Department of Natural Resources (MDNR) Division of Lands and Minerals regulates utility crossings over, under or across any state land or Public Water identified on the Public Waters and Wetlands

Maps. A license to cross Public Waters is required under Minn. State 84.425 and Minn. Rules Chapter 6135. Both route alternatives cross the Buffalo River and would require a public water crossing license.

Wetland Conservation Act Approval
The Minnesota Board of Water and Soil Resources administers the state Wetland Conservation Act pursuant to Minn. R. ch. 8420 with the aid of the designated local government unit (LGU). In the Proposed Project the LGU is the Clay County Soil and Water Conservation District. The Proposed Project may require a permit under these rules if permanent impacts to wetlands are anticipated because of construction. The Applicant would apply for this permit (which is applied for jointly with a Section 404 permit from USACE) as necessary.

4.7.3 Local Permits

The following local permits may be required prior to beginning construction of the Proposed Project:

Buffalo Red River Watershed District
The Proposed Project may require consultation with and a permit from the watershed district if impacts to surface water drainage are anticipated because of construction.

Road Crossing/Right-of-Way Permits
These permits may be required to cross or occupy county, township, and city road rights-of-way.

Building Permits
These permits may be required by the local jurisdictions for substation modifications and construction.

Over-width Load Permits
These permits may be required to move over-width or heavy loads on county, township, or city roads.

Driveway Access Permits
These permits may be required to construct access roads or driveways from county, township, or city roads.

Table 4-4
List of Potential Required Permits

Permit Description	Jurisdiction
Section 404 Permit/Preconstruction Notification	USACE
Permit to Cross Federal Aid Highway (US Hwy 10)	MNDOT
Certificate of Need	Minnesota PUC
Route Permit (Full Process)	Minnesota PUC
Site Permit	Minnesota PUC
Utility Permit	MNDOT
NPDES Storm Water Permit	MPCA
License to Cross Public Waters	MDNR Division of Lands and Minerals
Wetland Conservation Act Approval	Clay County Soil and Water Conservation District
Wetland	Buffalo Red River Watershed District
Construction	
Road Crossing Permit	Township, County
Road Right-of-Way Use Permit	Township, County
Building Permits	Township, County
Over-width Road Permit	Township, County
Driveway Access Permits	Township, County

5.0 ENVIRONMENTAL INFORMATION

Section 5.1 and Section 5.2 (and the corresponding subsections) provide a detailed description of the environmental setting, human settlement, land-based economies, archaeological and historic resources, natural environment, and rare and unique natural resources for the Proposed Project area as they pertain to Route 1 and Route 2, respectively. Due to the proximity of the two proposed routes, much of the information included in this section is similar for both the Route 1 and Route 2 corridors. Where applicable, a detailed description is provided in Section 5.1 and later referenced in Section 5.2 to avoid large duplications of identical information. Summaries of the impacts and proposed mitigation efforts for the Proposed Project are included at the end of each subsection for both routes.

5.1 Route 1 Environmental Information (Applicant's Preferred Route)

5.1.1 Environmental Setting

The Proposed Project area is situated within the Red River Prairie Subsection, which covers 3,985,620 acres (6,173 square miles) in northwestern Minnesota, representing approximately 7 percent of Minnesota. The western boundary of this subsection is formed by the Red River. The eastern boundary follows the eastern limits of continuous tall grass prairie vegetation at the time of Euro-American settlement. Portions of a till plane are included. The southern boundary follows the southern end of the till plain and the Glacial Lake Agassiz basin.

The majority of the Red River Prairie Subsection is a glacial lake plain with silty, sandy, and clayey lacustrine deposits. It is level, uniform, and featureless, broken only by wetlands, meandering waterways, and old beach ridges. Drainage is to the north via the Red River and its tributaries. The major landform is a large lake plain (Glacial Lake Agassiz). Minor landforms include till plain, beach ridges, sand dunes, and water-reworked till. The greatest depth of lake laid sediments is present along the Red River, which forms the western boundary. Lacustrine origin sediments thin to the east, where glacial till was leveled and reworked with little deposit of lacustrine sediments. Topography is level to gently rolling. There is some steeper topography along drainages and adjacent to Lake Traverse.

The most important land use in this area is agriculture. Due to the extensive agricultural use in the area, the lake plain has been intensively ditched. Some native flora persists in small fragments (in some moderate size) east of the beach ridges and in the interbeach zone. Native flora consists of tallgrass prairie and wet prairie that is dominated by bluestems (*Andropogon scoparius* and *A. geradii*), Indian grass (*Sorghastrum nutans*), bluejoint grass (*Calamagrostis canadensis*), cordgrass (*Spartina pectinata*), cattails (*Typha spp.*), rushes (*Juncus spp.*), and sedges (*Carex spp.*). Narrow forested areas that consist of cottonwood (*Populus deltoids*), elm (*Ulmus spps*.) and willow (*Salix spp*.) are common along larger streams and rivers. Precipitation averages between 21 to 23 inches, with the lowest amounts at the southwestern edge of the subsection. About half of the precipitation arrives during the growing season. The growing season ranges from 111 to 136 days.

5.1.2 Human Settlement

5.1.2.1 Public Health and Safety

The Applicant will ensure that proper safeguards will be implemented for construction and operation of the facility. The Proposed Project would conform to all applicable local, state, and NESC standards regarding clearance to the ground, clearance to crossing utilities, clearance to buildings, strength of materials, and right-of-way widths. The proposed transmission line will be designed to meet or surpass all relevant local and state codes and North American Electric Reliability Council (NERC) standards. Appropriate standards will be met for construction and installation, and all applicable safety procedures will be followed during and after installation. This will include clear signage during all construction activities.

The proposed transmission line will be equipped with protective devices to safeguard the public if an accident was to occur and a structure or conductor on the transmission line was to fall to the ground. The protective devices are breakers and relays located where the line connects to the substation. This equipment will de-energize the transmission line should an event such as this occur.

5.1.2.2 Land Use

Based on 2000 US Census Bureau (2006a) data, Clay County encompasses 1,053 square miles, averaging 48.7 persons per square mile. The statewide average population density was 61.8 persons per square mile, covering 87,014 square miles. Clay County is located in west-central Minnesota, and land use in the Proposed Project area is predominately agricultural land. Other minor land uses include pasture land, wetland, mining, and forested land.

The transmission line corridor is located in a rural setting with scattered residences northeast of the town of Glyndon, and northwest of the town of Hawley. Most of Route 1 will follow MN Highway 9, running north to south. The transmission line would run through Spring Prairie Township and Riverton Township.

The majority of the transmission line will follow areas zoned "Agricultural Preservation District" (AgP-1), (Clay, 2005). "Agricultural Preservation" is intended to preserve and promote the use of land for agricultural purposes and to protect it from encroachment by non-agricultural development. A portion of the project corridor will include areas zoned "Flood Hazard Zones", these areas are related to the floodway and flood fringe associated with the Buffalo River. The Route 1 transmission line will avoid crossing through the town of Glyndon and any area zoned within Glyndon Township (see Section 3.2.1 for details on Route 1).

Spring Prairie Township and Riverton Township have adopted their own zoning ordinances in addition to the Clay County Planning and Zoning ordinances for zoning requests (Conditional Use Permits, variances, etc.). All zoning requests must be granted by both Clay County and the Township for these areas.

5.1.2.3 Landowner Displacement

Residences and businesses near the route were identified through review of high resolution aerial photographs and the Clay County Address Points database. Using GIS, the area within 150 feet on either side of the proposed route centerline (for a total corridor width 300 feet) was evaluated to identify the number of residences and businesses present. Based on this analysis there are eight residences and one business within the Route 1 corridor.

Utilizing the same review of high resolution aerial photographs and the Clay County Address Points database, none of the residences and only the one business was determined to be within 100 feet of the proposed transmission route centerline.

5.1.2.4 Noise

Noise is generally defined as unwanted or excessive sound. Some land uses are considered more sensitive to intrusive noise than others due to the type of activities typically involved at the sensitive human noise receptors. Specifically, sensitive human noise receptors normally include residences, schools, libraries, religious institutions, hospitals and nursing homes, daycare centers, and other businesses within the vicinity of the Propose Project.

Managing noise is complicated by the varied character and amount of sources in a particular area. The ambient sound pressure level in a particular region is comprised of a variety of natural and manmade sources. Sound levels are determined by small variations in air pressure, and these pressures are referenced to a logarithmic scale in the units of decibels. Human response to sound is a function of the magnitude of pressure variations and the frequency distribution of the sound energy.

Community noise levels are measured in terms of the A-weighted decibel (dBA) scale, which was developed to approximate the human ear's sensitivity to certain frequencies by emphasizing the middle frequencies and de-emphasizing lower and higher frequencies. This scale, expressed as dBA, best correlates the human response to sound and is commonly used as a descriptor for ambient sound levels. The threshold of human hearing is about 10 dBA, while noise above 140 dBA can cause damage to hearing after just one exposure. **Table 5-1** presents typical sound levels for common conditions or activities referenced to the dBA scale.

Table 5-1
Typical Sound Levels for Common Conditions and Activities

Type of Noise	Sound Level (dBA)
Rifle	163 dBA
Chainsaw; Hammer on Nail	120 dBA
Tractor	90 dBA
Construction of Wind power project	85 to 88 dBA (distance of 50 feet)
Freeway Traffic	70 dBA
Refrigerator	50 dBA
Operation of Wind power project	45 to 50 dBA (distance of 1,000 feet)
Quiet Residential Area	40 dBA
Quiet Bedroom at Night	30 dBA

Source: League for the Hard of Hearing 2006; Tipler 1991

Presently, noise in the Proposed Project area is dominated by traffic on local roads, and agricultural and equipment operations. The heaviest traveled roadway in the Proposed Project area is MN Highway 9 South. Secondary noise in the area persists from general low-density, rural neighborhoods, and farming-related activities. Ambient noise levels in the Proposed Project area are typical of noise levels experienced within a predominantly rural area.

The MPCA has a statewide noise regulation (Minn. Rule 7030.0050) which specifies daytime and nighttime noise levels that can not be exceeded by any source. These standards are consistent with speech, sleep, annoyance, and hearing conservation requirements for receivers within areas grouped according to land activities by the noise area classification (NAC). The NAC for household units (including farm houses) is identified as NAC 1. The daytime standards state that a sound level of 60 dBA may not be exceeded for more than 50 percent of the time for a one hour survey, and a sound level of 65 dBA may not be exceeded for more than 10 percent of the time for a one hour survey. The nighttime standards state that 50 dBA many not be exceeded for more than 50 percent of a one hour survey, and 55 dBA may not be exceeded for more than 10 percent of a one hour survey. **Table 5-2** presents the regulated noise levels from the State of Minnesota statutes. The L50 is the noise level exceeded for 50 percent of the time during any measurement duration, and represents the median sound level. The L10 is the sound level exceed for 10 percent of the time during any measurement duration.

Table 5-2
State of Minnesota Noise Standards [db(a)]*

Noise Area Classification (as Identified in Minn. Rule 7030.0050)	Daytime	Daytime	Nighttime	Nighttime
	L50	L10	L50	L10
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

* A-weighted decibels
Source: Minnesota Rule 7030.0040

The sources of audible noise from the proposed project would be the transmission line conductors and the substation equipment. The level of noise generated by the conductors depends on conductor conditions, voltage level, and weather conditions. In foggy, rainy, and wet conditions, transmission conductors can create a crackling sound due to the small amount of electricity ionizing the moist air near the wires (less than 50 dBA, which is below the most restrictive permissible noise level from NAC 1 (Table 5-2)). During a heavy rain general background noise is generally greater than the noise from a transmission line. During dry weather noise from the transmission line is faintly audible or inaudible (less than 20 dBA, which is comparable to the level of a whisper).

The main source of audible noise from a substation is due to the operation of the transformers. Transformers produce noise whenever they are energized, and the level of the noise depends on transformer size, voltage level, and weather conditions. Substation noise is generally minimal and nearly constant with slight variation because of operating conditions (cooling fans on or off, etc.). The Noble Flat Hill Windpark I substation and its transformers and the switching station would be designed and constructed to comply with state noise standards. The substation and switching station parcels are surrounded by rural land uses and should not have significant noise impacts on nearby receptors. No transformers are planned at the switching station; therefore, noise produced from the operation of the switching station under normal conditions would be inaudible beyond the fence line. In addition, ten acre parcels will be acquired to accommodate the 2.5 acre substation and the 6 acre switching station. The larger parcel size will also allow for buffer land between the electrical equipment and the adjacent properties.

5.1.2.5 Aesthetics

The visual setting of Route 1 is low-density, predominantly rural, consisting of an altered landscape with views ranging from scattered residences in an agricultural setting to roadways. The characteristic natural landscape of the Proposed Project area varies from flat topography to the marked elevation increases associated with the Glacial Agassiz beach ridges to the east of the Proposed Project area. Intermittent drainages enter the Proposed Project area, and some scattered wetlands are present throughout the Proposed Project area. The color of the landscape generally contains brownish-yellow fields of croplands with some wooded areas present around the Buffalo River.

Visual sensitivity is dependent on viewer attitudes, the types of activities in which people are engaged when viewing the site, and the distance from which the site will be seen. Overall, higher degrees of visual sensitivity are correlated with areas where people live, are engaged in recreational outdoor pursuits, or participate in scenic or pleasure driving. Conversely, visual sensitivity is considered low to moderate in industrial or commercial areas where the scenic quality of the environment does not affect the value of the activity.

The settlements in the Proposed Project area are primarily residences and farm buildings with some locations near the transmission corridor. Visual impacts would be greatest for those residences located nearest to the transmission corridor. Visual impacts would be greatly reduced with significant distance from the corridor. Furthermore, the proposed route will contrast the open agricultural areas and will be visible to travelers along MN Highway 9. Buffalo Ridge State Park and The Nature Conservancy land are within the vicinity of the Proposed Project area. It is possible that the transmission lines will be visible from some vantage points in these areas.

5.1.2.6 Socioeconomic Information

Population characteristics and economic data (based on U.S. Census data) for the Proposed Project area are described in this section.

Demographics
The route is located in Clay County. In 2000, Clay County had a population of 51,229; an increase of 1.6 percent from the 1990 census; and in 2006, the estimated population was 54,476, an increase of 6.3 percent from the 2000 census. Statewide, Minnesota's population in 2000 was over 4.9 million, an increase of 12.4 percent from the 1990 census; and in 2006, the estimated population was more than 5.1 million, an increase of 5 percent from the 2000 census.

Economy
According to the Bureau of Economic Analysis, Minnesota's per capita personal income (PCPI) was $38,859 in 2006. This represents 106 percent of the national average PCPI. In comparison, Clay County's PCPI was $28,312 in 2006. This represents 73 percent of the state average PCPI and 77 percent of the national average PCPI.

The economic base of Clay County consists primarily of management, professional, and related occupations (31.9 percent); sales and office occupations (27.9 percent); and educational, health, and social services (27.4 percent). In comparison, the economic base of Minnesota consists primarily of management, professional, and related occupations (35.8 percent); sales and office occupations (26.5 percent); and 20.9 percent in educational, health, and social services (US Census Bureau 2007a). The economic base of the Proposed Project area is primarily rural agricultural production.

5.1.2.7 Environmental Justice

The Proposed Project would be located in Clay County in west-central Minnesota. Minority populations and low-income populations are discussed below.

US Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 CFR 7629, 16 February 1994) directs federal agencies to "make…achieving environmental justice part of its mission" and to identify and address "…disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations." This section identifies any minority and low-income populations that may be affected by the Proposed Project.

Minority populations are persons of Hispanic or Latino origin, Blacks or African Americans, American Indians or Alaska Natives, Asians, and Native Hawaiian and other Pacific Islanders. Minority populations for 2000 are identified in **Table 5-3**. The Council on Environmental Quality (CEQ) identifies these groups as minority populations when either (1) the minority population of the affected area exceeds 50 percent or (2) the minority population percentage in the affected area is meaningfully greater than the minority population percentage in the general population or appropriate unit of geographical analysis (CEQ 1997).

As shown in **Table 5-3**, the Proposed Project is not expected to create disproportionately high or adverse human health or environmental effects on the minority population.

The two largest minority groups reported in Clay County in 2005 were persons of Hispanic or Latino origin (3.3 percent) and American Indian and Alaska Native persons (1.6 percent), followed by Asian persons (1.1 percent), persons reporting two or more races (1.1 percent), and black persons (0.7 percent). Compared to the state, Clay County has a minority population totaling 6.8 percent, whereas Minnesota's minority population totals 12.6 percent (US Census Bureau 2007a).

Table 5-3
Minority Populations 2005

Minority Group	Clay County	State of Minnesota
Total Population	54,476	5,167,101
Percent: White persons	95.4%	89.9%
Percent: Minority, composed of*	**6.8%**	**12.6%**
Persons of Hispanic or Latino origin	3.3%	3.6%
American Indian and Alaska Native persons	1.6%	1.2%
Black or African American persons	0.7%	4.3%
Asian persons	1.1%	3.4%
Native Hawaiian and other Pacific Islander persons	0.1%	0.1%

Source: US Census Bureau 2007a
*Totals may not add to Percent Minority because of reporting classifications and/or the value is greater than zero but less than one-half unit of measurement

According to the Department of Housing and Urban Development, low-income neighborhoods are those where more than 50 percent of the population has an income less than 50 percent of the median per capita income for the whole community. Low-income populations for 2004 are illustrated in **Table 5-4**.

Low-income populations are defined by environmental justice guidance by using the statistical poverty threshold of the US Census Bureau. In 2004, the poverty-weighted average threshold for a family of four was $19,307 and $9,645 for an unrelated individual (US Census Bureau 2007b). The national poverty level was over 12 percent. To be classified meaningfully greater, CEQ recommends a formula describing the environmental justice low-income threshold as being 10 percent above the national rate (or 22.7 percent) as applied to local poverty rates (CEQ 1997).

Table 5-4
Low-Income Populations 2004

Jurisdiction	Percent Below Poverty Level
United States	12.7%
State of Minnesota	8.1%
Clay County	9.7%

Source: US Census Bureau 2007b

5.1.2.8 Cultural Values

Cultural values include perceived community beliefs or attitudes in a given area that provide a framework for each social group's unity. The Clay County Community-Based Comprehensive Plan (the Plan) was used to identify key community values and community land use goals. The Plan was adopted in 1980 and updated in 2001. The plan reflects the aspirations of the community and changing circumstances facing it. It provides the policy, standards, and principals to guide development of cities and rural areas in a logical, efficient manner. The plan also contains Clay County's long-range plan for growth and development over the next 20 years as well as goals, policies, and the general framework to protect land use, growth areas, and transportation corridors.

The Plan primarily focuses on guiding the development of cities and rural areas in a logical and efficient manner and protecting growth areas and transportation corridors. The County Vision for Clay County that is highlighted in the Plan can be summarized by the following general themes:

1) Strong Agricultural Base
2) Planned, Sustainable Growth
3) Strong Economy
4) Responsive, Cooperative Government
5) Preservation of Natural Resources, Open Spaces and Recreational Opportunities
6) High Quality of Life

These planning themes promote the development and implementation of goals and policies for agricultural protection, land use, transportation, housing, economic development and environmental protection for Clay County. The following goals and policies are relevant to the actions involved in the Proposed Project:

- *Economic Development Goal #1: Cooperatively utilize existing and new resources for economic growth in the County.*
  - *Policy # 7: Ensure that Clay County continues to have access to state-of-the-art telecommunication and essential utility infrastructure.*
- *Natural Resources Goal #1: Identify, protect, and preserve the County's high quality natural, scenic, cultural and open space areas.*

The Proposed Project area is located within Moland, Spring Prairie, Glyndon, and Riverton Townships and is identified in the Future Land Use Plan as being primarily general rural area, with proportions of flood plain identified around the Buffalo River. As noted in Section 2.5, the purpose of the Proposed Project is to capture wind energy generated by the proposed 201 MW Noble Flat Hill Windpark I, and connect to the existing OTP Sheyenne-Audubon 230 kV transmission line southeast of Glyndon, Minnesota.

Clay County already participates in the wind energy field by hosting wind farms and transmission lines, including wind turbines in the City of Moorhead and three 750 kW turbines operating in rural Clay County on the western edge of Keene Township (Clay County 2001, p.2-50). The Plan identifies commercial development of wind energy as an important opportunity for Clay County, and sites a survey of farmers conducted by the Minnesota Project in 1995 that showed nearly unanimous support for wind development, both for environmental benefits and rural economic development (Clay County 2001, p.2-51).

5.1.2.9 Recreation

Park and recreation areas provide opportunities for both active and passive recreation for Clay County residents and visitors. The amount of land in Clay County for this use is 3 percent (19,756 acres). There are many existing recreational resources within the Proposed Project area, including golf courses, public hunting grounds, shooting preserves, trails, rivers, wildlife management areas and parks, and state-owned lands such as nature preserves. Lands included in wildlife management areas are: scientific and natural areas (SNA), Buffalo River State Park, WPA parks, and Bluestem Prairie nature preserve owned by Minnesota Department of Natural Resources (MDNR) and The Nature Conservancy. Popular activities include camping, fishing, hunting, bird watching, swimming, biking, hiking, and nature observation. The Buffalo River State Park and the Bluestem Prairie nature preserve provide opportunities for viewing wildlife and intact ecosystems.

5.1.2.10 Public Services

"Public Services" generally refers to services provided by government entities to its citizens, and are used to benefit public health and safety, such as education, emergency services (fire, ambulances, and police), potable water, waste management, and utilities. Many of the public services available to residents in Clay County are associated with the larger city of Moorhead within the greater project area, but not within the transmission line corridor. Outside the city, landowners are typically serviced with privately-owned septic systems and wells. The Proposed Project would facilitate provision of electrical service to OTP utility and other utility company customers in Clay County, and throughout Minnesota and the Upper Midwest.

5.1.2.11 Impacts and Mitigation for Route 1-Human Settlement

Public Health and Safety
Measures to avoid and minimize potential impacts to human health and safety are incorporated into the proposed facility design and design cost. No additional mitigation measures are needed or proposed.

Land Use
All land uses crossed by Route 1 have the potential to be impacted by the proposed route. The proposed transmission line will mostly follow an existing right-of-way along MN Highway 9 and is not expected to permanently impact land uses. Construction will result in temporary removal of shrubs and grassland within the right-of-way.

From the initial route identification process, the Applicant has attempted to minimize potential impacts by avoiding urban/residential areas and by co-locating the routes along existing right-of-way such as roadways and existing transmission lines. Any modifications to the intended right-of-way alignment would be evaluated to minimize impacts. Locations of new right-of-way would be determined with landowners' or agencies' input. Construction activities will be limited to the right-of-way.

Landowner Displacement
If residences fall within the proposed right-of-way the transmission alignment will be shifted in a manner such that no person will be displaced from their residence or business. Route 1 follows an existing road right-of-way and so no person is expected to be displaced from their residence of business. All of the homes located along the right-of-way are greater than 100 feet from the proposed transmission line.

As discussed in Section 4.3, easements of approximately ½-mile wide have already been acquired along approximately seven miles of the proposed route. These easements would allow for new right-of-way to be established on land adjacent to the existing road right-of-way to accommodate overhang from structures within the road right-of-way, or to allow structures to be placed on private land if construction within the

road right-of-way is infeasible or not supported by the respective road authority. As part of the acquisition/coordination process, affected property owners will be notified of the construction schedule, site access requirements and vegetation clearing (and maintenance) requirements for construction and maintenance of the line.

Temporary indirect effects to residential properties may occur and would include construction related noise, potential interruptions to traffic during construction, temporary impacts to properties, and possible changes to home or property values. Noble has coordinated with private land owners, township and county officials and representatives of Xcel Energy to minimize impacts of the right-of-way. No landowners would be displaced by the acquisition of the substation and switching station parcels. No additional mitigation measures are needed or proposed.

Noise

The noise levels from the proposed line are comparable to the existing noise environment and will have no significant impact on humans or the environment. Corona on the transmission line conductors can generate electromagnetic noise at the frequencies at which radio and television signals are transmitted. This noise can cause interference (primarily with AM radio stations and the video portion of TV signals) with the reception of these signals depending on the frequency and strength of the radio and television signal. The Applicant does not anticipate any impacts from the operation of the new line. Although this type of interference can occur, the Applicant will investigate these problems and correct those caused by the Applicant's facilities.
The transmission line will be routed along existing corridors and will also be routed to minimize impacts to residences along or near the route.

The substation and switching station parcels are surrounded by rural land uses and should not have significant noise impacts on nearby receptors. The nearest noise receptors to the substation and switching station locations are more than 1,000 away. No transformers are planned at the switching station; therefore, noise produced from the operation of the switching station under normal conditions would be inaudible beyond the fence line. In addition, ten acre parcels will be acquired to accommodate the 2.5 acre substation and the 6 acre switching station. The larger parcel size will also allow for buffer land between the electrical equipment and the adjacent properties. No additional mitigation is necessary, since there will be minimal or no noise impacts resulting from the Proposed Project.

Aesthetics

Impacts to aesthetics should be minimal due to the use of existing corridors along the entire length of the route. This route is already impacted by the presence of MN Highway 9 and other roadway corridors. No aesthetic resources have been identified that would be impacted by this transmission line. Noble proposes to co-locate the existing 23.5 kV distribution line onto the transmission line thereby consolidating electrical utilities within one corridor.

The Applicant proposes to work with land owners to identify aesthetic concerns. Care would be given to preserving the natural landscape and construction and operation would be conducted to prevent unnecessary destruction of the surrounding landscape. In addition the Applicant has identified routes that avoid homes and other surrounding land uses to the greatest extent possible.

The proposed substation and switching station will be most visible to landowners immediately adjacent to the parcels of land that would be developed. The substation and switching station will also be visible to motorists driving along roads adjacent to the facilities. Ten acre parcels will be acquired to accommodate the 2.5 acre substation and the 6 acre switching station. The larger parcel size will also allow for buffer land

between the electrical equipment and the adjacent properties. The substation and switching station will have limited local visibility because they will be sited away from high traffic areas.

Additionally, if concerns are raised in regards to the aesthetic impacts of the substation, screening with plants or berms may be employed to minimize visual impacts.

Socioeconomic

Short-term impacts to socioeconomic resources will be relatively minor. The construction, operation, and maintenance of the transmission line will not have an effect of the socioeconomic resources along the route.

The proposed transmission line would most likely benefit the economy of the surrounding communities. In the short-term, there would likely be positive economic impacts associated with construction. Revenue might increase for local businesses due to increased spending from workers associated with project construction. Additionally, temporary jobs will become available as a result of project construction.

Long-term impacts may result from the new infrastructure and reliable power. The availability of reliable power in the area will have a positive effect on local businesses and the quality of services provided to the public. This transmission line will improve the capability of local wind generators to transport energy generated in the region, specifically the energy generated by the 201 MW Noble Flat Hill Windpark I. The local property taxes generated from this windpark through the state production tax are estimated to be in excess of $800,000 per year. The establishment of this area of Minnesota as an important producer of alternative energy may also encourage the development of wind related businesses in the area, and thus contribute to economic growth in the region.

The proposed project would require acquisition of parcels for the Noble Flat Hill Windpark I substation and the switching station, both of which are currently used for agricultural purposes. Additionally, the Proposed Project would require easements on private land along the right-of-way as described in Section 4.3. This would temporarily inhibit agricultural production in the construction area and permanently inhibit agricultural production in the structure locations and on portions of the substation and switching station parcels. Approximately 2.5 acres of the substation parcel and six acres of the switching station parcel would be removed from agricultural production to accommodate the substation and switching station equipment and other necessary facilities. The remainder of the two ten acre parcels could continue to be used for agricultural production. No mitigation is necessary, since the Proposed Project minimizes agricultural impacts.

Property acquisition for these facilities and for transmission line right-of-way would include compensation for affected property owners. The Proposed Project would not result in economic losses to property owners. No additional mitigation is proposed, because no negative socioeconomic impacts were identified.

Environmental Justice

The Proposed Project is not expected to create disproportionately high or adverse human health or environmental effects on low income populations, therefore, no mitigation is necessary.

Cultural Values

The Proposed Project is consistent with this Clay County Comprehensive Plan since it minimizes property impacts by locating transmission lines within or directly adjacent to existing utility, roadway or other public corridors; and it includes power pole sharing with local distribution lines where possible (see Section 2.5 and Section 3.2.1). The Proposed Project is also consistent with the goals and policies in that Plan that relate to the environment, natural resources, and economic development Therefore, no substantive cultural value impacts are anticipated to result from the Proposed Project. No mitigation is necessary, since the Proposed Project includes planning and design features that are consistent with local cultural values.

. . . .

Recreation

The line will likely be visible to individuals using recreation resources with 1.5 to 2 miles of the transmission line. No direct impacts are anticipated to SNA or State Park lands, due to the presence tree cover and/or altered landscapes in the area. The Applicant will work with MDNR and USFWS to avoid and minimize impacts to waterfowl on SNA and State Park lands. The proposed route will not cross SNA or State Park lands and so will not impede on land heavily used for recreation in this area, therefore no mitigation is necessary.

Public Services

No public services provisions will be impacted by the proposed route, therefore no mitigation is recommended.

5.1.3 Land-Based Economies

5.1.3.1 Agriculture

According to the 1997 Census of Agriculture, Clay County has seen the amount of lands in farms (acres) and the number of farms decrease slightly in the previous ten years. However, the average size of farms (acres) has increased from 579 in 1987 to 655 in 1997. In Clay County most of the agricultural products grown and sold are crop oriented. According to the 2002 Agricultural Census, approximately 90.46% of the land in farms is used for cropland. Top crop items for Clay County include wheat, soybean, and sugarbeets. Of these three crop items Clay County is ranked the 3rd largest producer of wheat, the 7th largest producer of soybean, and the 2nd largest producer of sugarbeet. Sales from these crops in 2002 were $112,696,000. Livestock sales accounted for $22,228,000 of the total sales in 2002. The top livestock inventory items for Clay County include turkeys, hogs and pigs, and cattle and calves.

5.1.3.2 Forestry

The proposed project corridor occurs in what was historically the Red River prairie region in Minnesota. The primary tree cover in the Proposed Project area is associated with waterways and homesteads. None of these areas are economically significant production areas.

5.1.3.3 Tourism

Much of the tourism in this region is associated with either the City of Moorhead or the Red River Valley. Moorhead is the County seat and contains the Clay County courthouse. In Moorhead, there are many cultural attractions and historic sites including art galleries and museums, theater, opera and symphony, science and history exhibits, and the Heritage Hjemkomst Center.

Several state parks and nature preserves are located in this area of the Red River Valley including: Buffalo River State Park and the adjacent Bluestem Prairie preserve which is one of the largest tracts of native prairie in the state (See section 5.1.2.9 for more details on tourism and recreation in these areas). Buffalo State Park and the Bluestem Prairie preserve are located approximately one mile east or ½-mile east of the corridor for Route 1, respectively.

5.1.3.4 Mining

Large deposits of glacially derived sediments are present throughout the eastern portion of the Proposed Project area. As a result, aggregate mining operations are present in the vicinity of the transmission line route. However, according to MNDOT county pit maps for Clay County, there are not active or inactive

aggregate pits or rock quarries within a mile of the Route 1 corridor. Although there are aggregate mines in the region, there are no mined areas or identified potential mineral resources in the immediate area of the proposed transmission line route or substation/switching station locations.

5.1.3.5 Impacts and Mitigation For Route 1-Land-Based Economics

Agriculture

The impacts to agricultural land will be minimal due to the routes location within an existing right-of-way. Most of the impact to farmland will be limited to possible pole placement within the field production areas. No farm fields will be bisected by the proposed transmission corridor. During construction, temporary impacts such as soil compaction and crop damage within the right-of-way are likely to occur.

Wherever possible, poles will be placed so they fall within existing right-of-way, minimizing permanent impacts to agricultural land. The Applicant will compensate landowners for crop damage and soil compaction that occurs during project construction.

The substation location and the proposed switching station location will each be located on ten acre private properties that are currently used for agricultural purposes. Approximately 2.5 acres of the substation parcel and six acres of the switching station parcel would be removed from agricultural production to accommodate the substation and switching station equipment and other necessary facilities. The remainder of the two ten acre parcels could continue to be used for agricultural production. No mitigation is necessary, since the Proposed Project minimizes agricultural impacts.

Forestry

The Proposed Project will not affect forest production resources; therefore, no mitigation is necessary.

Tourism

The Proposed Project is not anticipated to impact tourism, therefore, no mitigation is necessary.

Mining

The proposed transmission line and substation/switching station would be built largely within or adjacent to existing public road right-of-way areas which are already unavailable for mining activities. Therefore, the Proposed Project would not result in mining impacts.

5.1.4 Archaeological and Architectural History Resources

The heritage of the Proposed Project area is manifested in its archaeological record, architectural history, and in its Native American and European-American communities. These resources represent aspects of the physical environment that relate to culture, society, and institutions that bond communities together and link them to their environmental and social surroundings. In this context, cultural resources can include but are not limited to prehistoric and historic archaeological sites, buildings, structures, objects, districts, natural features, and biota; all of which can be deemed significant to a culture or community for scientific, social, traditional, religious, or other reasons.

Tetra Tech conducted a record search and review of existing records contained at the Minnesota State Historic Preservation Office (SHPO) in the Minnesota Archaeology Inventory database and in the Standing Structures Inventory database. The records search was conducted to determine if significant archeological, architectural history, or tribal resources have been documented within the vicinity of the Proposed Project and, if present, identifies the likelihood of impacts to these resources from project development. Search parameters for the cultural resources records search are listed in **Table 5-5**.

Table 5-5
Search Parameters for Cultural Resources Records Inventory

Inventoried Records	Search Parameters
Archaeological Sites	1 mile from the proposed transmission line corridors
Architectural History Properties	1 mile from the proposed transmission line corridors
Previous Surveys	1 mile from the proposed transmission line corridors

Cultural History

Minnesota's prehistory has been divided into three broad cultural periods: Pre-Contact (9,500 B.C. to A.D. 1650), Contact (A.D. 1650 to 1837), and Post-Contact (1837 to 1945). The Pre-Contact Period includes several traditions such as Paleoindian (9,500-7,000 B.C.), Archaic (7,000-500 B.C.), Woodland (500 B.C.-A.D.1650), Plains Village (A.D.900-1300), Mississippian (A.D.1300 to 1650), and Oneota (A.D.1300-1650 B.P.). By A.D. 1650, the first French explorers had reached Minnesota, ending Minnesota's prehistory and initiating the Contact Period. This period is further broken down based on Euro-American influences in the state including: French (1650-1803); British (1763-1816); and the Initial United States Presence (1803-1837). At that time, the Native American tribes present in the state included the Chiwere Siouan language groups, Eastern Dakota, Western Dakota, and Ojibwe Indians, all of which were in constant interaction with Euro-Americans in search of animal furs. The Contact Period lasted until around 1837 when Native Americans were forcibly divided into communities and put onto reservations while Euro-American settlement expanded and new ways of life (i.e., lumbering and intensive agriculture) overtook the region.

The Post-Contact Period began with the intensive settlement of Minnesota by Euro-Americans and the resettlement of Native Americans to reservations. The waterways in the state initially served as the primary means for commerce, travel, and sustenance for the first Euro-Americans to permanently settle the state and played a major role in the development of the state by providing a means to transport raw materials from Minnesota on barge traffic down the Mississippi River from the port at Duluth to industries in the eastern United States. Three of Minnesota's earliest Post-Contact traditions directly related to the early use of waterways for transportation and include the Early Agriculture and River Settlement (1830s-1870), St. Croix Triangle Lumbering (1837-1920), and Settlement and Fishing on Minnesota's North Shore (1854-1930). As railroad transportation grew and expanded throughout Minnesota, so did the settlement of these previously unpopulated areas and with it came more intensive agriculture (Railroads and Agricultural Development [1870-1940]), lumbering (Northern Minnesota Lumbering [1870-1930]), tourism and recreation (North Shore Tourism and Recreation [1870-1945]), development of large urban centers (Urban Centers [1870-1945]) and the mining (Iron Ore Industry [1880s-1945]). These cultural resources represent some of the state's most interesting and complex cultural resources. The Original Public Land Surveyor Maps from 1870 and 1872 indicated that the Proposed Project area was mostly prairie with some wet prairie at the time of initial development. The only timber in the area was located along the Buffalo River.

5.1.4.1 Documented Cultural Resources

Cultural Resources Surveys

At least four cultural resources surveys have been conducted within the search area for the Proposed Project described in **Table 5-5**. All of these surveys involved background or historical research and field surveying. Two of these surveys were conducted in the late 1970s and included improvements along Trunk Highway 9 (along Route 1) and Highway 10 which transects Route 1 and Route 2. Additional surveys performed included a bridge replacement on Trunk Highway 10 over the Buffalo River near Route 1. Overall, the Proposed Project area in the vicinities of Routes 1 and 2 have not been intensively surveyed for cultural

resources. Cultural resources previously documented within the Proposed Project area are summarized on **Table 5-6**.

Table 5-6
Cultural Traditions Previously Documents in the Study Area

Cultural Tradition	Time Span	Characteristics
Woodland	500 B.C.-A.D.1650	Introduction of ceramic technology and cultivated plants. Subsistence and movement patterns tied to seasonal availability of resources. Mound construction and elaborate mortuary practices. Extensive trade networks

Archaeological Sites
No archaeological sites have been documented within 1 mile of Route 1**.**

Historical Properties
One architectural history property has been identified within 1 mile of Route 1. This property, the Spring Prairie Township Hall, has not been evaluated for listing on the NRHP; however, the proposed location of Route 1 will likely pass in close proximity to the property.

National Register Eligible Properties
According to SHPO file search of archaeological sites and architectural history properties performed on August 18, 2008, no properties evaluated for the National Register have been identified within Route 1 of the Proposed Project area.

5.1.4.2 Impacts and Mitigation For Route 1-Archaeological and Historical Resources

Given the moderate number of previously documented archaeological sites and architectural history properties along Route 1 and Route 2, it is likely that undocumented cultural resources exist within the Proposed Project area. Once a final route for the transmission line is determined, the Applicant will conduct a Phase IA pedestrian survey along the final route. Upon completion of the Phase IA report, recommendations for subsurface testing will be made for areas of low surface visibility and/or increased potential for buried archaeological resources. In addition, a more detailed review of previously documented cultural resources, which have not been evaluated in terms of NRHP eligibility, to determine significance and potential impacts from project development will be conducted, if necessary. Avoidance of archaeological sites and architectural history properties is always the preferred mitigation method; however, if sites cannot be avoided, further investigations may be needed to evaluate significance and recover data.

At this time, there are no known archaeological sites within the Proposed Project area and no additional work appears to be necessary for these sites. However, if project plans change and these archaeological sites are included in the Proposed Project area, then a more intensive review of these unevaluated sites will be needed to determine significance and the potential for impacts from project development. Once final locations for transmission facilities have been chosen, a more intensive review of site records will help determine if impacts are likely; ground-truthing of sites may be necessary if adequate site location information is absent from the records. If impacts to sites can be avoided, no further action is required.

The Applicant will initiate consultation with the Minnesota SHPO specifically regarding any adverse visual effects the transmission lines may have to architectural properties in the vicinity of the Proposed Project area. Current project plans revealing the approximate location of the transmission lines and the estimated height of these structures will be presented to the SHPO in an attempt to mitigate potential adverse visual effects to these historic properties.

5.1.5 Natural Environment

5.1.5.1 Geomorphic and Physiographic Environment

The Proposed Project area is situated within the Red River Prairie Subsection, which covers 3,985,620 acres (6,173 square miles) in northwestern Minnesota, representing approximately 7 percent of Minnesota. The western boundary of this subsection is formed by the Red River. The eastern boundary follows the eastern limits of continuous tall grass prairie vegetation at the time of Euro-American settlement. Portions of a till plain are included. The southern boundary follows the southern end of the till plain and the Glacial Lake Agassiz basin.

Topography

The Red River Valley is one of the flattest land surfaces in North America. The topography of the Proposed Project area is level to gently rolling and consists of a large lake plain from Glacial Lake Agassiz. There is some steeper topography along drainages and adjacent to Lake Traverse. Areas to the east of the Proposed Project include Agassiz Beach Ridges topography with noted elevation increases. Elevations range from approximately 910 to 1,117 feet above mean sea level.

Geology

Data on the geology of the Red River Valley was obtained from the Department of North Dakota State University. The Proposed Project area is located within the Red River Valley subsection of Northwestern Minnesota. The Red River Valley is the youngest major land surface in the contiguous United States, with Glacial Lake Agassiz draining only about 9,200 years ago. The geology of Clay County is a direct result of the glaciers that once covered the area. The western portion of the County is made up of glacial drift (ground moraine) and the eastern part of the County is made up of terminal moraine.

Underlying the Red River Valley are soils that induce agricultural activity. These soils consist of developed clays, derived from the late-glacial erosion and reworking of Cretaceous shales dispersed as fine grained sediments into Lake Agassiz. Pre-glacial topography is still present in this area, but buried underneath several hundred feet of this glacial drift and glacial lake sediments. Precambrian granitic and gneissic basement rock (greater than 2.5 billion years in age) exists at a depth of approximately 200-300 feet. Overlying this rock at about 100-200 feet is glacial sediment (predominantly till with some localized zones of outwash sands and gravels). Over this layer at approximately 85 feet are slickensided fat clays and silty clays.

5.1.5.2 Climate

Based on National Climatic Data Center information (1971-2000), the average temperature for the region ranges from approximately 70 degrees Fahrenheit (°F) in July to approximately 4°F in January, although individual locations in the region can have average low temperatures several degrees cooler due to local effects. Extreme summer temperatures can routinely top 80°F, while winter temperatures can routinely drop below -7°F.

Typical summers (June-August) provide abundant rainfall (from 2-4 inches per month). Average snowfall in winter ranges from 0.3-1.0 inches per month. The average total annual precipitation falls in the low to mid 20 inch range.

5.1.5.3 Soils

Soils along Route 1 are poorly, somewhat poorly, and moderately well-drained lacustrine clays, silts, and sands. They are primarily Mollisols or Aquolls. Borolls (cold, dry Mollisols) are also common. Other soils in the Proposed Project area include saline soils which are present in localized areas and dry, sandy and gravelly soils which are characteristic of the beach ridges to the east of the Proposed Project area.

5.1.5.4 Air Quality

The primary air quality concerns related to transmission lines are ozone and nitrogen oxide emissions surrounding the conductor due to "corona discharge". "Corona discharge" is when a thin layer of air molecules around the conductors becomes electrically charged, and during wet conditions, conducts electricity. This phenomenon produces a small amount of ozone, however, the amount of ozone produced is likely in the same range of that produced by a lightening storm. Furthermore, moisture (the same factor that increases corona discharge from the transmission lines) inhibits the production of the ozone.

The Environmental Protection Agency (EPA) has regulations regarding permissible concentrations of ozone and oxides of nitrogen (62 Federal Register 38856). The national standard is 0.08 parts per million (ppm) on an eight-hour averaging period (40 CRF Part 50). The Minnesota state standard is 0.08 ppm based on the fourth highest 8-hour daily maximum average in one year (Minn. R. 7009.0080). Incremental concentrations of ozone due to corona would be expected to be in the order of one-tenth of the standard near the transmission line (0-8 parts per billion), and insignificant at ground level.

Temporary and localized impacts to air quality are likely to occur during construction due to emissions for construction vehicles and fugitive dust from clearing activities. The magnitude of construction emissions will vary according to weather and phase of construction, but will be minimal and temporary. Adverse impacts to the surrounding environment will be minimal because of the short duration of emissions and dust producing phases of construction.

5.1.5.5 Water Resources

Hydraulic features, such as wetlands, lakes, rivers, floodplains, and drainage ditches perform important functions within a landscape. These functions include flood attenuation, ground water recharge, water quality protection, and habitat for local biota. The following sections will provide a summary of surface water, water quality, floodplain, and groundwater resources present in the Proposed Project area.

Public waters

Public waters are water basins and watercourses in Minnesota with significant recreational or natural resource value as defined by Minnesota Statute 103G.005. The MDNR has regulatory jurisdiction over these waters. The major watersheds in the area include the Red River, Buffalo River, and Wild Rice/Marsh River Watersheds. These watersheds drain the western, central, and northern parts of the county, respectively. The Buffalo River and Wild Rice River are the primary tributaries to the Red River of the North. Most of the manmade drainage systems or public ditches are located in the western lakebed area due to the lack of natural drainage systems in the Lake Agassiz plain. Drainage systems within the beach ridge area are practically nonexistent because of the abundant supply of natural drainage with sufficient gradient. Minnesota Public Waters mapping indicates that the Buffalo River is the main water resource within the Proposed Project area (see Figure 1 and Figure 3 in Appendix A, and **Table 5-7**.)

The Buffalo-Red River Watershed District's online ditch mapping inventory was utilized to determine which County ditches Route 1 will cross (see Figures 2, 3, and 4 in Appendix A, and **Table 5-7**). The Clay County Ditch Number 3 is located parallel and adjacent to Route 1, on the south side of 70th Avenue North. At the intersection of 70th Avenue and MN Highway 9, Route 1 will span across the County Ditch Number 3. The Clay County Ditch Number 2 is located parallel to 43rd Avenue and Route 1 will cross the ditch at the intersection of 43rd Avenue and MN Highway 9. On the east side of MN Highway 9 Ditch #2 runs parallel to the highway for a short distance then turns south east away from MN Highway 9. It is possible that if the Route 1 transmission line is located on the east side of MN Highway 9 it will run parallel to Ditch #2 for a short distance. The Clay County Ditch Number 63 is located adjacent to 28th Avenue. At the Intersection of

28th Avenue and MN Highway 9, Route 1 will cross County Ditch Number 63. South of the Buffalo River on the west side of MN Highway 9 is an intermittent stream depicted on the MNDNR PWI map as public water. Route 1 will intersect the intermittent stream north of 12th Avenue. The Clay County Ditch Number 12 is located parallel to 40th Avenue and Route 1 will cross the ditch at the intersection along MN Highway 9. The Applicant will attempt to span the Clay County Ditches and public waters, therefore no impacts are anticipated.

Table 5-7
Route 1 Water Features

ID	Type[1]	Jurisdiction
Feature 1A	County Ditch #3	Clay County SWCD/ Buffalo-Red River Watershed District
Feature 1B	Palustrine emergent temporarily flooded (PEMA)	Clay County SWCD/Buffalo-Red River Watershed District/ USACE
Feature 1C	County Ditch #2	Clay County SWCD/ Buffalo-Red River Watershed District
Feature 1D	County Ditch #63	Clay County SWCD/ Buffalo-Red River Watershed District
Feature 1E	Palustrine unconsolidated bottom semipermanently flooded (PUBF)	Clay County SWCD/Buffalo-Red River Watershed District/ USACE
Feature 1F	Buffalo River	Clay County SWCD/Buffalo-Red River Watershed District/ MDNR/ USACE
Feature 1G	Intermittent Stream	Clay County SWCD/Buffalo-Red River Watershed District/ MDNR/ USACE
Feature 1H	Palustrine emergent temporarily flooded-partially drained (PEMAd)	Clay County SWCD/Buffalo-Red River Watershed District/ USACE
Feature 1I	County Ditch #12	Clay County SWCD/ Buffalo-Red River Watershed District

[1] Wetlands types adapted from Classification of Wetlands and Deepwater Habitats of the U.S., Cowardin et al. (1979).

Water Quality

The MPCA oversees water quality studies and regulations in Minnesota. The Buffalo River is the only major water resource within the Proposed Project area and has been judged impaired by the MPCA. Pollution sources include sediment, feedlots, agricultural chemicals, urban runoff, animal holding areas, and septic systems. Of these potential sources, turbidity is a concern for the Buffalo River in the Proposed Project area.

Floodplains

Floodplains are low-lying areas that are subject to periodic inundation due to heavy rains or snow melt. These areas are generally adjacent to lakes and rivers. Federal Emergency Management Agency (FEMA) maps were reviewed to determine whether 100-year or 500-year floodplains are present in the Proposed Project area. Mapped floodplains were identified within Clay County, and the proposed transmission line route appears to intersect floodplains adjacent to the Buffalo River (FEMA 2007). The Buffalo River as well as several intermittent streams traverse the Proposed Project area. Many prairie wetlands appear to be within or near the Proposed Project area. A floodplain map depicting the FEMA 100-year and 500-year floodplain for the Proposed Project area are shown on Figure 8. These figures illustrate that Route 1 would cross approximately two miles of the floodplain.

Ground Water

There are three primary aquifers in Clay County; the Buffalo, Moorhead, and Kragnes aquifers. The Buffalo aquifer is the primary source of groundwater in the County. It is about 1-8 miles wide and thirty two miles long. It lies about 5 miles east of Moorhead. Glacial sediments overlay more than half the aquifer at a depth from 20-120 feet. The thickness of the aquifer ranges from 0 feet at the edges to around 200 feet at the

center with the flow generally northward toward adjacent streams. A direct link between the Buffalo River and the aquifer have been identified, this indicates a potential for pollution of the aquifer.

Intense irrigation occurs on the agricultural land in Clay County. This is a concern for the groundwater quality as most irrigation occurs in the eastern part of the region in sandy soil where aquifers are recharged and easily contaminated. Furthermore, there are concerns about contaminating the Buffalo Aquifer during industrial development and land use.

5.1.5.6 Wetlands and Riparian Areas

Wetlands and riparian areas are important resources in part because they provide habitat, which is utilized by both resident and migratory wildlife. They are also unique because of their hydrologic conditions and their role as ecotones between terrestrial and aquatic systems (Mitsch and Gosselink 1993). Wetlands have many distinguishing features, the most notable of which are the presence of standing water or saturation within 12 inches of the surface, unique wetland soils, and vegetation adapted to or tolerant of saturated soils. There are many definitions and terms describing wetlands. The legal definition of a wetland, as outlined in the 1987 United States Army Corps of Engineers (USACE) Wetlands Delineation Manual (Wetland Training Institute, Inc 1995), is given as follows:

> The term "wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. (33CFR328.3(b); 1984)

Ecologically, wetlands are recognized by three parameters: wetland hydrology, hydric soils, and wetland vegetation. Hydric soils are soils that are wet frequently enough to periodically produce anaerobic conditions, thereby influencing the species composition or growth, of plants on those soils. Under most circumstances, at least one positive field indicator of each parameter will be apparent at any given wetland. Websoil survey information for the Proposed Project area indicates that hydric soils are located within the Proposed Project area (NRCS Websoil Survey 2007).

Numerous federal, state, county, and local regulations currently affect construction and other activities in wetlands. The principal laws in Minnesota affecting wetlands and streams are Sections 404 and 401 of the Federal Clean Water Act (CWA), the public waters laws administered by the MDNR, and the Minnesota Wetlands Conservation Act (WCA). Section 404 (regulation of discharge of dredge/fill materials into wetlands) is implemented by USACE. The public waters laws regulate work in public waters, including wetlands listed on the MDNR inventory of protected waters and wetlands. The Minnesota WCA was first passed in 1991. The local government unit (LGU) has the primary responsibility for administration of the WCA and for making key determinations. Generally, the LGU is the local watershed or County. In many instances both jurisdictions overlap the same wetland feature. The Clay County Soil and Water Conservation District is the identified LGU for the Proposed Project area.

The National Wetland Inventory (NWI) database indicates the general location of wetlands based on changes in vegetation patterns as observed from aerial photography. Tetra Tech reviewed aerial photographs and NWI data to determine the presence of wetland habitat within the Proposed Project area; this search indicated that several wetland areas are located within the Proposed Project area. The wetland and other water features observed along Route 1 through review of high-resolution aerial photography and the NWI dataset are listed in **Table 5-7**.

NWI mapping indicates three wetlands along the Route 1 corridor (see Figures 2, 3, and 4 in Appendix A, and **Table 5-7**). The three NWI wetlands identified are not listed on the MDNR's inventory of public waters. A palustrine emergent temporarily flooded (PEMA) wetland is depicted on the west side of Highway 9 between 43rd Avenue and 57th Avenue (Feature 1B). A palustrine unconsolidated bottom semipermanently flooded (PUBF) wetland is depicted on the west side of Highway 9 and adjacent to the north of the Buffalo River (Feature 1E). This wetland is associated with the Buffalo River and may be under the jurisdiction of the United States Army Core of Engineers (USACE). A palustrine emergent temporarily flooded-partially drained (PEMAd) wetland is depicted on the west side of Highway 9 between 12th Avenue and 17th Avenue (Feature 1G). The wetlands identified on the NWI map do not necessarily represent the actual wetlands subject to protection under Section 404 of the Clean Water Act and under the Minnesota Wetland Conservation Act.

5.1.5.7 Flora

This section describes plant and wetland communities known to occur within the vicinity of the Proposed Project area. Literature reviews were conducted to determine the types of vegetation and vegetative communities present. A Tetra Tech biologist conducted a limited field reconnaissance of the Proposed Project area on December 18th and 19th, 2007. A determination of plant communities and potential wetland habitats was conducted to the extent feasible given the limitations imposed by the brevity of the site reconnaissance.

A majority of the vegetation surrounding the transmission line corridor is crops planted on agricultural land and field margins dominated by common weeds such as Thistle (*Cirsium spp.*), Stinging Nettle (*Urtica dioica*), and others. This land was once dominated by native prairies, and areas surrounding the corridor may contain prairie remnants. Native flora consists of tallgrass prairie and wet prairie that is dominated by bluestems (*Andropogon scoparius* and *A. geradii*), Indian grass (*Sorghastrum nutans*), bluejoint grass (*Calamagrostis canadensis*), cordgrass (*Spartina pectinata*), cattails (*Typha spp.*), rushes (*Juncus spp.*), and sedges (*Carex spp.*). Narrow forested areas that consist of cottonwood (*Populus deltoids*), elm (*Ulmus spps*.) and willow (*Salix spp*.) are common along larger streams and rivers.

Plant Communities

A plant community is a combination of different plants growing together. Each plant community has a unique structure and appearance, which is determined by the proportions of the species growing in it. The composition of a plant community type, such as perennial grassland, changes from place to place due to the physical environment. This is because each species has certain limits to where it will grow and survive. Those species that have similar limits often are found growing together; hence, they become a loosely assembled plant community.

The identification of native plant communities within the Proposed Project area is essential to identifying wildlife-habitat relationships. Delineating vegetation types will provide an indication as to the types of species that may utilize the Proposed Project area. Land cover information was acquired from Minnesota Land Management Information Center (LMIC 1999) that was derived through aerial photographs, the USFWS NWI field maps, and Landsat satellite images. According to the Minnesota Land Management Information Center, the Proposed Project area is comprised primarily of cultivated lands. Other land cover types observed include native grasslands, deciduous forests, wetlands, rural residential and farmstead properties, gravel pits and open mines. According to the MDNR Natural Heritage Database (MDNR 2007) there are numerous prairie types that have been identified in lands adjacent to the east of the Proposed Project area that include; Dry Sand – Gravel Prairies, Mesic Prairies, Wet Bush Prairies, Wet Prairies, Wet Saline Prairies, Wet Seepage Prairies, and several undetermined native plant communities.

5.1.5.8 Fauna

This section identifies commonly-found wildlife species known to occur or potentially occur within the Proposed Project area. **Table 5-8** identifies those species observed in the Proposed Project area during the December 18th and 19th, 2007 site visit.

Table 5-8
Wildlife Species Observed in the Proposed Project Area During Field Reconnaissance

Common Name	Scientific Name
Birds	
Ring-necked pheasant	*Phasianus colchicus*
American crow	*Corvus brachyrhynchos*
Ruffed grouse	*Bonasa umbellus*
Mammals	
White-tailed deer	*Odocoileus virginianus*
Eastern cottontail	*Sylvilagus floridanus*
Eastern fox squirrel	*Sciurus niger*

Raptors

A variety of raptor species are common spring and fall migrants, winter residents, and residents during the breeding season. Raptor species likely to occur or known to occur within the Proposed Project area are the broad-winged hawk (*Buteo platypterus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and great horned owl (*Bubo virginianus*). Some species that are known to occasionally be within the area during spring, fall, and/or winter and take residence during the breeding season include the northern harrier (*Circus cyaneus*), Cooper's hawk (*Accipiter cooperii*), red-shouldered hawk (*Buteo lineatus*), bald eagle (*Haliaeetus leucocephalus*), merlin (*Falco columbarius*), osprey (*Pandion haliaetus*), northern goshawk (*Accipiter gentilis*), Swainson's hawk (*Buteo swainsoni*), ferruginous hawk (Buteo regalis), golden eagle (Aquila chrysaetos), peregrine falcon (*Falco peregrinus*), prairie falcon (*Falco mexicanus*), Eastern screech owl (*Megascops asio*), barred owl (*Strix vari*), and northern saw-whet owl (*Aegolius acadicus*) (Minnesota Ornithological Union [MOU] 2007). Given the topography and natural setting of the Proposed Project area, a number of different species may be present. Potential wildlife issues within the Proposed Project area are summarized on **Table 5-9**.

Avian Migration and Potential Occurrence in the Proposed Project Area

Avian collisions, especially raptor and waterfowl species, are a possibility after completion of the transmission line. Of these species, waterfowl are the most susceptible to transmission line collision, especially if the line is placed between agricultural fields that serve as feeding areas, or between water bodies. There are several wetlands in or near the Proposed Project area that may serve as habitat for waterfowl species.

Electrocution of raptors is a concern. Electrocution occurs when birds with large wingspans come in contact with either two conductors or a conductor and a grounding device. The transmission lines for this project will provide adequate spacing to eliminate the risk of electrocution. Additional impacts may occur if birds build nests on transmission line structures.

The Proposed Project area lies within the Mississippi Flyway, which is heavily utilized by numerous species of birds during the spring and fall migrations. These include many species of waterfowl (i.e., ducks, geese and swans), shorebirds, songbirds, and raptors. Waterfowl, raptors, shorebirds, and grassland bird species are likely to migrate through the area in the vicinity of the Proposed Project on a seasonal basis. Bird/transmission line interactions are determined by a number of factors including visibility and weather, with increased bird and transmission line interactions occurring at night and in inclement weather. Inclement weather and low cloud ceilings force migrating birds to fly at reduced altitudes, thereby putting

them at greater risk for adverse interactions with transmission lines (National Wind Coordinating Committee [NWCC] 2004).

Based on the number and types of wetlands present in the vicinity of the Proposed Project area, particularly to the east, these habitats are likely to provide nesting and migration stopover habitat for large numbers of breeding waterfowl or shorebirds. Most migrating waterfowl fly several thousand feet above ground level (e.g., 2,000 feet for Canada geese). The greatest risk would be for those birds that stop over in the vicinity of the Proposed Project area, since they would be flying at lower altitudes while ascending and descending. Observed areas of shrub/woodland habitats within the Proposed Project area serve as important habitat for resident and migratory bird species. The diversity of raptor species possibly occurring within the vicinity of the Proposed Project area coupled with known migration routes suggests there is the potential for raptors to migrate through.

Bats

Due to the timing of the initial site reconnaissance, no bats were observed within the Proposed Project area. However, bats are likely present in the vicinity with some habitats in the Proposed Project area likely receiving more use than others. Some potentially occurring bat species known to reside or migrate through Clay County includes the big brown bat (*Eptesicus fuscus*), the silver-haired bat (*Lasionycteris noctivagans*), the hoary bat (*Lasiurus cinereus*), the eastern red bat (*Lasiurus borealis*), eastern pipistrelle (*Pipistrellus subflavus*), little brown myotis (*Myotis lucifugus*), and northern myotis (*Myotis septentrionalis*). Little is known about the migration corridors used by these species. It is possible that portions of the Proposed Project area could provide a migratory pathway for any of the species above.

Bats typically utilize farm buildings and dead and dying trees with cavities and loose bark as roosting and maternity habitat. Bats typically use forests, riparian corridors and wetlands as feeding habitats due to higher nocturnal insect densities in these areas. In the Proposed Project area, these habitats are present. Due to the lack of data concerning bat/transmission line interactions, actual effects to bat populations with the Proposed Project area cannot be predicted (Keely 2001).

Wildlife impacts are anticipated to be variable (low to high) for state and federally listed wildlife species and other wildlife species in the Proposed Project area due to the natural setting and diversity of resources located within and in the vicinity of the Proposed Project area, the diversity of wildlife species and subsequent utilization of the Proposed Project area. The summary of potential wildlife impacts is based on known occurrence records and from correspondence with the MDNR and USFWS (agency correspondence is explained further in Section 6 and contact letters are included in Appendix C). The impacts are dependent on the final determined route and alignment of the transmission line locations.

Table 5-9
Summary of Potential Wildlife Issues

Issue	Potential [1]			Comments
	H	M	L	
Potential for Raptor Nest Sites		X		Tree nesting habitat was observed within the Proposed Project area as well as adjacent lands. Marsh and grassland habitat in the vicinity of the Proposed Project area could also provide habitat for ground-nesting species.
Potential for Protected Species to Occur		X		Several federal and state listed species have been reported to occur in vicinity of the Proposed Project area. It is possible that other listed species not reported may occur also.
Potential Migration Pathways		X		The Proposed Project area provides some migratory stopover habitat (wetlands, grassland, forest, etc.) for waterfowl, raptors, and songbirds, primarily along the eastern portion and adjacent lands to the east of the Proposed Project area. Larger water bodies including several tailings ponds and other wetland areas according to the NWI maps reviewed are located within the Proposed Project area.
Potential Raptor Flight Collisions		X		Use of the Proposed Project area by raptors is likely to occur during migration periods in the spring and fall. Some raptors would be expected to reside in Proposed Project area during spring and summer.
Potential for Raptor Prey Species		X		No large concentrations of prey species were observed during the initial or numerous subsequent site visits, however small mammals and other prey are likely present in wetlands, marshes and forest areas.
Uniqueness of Habitat in the Proposed Project Area		X		Habitat in the Proposed Project area is not unique to the surrounding landscape or region. However, the Proposed Project area is located within one mile of several native state protected prairie natural areas.
Potential For Use by Bats		X		Woody vegetation that would provide suitable maternity and roosting habitat is present throughout the Proposed Project area. Tailings ponds and wetlands provide high quality foraging habitat as they produce large numbers of insect prey.
Potential for Federal and State Game Issues			X	White-tailed deer, and ruffed grouse, are common game species within the Proposed Project area. Habitat loss will marginally impact these species.

1 Potential Ratings: H = High; M = Medium; and L = Low

5.1.5.9 Impacts and Mitigation For Route 1-Natural Environment

Geomorphic and Physiographic Environment

Topography
The project would not require substantive excavation or earth moving since transmission lines are constructed to conform to the local topography, and minimal grading is anticipated to construct the substation and switching station. Local soil disturbance and excavation to install pole structures will be required, however, there will be no impacts to regional topography. Any areas where soil is disturbed or excavation is required will be regarded to existing conditions to the extent practicable.

Geology
The project would not require substantive excavation since transmission lines are constructed to conform to the local topography and minimal grading is anticipated to construct the substation and switching station. Surficial deposits are more than 200 feet deep, thus conflicts with bedrock are not anticipated. The Proposed Project would not impact the geology of the Proposed Project area. Because no impacts will occur, no mitigation is necessary.

Climate

Concerns relating to potential effects on climate are primarily related to concerns about the emission of greenhouse gasses (GHG). The proposed project does not include activities that have the potential to substantively increase GHG emissions. Minor activities, such as the operation of construction equipment, are expected to emit small amounts of GHG, however these emissions would be minimal and their effects would be short term. The Applicant would ensure that all construction equipment is maintained and operates in good working order. No further mitigation is necessary because no impacts are anticipated.

Soils

Surface soils would be disturbed by site clearing, grading, excavation activities at structure locations, and during transport of construction materials and machinery. This disturbance is minimal and is generally less invasive than typical agricultural practices such as plowing and tilling. Furthermore, most activity will take place in or adjacent to an existing road right-of-way. The Applicants will attempt to utilize existing disturbed areas where possible. Where disturbance and excavation can not be avoided entirely, it would be minimized by using Best Management Practices (BMP). Soil compaction would be treated and restored through tillage operations. No permanent impacts to soil are anticipated during the construction of the transmission line, the substation, or the switching station.

Air Quality

The Environmental Protection Agency (EPA) has regulations regarding permissible concentrations of ozone and oxides of nitrogen (62 Federal Register 38856). The national standard is 0.08 parts per million (ppm) on an eight-hour averaging period (40 CRF Part 50). The Minnesota state standard is 0.08 ppm based on the fourth highest 8-hour daily maximum average in one year (Minn. R. 7009.0080). Incremental concentrations of ozone due to corona would be expected to be in the order of one-tenth of the standard near the transmission line (0-8 ppb), and insignificant at ground level. For both cases, these estimates of ozone levels are well below the federal and state standards. Given this, there will be no measurable impacts relating to ozone for the project, and therefore, no mitigation is necessary.

Temporary and localized impacts to air quality are likely to occur during construction due to emissions for construction vehicles and fugitive dust from clearing activities. The magnitude of construction emissions will vary according to weather and phase of construction, but will be minimal and temporary. Adverse impacts to the surrounding environment will be minimal because of the short duration of emissions and dust producing phases of construction.

Water Resources

Public Waters

Impacts to surface water are not likely to occur to public waters basins as a result of the Proposed Project. The transmission line will cross the Buffalo River at the junction of Highway 9 and Highway 10. However, the Applicants will attempt to span the Buffalo River using the existing Xcel Energy right-of-way, therefore impacts to the river will minimal.

Water Quality

During construction there is a possibility of sediment reaching surface waters as the ground is disturbed by excavation, grading, and construction traffic. However, once the project is complete it will have no impact on surface water quality. The Applicant will maintain sound water and soil conservation practices during construction and operation of the Proposed Project to protect adjacent water resources and minimize soil erosion. A Storm Water Pollution Prevention Plan (SWPPP) will be prepared and implemented during construction of the transmission line, substation, and switching station, as required by National Pollution Discharge Elimination System (NPDES) permitting, and use of standard Best Management Practices would ensure that no permanent water quality impacts result from the Proposed Project.

Floodplains
Floodplains will require further evaluation from a regulatory perspective. During periods of intense rainfall and during spring runoff, many of the upland drainage bottoms may exhibit temporary flooding. A review of digital floodplain data shows that up to 25 of the transmission structures may be placed in floodplains adjacent and to the north of the Buffalo River, assuming an average spacing of 400 feet between structures. The estimated permanent impact would be about 375 square feet (0.009 acres). Since floodplain impacts are, generally, regulated based on changes to floodplain storage (volume), the overall storage impact would correspond to approximately 0.5 cubic yard of displaced water for every foot of inundation, for each structure. However, due to the proposed double-circuiting with the existing Xcel Energy 23.5 kV transmission line (see Section 3.2.1 and Section 4.3 for further details), the new transmission structures will likely replace the existing structures, mitigating some of this impact within the floodplain.

Overall impacts would depend on the elevation of the poles as compared to the floodplain elevation. Storage volume impacts would be determined during final design, once pole locations have been identified. Design of the transmission lines placed in these areas should consider flooding possibilities and these structures should be engineered and constructed to withstand temporary inundation and forceful currents without significantly obstructing stream flow.

Ground Water
Permanent impacts to groundwater resources will not occur as a result of the Proposed Project. The Proposed will follow the existing road right-of-way and avoid the beach ridges to the east of the Proposed Project area where the Buffalo Aquifer has the potential to be contaminated. No impacts to the aquifer are expected due to construction. Any impacts to the Buffalo River (see Section 5.1.5.5 for connection between the Buffalo River and Buffalo Aquifer) are temporary and will not result in degradation of the aquifer. The Applicant will maintain sound water and soil conservation practices during construction and operation of the Proposed Project to protect adjacent water resources and minimize soil erosion. The Proposed Project will not impact municipal or private water sources in the Proposed Project area. The Proposed Project is not expected to result in impacts to groundwater quality, therefore, no mitigation is necessary.

Wetland and Riparian Areas
The Applicant will attempt to span wetlands and drainage systems along the Route 1 corridor. Pending the location of individual transmission poles, there is a potential for wetland areas to be impacted by the Proposed Project. The Applicant will maintain sound soil and water conservation practices during construction and operation of the Proposed Project to protect adjacent water resources and to minimize soil erosion. When it is not possible to span the wetland, Noble will draw on several options during construction to minimize impacts:

1) When possible, construction will be scheduled during frozen ground conditions.

2) Crews will attempt to access the wetland with the least amount of physical impact to the wetland (i.e. shortest route).

3) The structures will be assembled on upland areas before they are brought to the site for installation.

4) When construction during winter is not possible, wooden mats will be used where wetlands would be impacted.

Upon the final determination of the transmission route, the Applicant will conduct a comprehensive onsite wetland determination of the transmission line, substation parcel, and switching station parcel, which will include delineation of wetlands within the corridor to minimize any effects to water resources in the Proposed Project area.

Flora

Since the Proposed Project will occur along roads and agricultural lands that have been previously disturbed, no impacts are expected to native vegetation. The Applicant will conduct a comprehensive onsite biological assessment of the determined transmission line route, substation parcel, and switching station parcel prior to construction activities. Efforts will be made to assure that any identified prairie remnants and threatened and endangered species will be avoided near the route (this is discussed in more detail in section 5.1.6). Noble will maintain sound water and soil conservation practices during construction of the Proposed Project to protect adjacent water resources and minimize soil erosion, thus protecting essential habitat.

Fauna

There is minimal potential for the displacement of wildlife and loss of habitat from construction of the Proposed Project. Any impacts to wildlife are expected to be short term since the route will primarily be constructed along an existing road right-of-way. These short term impacts will affect only those wildlife that inhabit areas in the immediate area of construction. Additionally, these animals will be typical of those found in agricultural settings and will not affect species at a population level.

Avian collisions, especially raptor and waterfowl species, are a possibility after completion of the transmission line. Of these species, waterfowl are the most susceptible to transmission line collision, especially if the line is placed between agricultural fields that serve as feeding areas, or between water bodies. There are several wetlands in the Proposed Project area that may serve as habitat for waterfowl species. Impacts to local fauna are also possible, if animals are able to access the substation and switching station equipment. A fence will surround the exterior of all substation and switching station equipment, to help in deterring animals from entering these areas.

Electrocution of raptors is a concern. Electrocution occurs when birds with large wingspans come in contact with either two conductors or a conductor and a grounding device. The transmission lines for this project will provide adequate spacing to eliminate the risk of electrocution. With such precaution taken, electrocution is not a concern related to the project. However, additional impacts may occur if birds build nests on transmission line structures. Where overhead lines are constructed, the USFWS recommends that potential for bird electrocutions and bird strikes be reduced through implementation of measures outlined in "Suggested Practices for Raptor Protection on Power Lines" (Edison Electric Institute 1996) and "Mitigating Bird Collisions with Power Lines: The State of the Art in 1994" (Edison Electric Institute 1994), or more recent versions if available.

The Proposed Project area lies within the Mississippi Flyway, which is heavily utilized by numerous species of birds during the spring and fall migrations. These include many species of waterfowl (i.e., ducks, geese and swans), shorebirds, songbirds, and raptors. Waterfowl, raptors, shorebirds, and grassland bird species are likely to migrate through the area in the vicinity of the Proposed Project on a seasonal basis. Bird/transmission line interactions are determined by a number of factors including visibility and weather, with increased bird and transmission line interactions occurring at night and in inclement weather. Inclement weather and low cloud ceilings force migrating birds to fly at reduced altitudes, thereby putting them at greater risk for adverse interactions with transmission lines (National Wind Coordinating Committee [NWCC] 2004). Noble will attempt to avoid any areas known as major flyways or migratory resting spots. Where flyways can not be avoided measures such as shield wires will be used to reduce collisions.

Raptor nest surveys and monitoring of avian use and occurrence in appropriate seasons prior to project construction are generally recommended by USFWS. The Applicant will conduct point count surveys in the spring and fall throughout the Proposed Project area to document general avian use and migration through the area. The Applicant has also initiated an eight-week monitoring survey of avian use and occurrence in the Proposed Project area to document the intensity of resident bird use and identify sites where effects could be further minimized as practicable. Expected completion of this survey is at the end of August 2008, and the expected completion of the point count surveys is in October 2008. Such surveys will be used to either make decisions regarding development or document changes in use resulting from the facility's construction.

Loss of bat foraging and roosting habitat is a potential impact from the Proposed Project. Because bat use is unknown, and potentially suitable habitat for bats is present in the shrubby areas and near draws, lakes and wetlands, the Applicant has initiated an acoustic survey to gather information on bat passage rates in the various habitats of the Proposed Project area. If the results clearly indicate that use is higher in some types of habitat and/or landforms, this information can be used to site transmission lines and associated structures in areas with lower bat use.

5.1.6 Rare and Unique Natural Resources

5.1.6.1 Rare and Unique Flora

USFWS and MDNR maintain a list of federal and state threatened and endangered plant species. Species listed by one of these two agencies require protective measures for their perpetuation due to low populations (threatened, endangered, sensitive), sensitivity to habitat alteration, or cultural significance.

Observations made during the December 2007 site reconnaissance indicate that some clearing of potential native vegetation may be required for construction of transmission line facilities. Thus, due to the disturbance of potential native species, the Applicant will conduct a comprehensive onsite biological assessment of the determined transmission line route, substation parcel, and switching station parcel prior to construction activities, to confirm that sensitive species are not impacted. This survey would be conducted concurrent with the wetland determination survey.

The Applicant submitted a request to the USFWS and the MDNR to identify federal and states species of concern that could potentially occur within the Proposed Project area (see Appendix C). The USFWS has stated in correspondence to date that there are several high quality resources, including native prairie remnants that are required habitats for several protected and sensitive species that occur in the vicinity of the Proposed Project area. The MDNR responded in a letter dated January 9, 2007, stating that based on its review, there are 157 known occurrences of rare species or native plant communities in the area searched. The area searched by the MDNR and USFWS included areas outside the Proposed Project area, as it is defined in Section 2.4. A more detailed discussion of agency contacts and responses is included in Section 6. Responses from the USFWS, MDNR, and other environmental correspondence are attached as Appendix C. Just as stated by the USFWS, the MDNR has stated that the native plant communities are the required habitats for several protected and sensitive species that occur in the vicinity of the Proposed Project area. The state threatened and endangered plant species or plant species of concern listed by MDNR and the USFWS potentially occurring in the vicinity of the Proposed Project area and potentially affected areas are shown in **Table 5-10**. Specific information about these species and the potential for them to occur within the Proposed Project area is described below.

Federal Protected Species

The USFWS lists four threatened and endangered plant species within the state of Minnesota (USFWS 2007). Of these four species, one species, the western prairie fringed orchid (*Platanthera praeclara*) is

known to occur within prairie remnants in the vicinity of the Proposed Project area. Specific information about this species and the potential for it to occur within the Proposed Project area is described below.

Western prairie fringed orchid (Federal Threatened, State Endangered)
The western prairie fringed orchid is a federal threatened and state endangered species in Minnesota. Historically, the western prairie fringed orchid has been found in Minnesota where mesic to wet tallgrass prairies and sedge meadows occurred west of the Mississippi. These areas may include prairie remnants along roads and railroad rights-of-way and may also include disturbed sites. The orchid blooms from mid-June to late July in Minnesota. Threats to this species include loss of prairie habitats, invasion of non-native plants, haying, over-grazing, and habitat fragmentation. The western prairie fringed orchid may be found in suitable sites within the Proposed Project area.

State Protected Species
The MDNR lists over 250 threatened and endangered plant species in the state of Minnesota. According to the MDNR Natural Heritage Database, ten plant species are recorded to have occurred within the Proposed Project area or vicinity (Appendix C). Species occurrence and distribution information is often based on documented occurrences where surveys have taken place, so a lack of records does not necessarily indicate that species are absent from a particular area.

Plains reedgrass (State Species of Concern)
The plains reedgrass (*Calamagrostis montanensis*) is common on dry, open prairies, mostly in native range and associated with clay slopes. The plains reedgrass is a cool season grass beginning growth in mid-April, flowering and setting seed from June through July in Minnesota. The species has been recorded in areas to the east of the Proposed Project area.

Hall's sedge (State Species of Concern)
Hall's sedge (*Carex hallii*) is known to occur in wet meadows, springs, and seepage areas. Blooming occurs in Minnesota between June and July. The Hall's sedge has been recorded to occur in areas to the east of the Proposed Project area.

Northern singlespike sedge (State Species of Concern)
The northern singlespike sedge (*Carex scirpoidia*) prefers dry soil types and is considered to be widespread throughout its region. This species has been recorded to occur along the southern boundary of the Proposed Project area.

Sterile sedge (State Threatened)
The sterile sedge (*carex sterilis)* is a characteristic sedge of calcareous fens and other inland fresh meadows supported by stable, calcareous groundwater seepages. The sterile sedge has been recorded to occur in areas to the north and northeast of the Proposed Project area.

Small white lady's-slipper (State Species of Concern)
The small white lady's-slipper (*Cypripedium candidum*) prefers mesic blacksoil prairie, wet blacksoil prairie, glacial till prairie, sedge meadows, and calcareous fens. The small white lady's slipper blooms from mid-May to early June during hot weather. The small white lady's-slipper has been recorded to occur in areas to the east of the Proposed Project area.

Northern gentian (State Species of Concern)
The northern gentian (*Gentiana affinis*) is mostly restricted to the northern half of the state in cool northern prairies. Clumps of northern gentian usually bloom during August. The northern gentians do not tolerate heavy grazing. The northern gentian has been recorded to occur in areas to the east of the Proposed Project area.

Nuttall's sunflower (State Species of Concern)
The Nuttall's sunflower (*Helianthus nuttallii ssp.rydbergii*) is found along the banks of streams and ponds, wet meadows, and other wet places. The Nuttall's sunflower blooms in Minnesota from July to September. The Nuttall's sunflower has been recorded to occur in areas to the east of the Proposed Project area.

Oat-grass (State Species of Concern)
Oat-grass (*Helictotrichon hookeri*) prefers prairies and plains, often dominating sandhill prairie regions associate with drier upland sites. Oat-grass is a warm season grass that flowers in late July and sets seed through September. Oat-grass has been recorded to occur in areas to the east of the Proposed Project area.

Clustered broomrape (State Species of Concern)
The clustered broomrape (*Orobanche fasciculate*) is found to occur in prairies and flowers from May to August in Minnesota. The clustered broomrape has been recorded to occur in areas to the east of the Route 1 corridor of the Proposed Project area.

Louisiana broomrape (State Species of Concern)
The Louisiana broomrape (*Orobanche ludoviciana*) is considered a dry prairie species that is parasitic on many kinds of plants, especially Artemisia. This species has been recorded to occur in areas to the northeast of the Proposed Project area.

Prairie Moonwort (State Species of Concern)
The prairie moonwort (*Botrychium campestre*) may be found in dry prairies and sand dunes as well as sandy, dry disturbed sites such as roadsides and old fields. This species is known to breed from May through early June possibly through July in more northern sites. This species has been recorded to occur in areas to the northeast of the Proposed Project area.

Least Moonwort (State Species of Concern)
The least moonwort (*Botrychium simplex*) may be found in terrestrial meadows, barrens, and woods in usually subacid soil. This species has been recorded to occur in areas to the northeast of the Proposed Project area.

Table 5-10
State Listed Flora Species Potentially Occurring Near the Proposed Project Area

Species	Scientific Name	Status	Likelihood of occurrence in Proposed Project area*	Habitat Association
VASCULAR PLANTS				
Plains reedgrass	*Calamagrostis montanensis*	State Species of Concern	Low	Common on dry, open prairies, mostly in native range and associated with clay slopes. The plains reedgrass is a cool season grass beginning growth in mid April, flowering and setting seed from June through July in Minnesota.
Hall' Sedge	*Carex hallii*	State Threatened	Low	Known to occur in wet meadows, springs, and seepage areas. Blooming occurs in Minnesota between June and July.
Northern Singlespike Sedge	*Carex sciropoidea*	State Species of Concern	Low	Prefers dry soil types and is considered to be widespread throughout its region.
Sterile Sedge	*Carex sterilis*	State Threatened	Low	Is a characteristic sedge of calcareous fens and other inland fresh meadows supported by stable, calcareous groundwater seepages.
Small While Lady's-slipper	*Cypripedium candidum*	State Species of Concern	Low	Prefers mesic blacksoil prairie, wet blacksoil prairie, glacial till prairie, sedge meadows, and calcareous fens. The small white lady's slipper blooms from mid-May to early June during hot weather.
Northern Gentian	*Gentinana affinis*	State Species of Concern	Low	Mostly restricted to the northern half of the state in cool northern prairies. Clumps of northern gentian usually bloom during August. The northern gentians do not tolerate heavy grazing.
Nuttall's Sunflower	*Helianthus nuttallii ssp. Rydbergii*	State Species of Concern	Low	Found along the banks of streams and ponds, wet meadows, and other wet places. The Nuttall's sunflower blooms in Minnesota from July to September.
Oat-grass	*Helictotrichon hookeri*	State Species of Concern	Low	Prefers prairies and plains, often dominating sandhill prairie regions associate with drier upland sites. Oat-grass is a warm season grass that flowers in late July and sets seed through September.
Clustered Broomrape	*Orobanche fasciculate*	State Species of Concern	Low	Found to occur in prairies and flowers from May to August in Minnesota.
Louisiana Broomrape	*Orobanche ludoviciana*	State Species of Concern	Low	Found in dry prairies. This species is parasitic on many kinds of plants, especially Artemisia
Prairie Moonwort	*Botrychium campestre*	State Species of Concern	Low	Found in dry prairies and sand dunes as well as sandy, dry disturbed sites such as roadsides and old fields. This species is known to senesce from May through early June possibly through July in more northern sites.
Least Moonwort	*Botrychium simplex*	State Species of Concern	Low	Found in terrestrial meadows, barrens, and woods in usually subacid soil.

*"Likelihood of Occurrence" based on MDNR Natural Heritage Database element occurrences of species within a 1 mile radius of Proposed Project area and last observed date reported.

5.1.6.2 Rare and Unique Fauna

USFWS and MDNR maintain a list of federal and state threatened and endangered animal species. Species listed by one of these two agencies require protective measures for their perpetuation due to low populations (threatened, endangered, sensitive), sensitivity to habitat alteration, or cultural significance.

Observations made during the December 2007 site reconnaissance indicate that some clearing of potential native vegetation may be required for construction of transmission line facilities. Thus, due to the disturbance of potential native species, the Applicant will conduct a comprehensive onsite biological

assessment of the determined transmission line route, substation parcel, and switching station parcel prior to construction activities, to confirm that sensitive species are not impacted. This survey would be conducted concurrent with the wetland determination survey.

Based on issues identified with other transmission line facilities throughout the United States, those species of greatest concern are federally or state-protected avian species and bats that may occur in the vicinity of the Proposed Project area. Other species of conservation concern are those directly associated with sensitive or unique habitats. The Applicant submitted a request to the USFWS and the MDNR to identify federal and states species of concern that could potentially occur within the Proposed Project area. The USFWS has stated in correspondence to date that there are several high quality resources, including native prairie remnants that are required habitats for several protected and sensitive species that occur in the vicinity of the Proposed Project area. The MDNR responded in a letter dated January 9, 2007, stating that based on its review, there are 157 known occurrences of rare species or native plant communities in the area searched. The area searched by the MDNR and USFWS included areas outside the Proposed Project area, as it is defined in Section 2.4. A more detailed discussion of agency contacts and responses is included in Section 6. Responses from the USFWS, MDNR, and other environmental correspondence are attached as Appendix C. Just as stated by the USFWS, the MDNR has stated that the native plant communities are the required habitats for several protected and sensitive species that occur in the vicinity of the Proposed Project area. The state threatened and endangered animal species or animal species of concern listed by MDNR and the USFWS potentially occurring in the vicinity of the Proposed Project area and potentially affected areas are shown in **Table 5-11**.

Federal Protected Species

The ESA requires protection of species federally listed as threatened or endangered. Significant changes to the habitats of these species and projects that have potential to result in a "take" will require close scrutiny by USFWS and may require special permitting or mitigation measures to lessen or mitigate effects. The Dakota skipper (*Hesperia dacotae*) is the one federally listed candidate species that could potentially occur in the Proposed Project area (USFWS 2007). Specific information about this species and the potential for it to occur within the Proposed Project area is described below.

Dakota skipper (Federal Candidate Species, State Species of Concern)

The Dakota skipper is found in relatively flat and moist native bluestem prairies and within upland, dry prairies located on ridges or hillsides. The current distribution of this species straddles between tallgrass and mixed grass prairie regions. Threats to this species include fragmentation, loss of habitat, over grazing, inappropriate fire management, and woody plant invasions. This species has been recorded to occur in areas to the east of the Proposed Project area.

State Protected and Other Species of Conservation Concern

MDNR has identified 250 animal species in decline at the national, regional or state level, or species whose population status is not well known, but thought to be in decline. These species are listed as "species of concern" or as threatened or endangered based on such factors as known status, funding available for conservation, and presence of breeding habitat. The Applicant submitted a request to query the MDNR Natural Heritage Database, which maintains recorded sightings of species of concern within the state of Minnesota. According to the Natural Heritage Database there are nine records of threatened, endangered, or species of concern found to occur within the Proposed Project area or vicinity (Appendix C). However, because survey work for animals is less exhaustive, and because there has not been an on-site survey of all areas of the county or the Proposed Project area, ecologically significant features for which the MDNR has no recorded of, may exist within the Proposed Project area. Of the state threatened and endangered species or species of concern listed by MDNR, those birds, butterflies and moths potentially occurring in the vicinity

of the Proposed Project area and potentially affected are shown in **Table 5-11**. Specific information about these species and the potential for them to occur within the Proposed Project area is described below.

Henslow's sparrow (State Endangered)
Henslow's sparrow (*Ammodramus henslowii*) is very uncommon in west-central Minnesota as it is known to mostly occur in southeastern Minnesota during the breeding season. This species prefers large, flat fields with no woody plants and with tall, dense grass and standing dead vegetation. This species has been recorded to occur in areas to the northeast of the Proposed Project area.

Assiniboia skipper (State Endangered)
The assiniboia skipper (*Hesperia comma assiniboia*) is found in native short grass prairie, and open, sandy areas. Peak flight activity occurs in August but ranges from late July to late September. Species loss has been contributed to habitat loss due to agriculture and development. This species has been recorded to occur in areas to the northeast of the Proposed Project area.

Loggerhead shrike (State Threatened)
The loggerhead shrike (*Lanius ludovicianus*) is found in Minnesota during the breeding season, from late March to September. This species prefers "edge" habitat, nesting along roadsides and hedgerows in agricultural regions. Causes of decline are unknown but may be related to pesticide use. This species has been recorded to occur in areas to the east of the Proposed Project area.

Marbled godwit (State Species of Concern)
The marbled godwit (*Limosa fedoa*) is found in Minnesota during the breeding season in marshes and flooded plains nesting in June and July. The declining numbers of this species have been attributed to habitat loss. This species has been recorded to occur in areas to the east of the Proposed Project area.

Powesheik skipper (State Species of Concern)
The Powesheik skipper (*Oarisma powesheik*) requires wet mesic prairie habitat with native grasses, sedges, and a significant component of plants in the sunflower family. This species has declined in numbers due to poor fire management and habitat loss. This species has been recorded to occur in areas to the east and southeast of the Proposed Project area.

Uhler's arctic (State Endangered Species)
The Uhler's arctic (*Oeneis uhleri varuna*) can be found in slopes in dry, open bunchgrass habitat; tundra; and openings in pine forests. Flight peak for this species occurs from June to early July. Western Minnesota represents the eastern edge of its distribution. This species has been recorded to occur in areas to the east of the Proposed Project area.

Wilson's phalarope (State Threatened)
Wilson's phalarope (*Phalaropus tricolor*) can be found breeding in fresh-water marshes and wet meadows and wetlands. In Minnesota, this species can be found from late April to August. This species has been recorded to occur in areas to the east and northeast of the Proposed Project area.

Regal fritillary (State Species of Concern)
The regal fritillary (*Speyeria idalia*) has historically been found in Minnesota in the extent of native prairie and savanna. This species can be found in upland prairies and sometimes wetland prairies. Declines in numbers are unclear but may be related to insecticide use. This species has been recorded to occur in areas to the east of the Proposed Project area.

Greater prairie-chicken (State Species of Concern)
The greater prairie-chicken (*Tympanuchus cupido*) prefers undisturbed tallgrass prairies. The prairie chicken was almost extinct in the 1930s due to hunting pressure and habitat loss. Currently, human interactions are the greatest threat to this species. This species has been recorded to occur in numerous areas in areas to the east and northeast of the Proposed Project area.

Table 5-11
State Fauna Listed Species Potentially Occurring Near the Proposed Project Area

Species	Scientific Name	Status	Likelihood of occurrence in Proposed Project area*	Habitat Association
BIRDS				
Henslow's Sparrow	*Ammodramus henslowii*	State Endangered	Low	Very uncommon in west-central Minnesota as it is known to mostly occur in southeastern Minnesota during the breeding season. This species prefers large, flat fields with no woody plants and with tall, dense grass and standing dead vegetation.
Loggerhead Shrike	*Lanius ludovicianus*	State Threatened	Moderate	Feeds primarily on large insects, also other invertebrates, small birds, lizards, frogs, and rodents; sometimes scavenges. Nests in open country with scattered trees and shrubs, savanna, and, occasionally, open woodland; often perches on poles, wires or fenceposts.
Marbled Godwit	*Limosa fedoa*	State Species of Concern	Low	Found in Minnesota during the breeding season in marshes and flooded plains nesting in June and July.
Wilson's phalarope	*Phalaropus tricolor*	State Threatened	Moderate	Eats insects (larvae and adults), especially mosquitoes and crane flies. Feeds as it walks along muddy shores, wades in shallow water, or swims in whirls. Nests in shallow freshwater and saline ponds, marshes and wet meadows.
Greater Prairie – Chicken	*Tympanuchus cupido*	State Species of Concern	Moderate	Prefers undisturbed tallgrass prairies.
BUTTERFLYS AND MOTHS				
Assiniboia Skipper	*Hesperia comma assiniboia*	State Endangered	Low	Found in native short grass prairie, and open, sandy areas. Peak flight activity occurs in August but ranges from late July to late September.
Dakota Skipper	*Hesperia dacotae*	State Threatened	Low	Occurs in flat and moist native bluestem prairie and dry prairies that often are located on ridges and hillsides. Bluestem grasses and needlegrasses dominate these habitats as well as three wildflowers in the most suitable sites that include; pale purple (*Echinacea pallida*), upright coneflowers (*E. angustifolia*) and blanketflower (*Gaillardia spp*.).
Powesheik Skipper	*Oarisma powesheik*	State Species of Concern	Low	Requires wet mesic prairie habitat with native grasses, sedges, and a significant component of plants in the sunflower family.
Uhler's Arctic	*Oeneis uhleri varuna*	State Endangered	Low	Found in slopes in dry, open bunchgrass habitat; tundra; and openings in pine forests. Flight peak for this species occurs from June to early July. Western Minnesota represents the eastern edge of its distribution.
Regal Fritillary	*Speyeria idalia*	State Species of Concern	Low	Historically been found in Minnesota in the extent of native prairie and savanna. This species can be found in upland prairies and sometimes wetland prairies.

*"Likelihood of Occurrence" based on MDNR Natural Heritage Database element occurrences of species within a 1 mile radius of Proposed Project area and last observed date reported.

5.1.6.3 Impacts and Mitigation For Route 1-Rare and Unique Natural Resources

No impacts are anticipated to state and federally listed vascular plant species and wildlife species in the Proposed Project area. Several areas of concern were identified by USFWS and MDNR in areas primarily to the east the Proposed Project area. Therefore, The Applicant has attempted to avoid the eastern portion of

the area originally searched by the USFWS and MDNR. Furthermore, the Applicant has attempted to minimize and avoid impacts by siting the transmission line along an existing right-of-way.

The construction of the transmission line would result in temporary, construction related, and long-term loss of habitat in the small patches of grassland habitat, woodlands, and agricultural fields within the Proposed Project area. In addition, activities such as road construction and tree clearing can result in the loss of or disruption to habitats and allow for the introduction of unwanted plant species.

Due to the known presence of several Greater prairie chicken booming grounds in the vicinity of the Proposed Project area, the MDNR recommended close coordination with the MDNR Area Wildlife Manager to obtain the most recent data on prairie chicken use in the area. Based on a review of this data, the Proposed Project is not anticipated to directly impact any known prairie chicken booming grounds. Due to the known presence of sensitive habitat and endangered, threatened, or special concern species in the vicinity of the Proposed Project, the Applicant will conduct a comprehensive onsite biological assessment of the determined transmission line route, substation parcel, and switching station parcel prior to construction activities, to confirm that sensitive species are not impacted. Similarly, as discussed in the Section 5.1.5.9, the Applicant will conduct avian and bird field surveys in the Proposed Project area to document the intensity of resident and migratory bird and bat use and identify sites where effects could be further minimized as practicable.

According to the MDNR, several mussel species of concern have been documented in the Buffalo River in the vicinity of the Proposed Project area. Erosion and sediment control practices would be implemented and maintained for any work conducted near the river or stream areas. As described previously, sound water and soil conservation practices will be maintained during construction and the operation of the project to protect topsoil and adjacent water resources and minimize soil erosion.

5.1.7 Unavoidable Adverse Impacts – Route 1

The unavoidable adverse impacts caused by the construction of the Proposed Project along Route 1 are minimal. However, impacts that are unavoidable include land use, noise, aesthetics, agriculture, air, water, wetlands, flora, and fauna impacts (**Table 5-12**).

Table 5-12
Summary of Impacts and Mitigation – Route 1

Resource	Impact	Mitigation
Land Use	Temporary impact from construction activities on the land surrounding the poles and the access points used for construction; Minor permanent impact from placement of poles. Approximately 20 acres of land will be permanently impacted by construction of the substation and switching station.	Routes were identified that avoided areas with dense populations. The route will avoid homes and use existing roadway corridors for the entire 11.4-mile length of Route 1. Additionally, landowners will be compensated for all easements and parcel acquisitions.
Noise	Temporary impact from construction activities on the land surrounding the poles and the access points used for construction; Minor permanent impact from substation noise	Line routing avoided areas with dense populations. The route will avoid homes to the greatest extent possible. Construction will be conducted consistent with local ordinances. Additionally, buffer areas will be used around the substation and switching station.
Aesthetics	There are no areas with significant visual importance that will be impacted by the transmission line. However, minor visual impact will occur in areas where poles will be placed, and around the substation and switching station.	Line routing avoided areas with a large number of homes and used existing linear corridors that are already disturbed. Additionally, the line will be double-circuited with the existing Xcel Energy 23.5 kV line for 5 miles, thereby consolidating utilities on a single structure. Buffer areas will be used around the substation and switching station.
Agriculture	Temporary impact from construction activities to crop cycle and physical impact to the land along the access points and around the poles; Minor permanent impact from placement of poles, and on the substation and switching station parcels.	The line was routed along existing road right-of-way to minimize impacts to production areas. Landowners will be compensated for crop damage. Additionally, landowners will be compensated for all easements and parcel acquisitions.
Archaeological & Architectural History	A number of previously documented archaeological site and architectural history properties are known to occur near the proposed routes. Additional undocumented cultural resources may also be present along the Route 1 corridor.	The Applicant will conduct a Phase IA pedestrian survey along the final route to document any cultural resources within the anticipated area of impact. The Applicant will provide the results of all field surveys and identified historic properties in the vicinity of the Proposed Project area to the MN SHPO for formal review and comment.
Air	Temporary impacts will occur in the areas where Noble is actively constructing the transmission line.	Best management practices will occur during construction to minimize the amount of fugitive dust that is created.
Water	Route 1 will cross approximately 2 miles of floodplain adjacent and to the north of the Buffalo River.	Design of the structures placed in these areas will consider flooding possibilities and will be engineered and constructed to withstand temporary inundation and forceful currents without significantly obstructing stream flow. Additionally, the line route will be double-circuiting with

		the existing Xcel Energy 23.5 kV line and new structures will replace existing structures, minimizing additional impact to floodplains.
Wetlands	Three wetland areas were identified along the Route 1 corridor, and may be impacted by the proposed route. Temporary impacts will occur during construction.	Wetlands will be spanned if possible. Upon the final determination of the transmission route, wetlands within the corridor will be delineated to minimize any impacts. If wetlands cannot be avoided Noble will minimize impacts as described in Section 5.1.5.9.
Flora	Several areas of concern were identified by USFWS and MDNR in areas primarily to the east the Proposed Project area, although no impacts are anticipated within the Route 1 corridor.	The line was chosen to avoid these identified sensitive areas to the east. Additionally, Noble will conduct a comprehensive onsite biological assessment of the determined transmission line route, substation parcel, and switching station parcel prior to construction activities to identify any sensitive habitat or species.
Fauna	The possibility of birds and bats colliding with the lines is possible, especially in areas of high use by waterfowl and other species during migration.	Field surveys for resident and migrant avian and bat species will be conducted to evaluate potential impacts. Noble will work with the MDNR to identify areas along the new transmission line where additional measures are needed to protect the wildlife that may be impacted. Typical measures may include swan flight diverters and the use of H-frame structures.

5.2 Route 2 Environmental Information

5.2.1 Environmental Setting

Please see Section 5.1.1 for the description of environmental setting along Route 2.

5.2.2 Human Settlement

5.2.2.1 Public Health and Safety

The measures described in Section 5.1.2.1 pertaining to Route 1 are applicable to Route 2.

5.2.2.2 Land Use

The information described for Clay County in Section 5.1.2.2 pertaining to Route 1 are applicable to Route 2.

Most of Route 2 will follow existing and former right-of-way along the former Burlington Northern Railroad bed. The majority of Route 2 is located in a rural setting with scattered residences northeast of the town of Glyndon, and northwest of the town of Hawley. However, Route 2 will pass through the town of Glyndon (see description of Segment 2-2 in Section 3.2.2). The transmission corridor will run through Moland Township and Glyndon Township.

The majority of the transmission line will follow areas zoned "Agricultural Preservation District" (AgP-1), (Clay, 2005). "Agricultural Preservation" is intended to preserve and promote the use of land for agricultural purposes and to protect it from encroachment by non-agricultural development. A portion of the project corridor will include areas zoned "Agricultural Preservation/Urban Expansion District" these areas "refer to agricultural preservation areas with higher density rural residential development.

Glyndon Township has adopted their own zoning ordinances in addition to the Clay County Planning and Zoning ordinances for zoning requests (Conditional Use Permits, variances, etc.). All zoning requests must be granted by both Clay County and the Township for this area (see Section 3.2.2 for details on Route 2).

5.2.2.3 Landowner Displacement

Residences and businesses near the route were identified through review of high resolution aerial photographs and the Clay County Address Points database. Using GIS, the area within 150 feet on either side of the proposed route centerline (for a total corridor width 300 feet) was evaluated to identify the number of residences and businesses present. Based on this analysis there are 19 residences and three businesses along Route 2.

Utilizing the same review of high resolution aerial photographs and the Clay County Address Points database, a total of one of these residences and two of the businesses were determined to be within 50 feet of the proposed transmission route centerline.

5.2.2.4 Noise

Please see Section 5.1.2.4 for a background on noise and the Minnesota regulations regarding noise.

5.2.2.5 Aesthetics

The visual setting of the majority of Route 2 is low-density, predominantly rural, consisting of an altered landscape with views ranging from scattered residences in an agricultural setting to roadways. However,

section 2-2 of Route 2 (see Section 3.2.2 for details on Route 2) passes through Glyndon, MN. The visual setting in Glyndon is higher density, predominately urban, consisting of an altered landscape with views ranging from higher density residences and commercial/industrial areas, to roadways. The characteristic natural landscape of the Proposed Project area consists of flat topography. Intermittent drainages enter the Proposed Project area, and some remnant prairies are present throughout the Proposed Project area. The color of the landscape generally contains brownish-yellow fields of croplands with some wooded areas present around the Buffalo River.

Visual sensitivity is dependent on viewer attitudes, the types of activities in which people are engaged when viewing the site, and the distance from which the site will be seen. Overall, higher degrees of visual sensitivity are correlated with areas where people live, are engaged in recreational outdoor pursuits, or participate in scenic or pleasure driving. Conversely, visual sensitivity is considered low to moderate in industrial or commercial areas where the scenic quality of the environment does not affect the value of the activity.

The settlements in the Proposed Project area are primarily residences and farm buildings with locations along the transmission corridor. Most of these residences along the project corridor are located within the town of Glyndon. Visual impacts would be greatest for those residences located nearest to the transmission corridor. Visual impacts would be greatly reduced with significant distance from the corridor. Furthermore, the proposed route will contrast the open agricultural areas and will be visible to travelers along US Highway 10, and other county/township roads in the vicinity of the Route 2 corridor.

5.2.2.6 Socioeconomic

The information described in Section 5.1.2.6 on demographics, economics, race, and poverty in the area of Route 1 is applicable to Route 2.

5.2.2.7 Environmental Justice

Please see Section 5.1.2.7 for discussion on environmental justice in the region.

5.2.2.8 Cultural Values

Please see Section 5.1.2.8 for a discussion of Cultural Values along Route 2.

5.2.2.9 Recreation

Please see Section 5.1.2.9 for a general description of Recreation resources around Route 2.

5.2.2.10 Public Services

The public services discussed in 5.1.2.10 are applicable to Route 2.

5.2.2.11 Impacts and Mitigation For Route 2-Human Settlement

Public Health and Safety

Measures to avoid and minimize potential impacts to human health and safety are incorporated into the proposed facility design and design cost. No additional mitigation measures are needed or proposed.

Land Use

All land uses crossed by Route 2 have the potential to be impacted by the proposed route. The proposed transmission line will mostly follow an existing right-of-way along the old Burlington Railroad bed where it is not expected to permanently impact land uses. However, some of the land along this right-of-way has been sold back to land owners in recent years and may have been converted back into productive land. Establishing a transmission line along this route will impact productive agricultural land in these areas. Furthermore, construction will result in temporary removal of shrubs and grassland within the right-of-way.

Easements will have to be acquired along the proposed route to allow for new right-of-way to be established to accommodate construction along portions of the former railroad, resulting in new right-of-way impacts that would affect existing or future use of adjacent parcels. Approximately 4.8 miles of new right-of-way is expected to be required to accommodate construction of the Proposed Project along Route 2. Where new right-of-way is necessary, the Applicant would seek a 100 foot wide easement from private landowners to accommodate the transmission structures.

For approximately 1.6 miles along Route 2, additional easements will have to be acquired to allow for new right-of-way on land adjacent to the existing road right-of-way, to accommodate overhang from structures within the road right-of-way, or to allow structures to be placed on private land if construction within the road right-of-way is infeasible.

As part of the acquisition/coordination process, affected property owners will be notified of the construction schedule, site access requirements and vegetation clearing (and maintenance) requirements for construction and maintenance of the line.

From the initial process the Applicant has tried to minimize potential impacts by avoiding urban/residential areas to the greatest extent possible and by co-locating the routes along existing ROW such as railroads and existing transmission lines. Any shifts to the intended ROW would be evaluated to minimize impacts. Locations of new ROW would be determined with landowners' or agencies' input. Construction activities will be limited to the ROW.

Landowner Displacement

If residences fall within the right-of-way the transmission alignment will be shifted in a manner such that no person will be displaced from their residence or business. The majority of Route 2 follows an existing or former railroad right-of-way and so no person is expected to be displaced from their residence of business. All of the homes located along the right-of-way are greater than 50 feet from the proposed transmission line, with the exception of one residence and two businesses that are located within 30 feet of the proposed.

As discussed in Section 4.3, easements will need to be acquired along the proposed route. These easements would allow for new right-of-way to be established on land where former railroad right-of-way has been sold back to landowners, to accommodate overhang from structures within the road right-of-way, or to allow structures to be placed on private land if construction within the road right-of-way is infeasible or not supported by the respective road authority. As part of the acquisition/coordination process, affected property owners will be notified of the construction schedule, site access requirements and vegetation clearing (and maintenance) requirements for construction and maintenance of the line.

Temporary indirect effects to residential properties may occur and would include construction related noise, potential interruptions to traffic during construction, temporary impacts to properties, and possible changes to home or property values. Noble would coordinate with private land owners and township and county officials to minimize impacts of the right-of-way. No landowners would be displaced by the acquisition of the substation and switching station parcels. No additional mitigation measures are needed or proposed.

Aesthetics

Aesthetic impacts will be diminished due to the use of existing corridors along approximately 51 percent of the route. The proposed transmission line will pass through the town of Glyndon and there may be adjacent residences that would perceive the line as a visual intrusion in their neighborhood. The most visible components of the transmission lines are the transmission poles. These poles will be designed to have the narrowest profile possible to make them less obtrusive in the landscape. Furthermore, the Applicant proposes to work with land owners and homeowners to identify aesthetic concerns. Care would be given to preserving the natural landscape and construction and operation would be conducted to prevent unnecessary destruction of the surrounding landscape. In addition the Applicant has identified a route that avoids homes and other surrounding land uses to the greatest extent possible.

The proposed substation and switching station will be most visible to landowners immediately adjacent to the parcels of land that would be developed. The substation and switching station will also be visible to motorists driving along roads adjacent to the facilities. The substation and switching station will have limited local visibility because they will be sited away from high traffic areas.

Additionally, if concerns are raised in regards to the aesthetic impacts of the substation, screening with plants or berms may be employed to minimize visual impacts.

Socioeconomics

Please see Section 5.1.2.11 for a general discussion on the impacts and mitigative measures regarding socioeconomics in the region. A delay in the in-service date as discussed in Section 2.6 would cause a negative impact on the region. If the proposed 230kV transmission line is not constructed in a timely manner the proposed wind energy generating facility associated with the Proposed Project would not have the infrastructure available to outlet the wind energy being generated.

Environmental Justice

The Proposed Project is not expected to create disproportionately high or adverse human health or environmental effects on low income populations, therefore, no mitigation is necessary.

Cultural Values

Please see Section 5.1.2.11 for details on impacts and mitigation for cultural values in the Proposed Project area.

Recreation

The line will likely be visible to individuals using recreation resources with 1.5 to 2 miles of the transmission line. No direct impacts are anticipated to SNA or State Park lands. The Applicant will work with MDNR and USFWS to avoid and minimize impacts to waterfowl on SNA and State Park lands. The line will not cross SNA or State Park lands and so will not impede on land heavily used for recreation in this area.

Public Services

Measures to avoid and minimize potential impacts to human health and safety are incorporated into the proposed facility design and design cost. No additional mitigation measures are needed or proposed.

5.2.3 Land-based Economies

5.2.3.1 Agriculture

The description of the County agricultural resources in Section 5.1.3.1 pertaining to Route 1 is applicable to Route 2.

5.2.3.2 Forestry

Please see Section 5.1.3.2 for a description of forestry resources near the Proposed Project.

5.2.3.3 Tourism

Please see Section 5.1.3.3 for a description of tourist attractions in Clay County.

5.2.3.4 Mining

According to MN/DOT county pit maps for Clay County there are no active or inactive aggregate pits or rock quarries within several miles of the Route 2 corridor. Although there are aggregate mines in the region, there are no mined areas or identified potential mineral resources in the immediate area of the proposed transmission line route or substation/switching station locations.

5.2.3.5 Impacts and Mitigation for Route 2-Land-based Economics

Agriculture
The impacts to agricultural land will be minimal due to the routes location within an existing railroad and/or road right-of-way. However, some of the right-of-way for the railroad has been sold back to landowners in the area. These farm fields will be bisected by the Route 2 corridor. Most of the impact to farmland will be limited to pole placement within the field production areas. During construction, temporary impacts such as soil compaction and crop damage within the right-of-way are likely to occur. Some permanent impacts will result where the new right-of-way bisects agricultural fields. New right-of-way will be created for approximately 4.8 miles of the 9.9 mile route corridor.

Wherever possible, poles will be placed so they fall within the existing right-of-way, minimizing permanent impacts to agricultural land. The company will compensate landowners for crop damage and soil compaction that occurs during project construction.

The substation location and the proposed switching station location will each be located on ten acre private properties that are currently used for agricultural purposes. Approximately 2.5 acres of the substation parcel and six acres of the switching station parcel would be removed from agricultural production to accommodate the substation and switching station equipment and other necessary facilities. The remainder of the two ten acre parcels could continue to be used for agricultural production. No mitigation is necessary, since the Proposed Project minimizes agricultural impacts.

Forestry
The proposed project corridor will not affect forest production resources, therefore, no mitigation is necessary.

Tourism
The proposed transmission line is not anticipated to impact tourism, therefore, no mitigation is necessary.

Mining
No aggregate pits exist in the area of the proposed transmission line. Therefore, the Proposed Project would not result in mining impacts.

5.2.4 Archaeological and Historical Resources

Please see Section 5.1.4 for a brief regional prehistoric and historic-period context and a description of the record search and review of existing records that was conducted for the Proposed Project area.

5.2.4.1 Documented Cultural Resources

Please see Section 5.1.4.1 for a brief description of the documented cultural resource surveys in the area.

Archaeological Sites
One archaeological site has been documented within 1 mile of Route 2. This site is located 0.2 miles from Route 2 and consists of a Pre-contact Late Woodland artifact scatter. This site has not been evaluated for listing on the National Register of Historic Places (NRHP).

Historical Properties
A total of 13 architectural history properties have been identified within 1 mile of Route 2, primarily in the Town of Glyndon. None of the 13 properties have been evaluated for listing on the NRHP; however, the proposed location of Route 2 will likely pass in close proximity to some of these properties.

National Register Eligible Properties
According to SHPO file search of archaeological sites and architectural history properties performed on August 18, 2008, no properties evaluated for the National Register have been identified within Route 2 of the Proposed Project area.

5.2.4.2 Impacts and Mitigation for Route 2-Archaeological and Historic Resources

Please see Section 5.1.4.5 for a description of all archaeological and historic resources impacts, and the proposed steps for additional study and mitigation.

5.2.5 Natural Environment

5.2.5.1 Geomorphic and Physiographic Environment

Please see Section 5.1.5.1 for a brief description of the geomorphic and physiographic environment in the Proposed Project area.

Topography
Please see Section 5.1.5.1 for a description of the topography within the Proposed Project area.

Geology
Please see Section 5.1.5.1 for a description of the geology in the Proposed Project area.

5.2.5.2 Climate

Please see Section 5.1.5.2 for a general description of the climate in the region.

5.2.5.3 Soils

Please see Section 5.1.5.3 for a general description for the soils in the Proposed Project area.

5.2.5.4 Air Quality

Please see Section 5.1.5.4 for a discussion on Air Quality along Route 2.

5.2.5.5 Water Resources

Hydraulic features, such as wetlands, lakes, rivers, floodplains, and drainage ditches perform important functions within a landscape. These functions include flood attenuation, ground water recharge, water quality protection, and habitat for local biota. The following sections will provide a summary of surface water, water quality, floodplain, and groundwater resources present in the Proposed Project area.

Public waters
Please see Section 5.1.5.5 for a general description for public water in the Proposed Project area.

Minnesota Public Waters mapping indicates that the Buffalo River is the main water resource within the Route 2 corridor (see Figure 1 and Figure 6 in Appendix A, and **Table 5-13**). South of the Buffalo River is an intermittent stream located Approximately ¼ mile south of 12 Street Southeast. According to the MNDNR PWI map this intermittent stream is classified as public water.

The Buffalo-Red River Watershed District's online ditch mapping inventory was utilized to determine which County ditches Route 2 will cross (see Figures 5, 6, and 7 in Appendix A, and **Table 5-13**). The Clay County Ditch Number 3 is located parallel and adjacent to the south of 70th Avenue. The Route 2 Transmission Line will cross this ditch immediately after leaving the substation. The Clay County Ditch Number 2 is located parallel to 43rd Avenue and Route 2 will cross the ditch at the intersection of 43rd Avenue and Highway 9. South of the Buffalo River the Clay County Ditch Number 12 is located parallel to 40th Avenue and Route 2 will cross the ditch at the intersection along Highway 9. The Applicant will attempt to span the Clay County Ditches, therefore no impacts are anticipated.

Table 5-13
Route 2 Water Features

ID	Type[1]	Jurisdiction
Feature 2A	County Ditch #3	Clay County SWCD/ Buffalo-Red River Watershed District
Feature 2B	Palustrine emergent seasonally flooded (PEMC)	Clay County SWCD/Buffalo-Red River Watershed District/USACE
Feature 2C	Palustrine emergent temporarily flooded-partially drained (PEMAd)	Clay County SWCD/Buffalo-Red River Watershed District/ASACE
Feature 2D	Palustrine emergent temporarily flooded-partially drained (PEMAd)	Clay County SWCD/Buffalo-Red River Watershed District/ASACE
Feature 2E	County Ditch #2	Clay County SWCD/ Buffalo-Red River Watershed District
Feature 2F	Palustrine scrub-shrub temporarily flooded broadleaf deciduous (PSS1C)	Clay County SWCD/Buffalo-Red River Watershed District/ MDNR/ USACE
Feature 2G	Buffalo River	Clay County SWCD/Buffalo-Red River Watershed District/ MDNR/ USACE
Feature 2H	Palustrine unconsolidated bottom semipermanently flooded (PUBF)	Clay County SWCD/Buffalo-Red River Watershed District/ MDNR/ USACE
Feature 2I	Intermittent stream	Clay County SWCD/Buffalo-Red River Watershed District/ MDNR
Feature 2J	Palustrine unconsolidated bottom intermittently flooded-excavated (PUBGx)	Clay County SWCD/Buffalo-Red River Watershed District/USACE
Feature 2K	County Ditch # 12	Clay County SWCD/ Buffalo-Red River Watershed District

[1] Wetlands types adapted from Classification of Wetlands and Deepwater Habitats of the U.S., Cowardin et al. (1979)

Water Quality
Please see Section 5.1.5.5 for a discussion of water quality issues in the Proposed Project area.

Floodplains
Please see Section 5.1.5.5 for a discussion of floodplains in the Proposed Project area.

A floodplain map depicting the FEMA 100-year and 500-year floodplain for the Proposed Project area are shown on Figure 8. These figures illustrate that Route 2 would cross approximately ½-mile of the floodplain.

Ground Water
Please see Section 5.1.5.5 for a general discussion of ground water sources in the Proposed Project area.

5.2.5.6 Wetlands and Riparian Areas

Please see section 5.1.5.6 for a general discussion of wetlands.

The National Wetland Inventory (NWI) database indicates the general location of wetlands based on changes in vegetation patterns as observed from aerial photography. Tetra Tech reviewed aerial photographs and NWI data to determine the presence of wetland habitat within the Proposed Project area; this search indicated that numerous wetland areas are located within the Proposed Project area. The wetland and other water features observed along Route 2 through review of high-resolution aerial photography and the NWI dataset are listed in **Table 5-13**.

NWI mapping indicates six wetlands along the Route 2 corridor (see Figures 5, 6, and 7 in Appendix A, and **Table 5-13**). The six NWI wetlands identified are not listed on the MDNR's inventory of public waters. A palustrine emergent seasonally flooded (PEMC) wetland is depicted on the west side of the abandoned railway between 57th Avenue and 70th Avenue (Feature 2B). Two adjacent palustrine emergent temporarily flooded-partially drained (PEMAd) wetlands are depicted on the east side of the abandoned railway near 110th Avenue (Features 2C and 2D). A palustrine scrub-shrub temporarily flooded broadleaf deciduous (PSS1C) wetland is depicted on the west side the abandoned railway adjacent north to the Buffalo River (Feature 2F). A palustrine unconsolidated bottom semipermanently flooded (PUBF) wetland is depicted to the west of the abandoned railway line and 110th Avenue adjacent to the south of the Buffalo River (Feature 2H). The wetlands associated with the Buffalo River may be under the jurisdiction of the USACE. A palustrine unconsolidated bottom intermittently flooded-excavated (PUBGx) wetland is depicted on the east side of 110th Avenue between 12th Avenue and 28th Avenue (Feature 2J). The wetlands identified on the NWI map do not necessarily represent the actual wetlands subject to protection under Section 404 of the Clean Water Act and under the Minnesota Wetland Conservation Act.

5.2.5.7 Flora

This section describes plant and wetland communities known to occur within the vicinity of the Proposed Project area. Literature reviews were conducted to determine the types of vegetation and vegetative communities present. A Tetra Tech biologist conducted a limited field reconnaissance of the Proposed Project area and associated transmission facility locations on December 18th and 19th, 2007. A determination of plant communities and potential wetland habitats was conducted to the extent feasible given the limitations imposed by the brevity of the site reconnaissance.

A majority of the vegetation surrounding Route 2 is crops planted on agricultural land and field margins dominated by common weeds such as Thistle (*Cirsium spp.*), Stinging Nettle (*Urtica dioica*), and others. This land was once dominated by native prairies, and areas within the corridor may still contain prairie remnants. Using the Minnesota County Biological Survey (MCBS) railroad prairie remnant dataset, three segments of high quality mesic prairie have been identified along Route 2 (see Section 5.2.6 for more details on remnant prairies).

Please see Section 5.1.5.7 for a description of the plants that historically occur in the area and may be present in the prairie remnants along the proposed transmission line.

Plant Communities
Please see Section 5.1.5.7 for information on plant communities within the Proposed Project area.

5.2.5.8 Fauna

Please see Section 5.1.5.8 for discussion on fauna within the Proposed Project area.

5.2.5.9 Impacts and Mitigation For Route 2-Natural Environment

Geomorphic and Physiographic Environment

Topography
See Section 5.1.5.9 for a description of topography impacts and mitigation for the Proposed Project area.

Geology
See Section 5.1.5.9 for a description of geology impacts and mitigation for the Proposed Project area.

Climate
Please see Section 5.1.5.9 for a discussion on the impacts to climate in the Proposed Project area and proposed mitigation.

Soils
See Section 5.1.5.9 for a description of soil impacts and mitigation in the Proposed Project area.

Air Quality
See Section 5.1.5.9 for a description of air quality impacts and mitigation from the Proposed Project.

Water Resources

Public Waters
Impacts to surface water are not likely to occur to public waters basins as a result of the Proposed Project. The transmission line will cross the Buffalo River north of the town of Glyndon. However, the Applicants will attempt to span the Buffalo River using the former railroad right-of-way, therefore impacts to the river will minimal.

Water Quality
See Section 5.1.5.9 for a discussion of water quality impacts and mitigation associated with the Proposed Project.

Floodplains
Floodplains will require further evaluation from a regulatory perspective. During periods of intense rainfall and during spring runoff, many of the upland drainage bottoms may exhibit temporary flooding. A review of digital floodplain data shows that up to 7 of the transmission structures may be placed in floodplains adjacent to the Buffalo River, assuming an average spacing of 400 feet between structures. The estimated permanent impact would be about 105 square feet (0.002 acres). Since floodplain impacts are, generally, regulated based on changes to floodplain storage (volume), the overall storage impact would correspond to approximately 0.5 cubic yard of displaced water for every foot of inundation, for each structure.

Overall impacts would depend on the elevation of the poles as compared to the floodplain elevation. Storage volume impacts would be determined during final design, once pole locations have been identified. Design of the transmission lines placed in these areas should consider flooding possibilities and these structures should be engineered and constructed to withstand temporary inundation and forceful currents without significantly obstructing stream flow.

Ground Water
See Section 5.1.5.9 for a discussion of impacts and mitigation to ground water resources in the Proposed Project area.

Wetlands and Riparian Areas
The Applicant will attempt to span wetlands along the Route 2 corridor. Pending the location of individual transmission poles, there is a potential for wetland areas to be impacted by the Proposed Project. The Applicant will maintain sound soil and water conservation practices during construction and operation of the Proposed Project to protect adjacent water resources and to minimize soil erosion. Upon the final determination of the transmission route, the Applicant will conduct a comprehensive onsite wetland determination of the transmission line, substation parcel, and switching station parcel, which will include delineation of wetlands within the corridor to minimize any effects to water resources in the Proposed Project area.

Flora
Since the proposed project will occur along an existing railroad right-of-way and agricultural lands that have been previously disturbed, few impacts are expected to native vegetation. However, there are three areas identified along Route 2 that may contain remnant prairie. The total area of these prairie remnants is approximately 400,000 square feet (about 9.2 acres) within the railroad right-of-way, (assuming the prairie habitat is present throughout the majority of the 150-foot wide railroad right-of-way along the identified segments). A survey of vegetation and plant communities will need to be conducted along Route 2 to confirm existing remnant prairie and identify their locations and potential impacts along the route from the Proposed Project. Efforts will be made to assure that any identified prairie remnants and threatened and endangered species will be avoided near the route (this is discussed in more detail in section 5.1.6). The Applicant will maintain sound water and soil conservation practices during construction of the project to protect adjacent water resources and minimize soil erosion, thus protecting essential habitat.

Fauna
Please see Section 5.1.5.9 for a description of impacts and mitigation to fauna within the Proposed Project area.

5.2.6 Rare and Unique Natural Resources

5.2.6.1 Rare and Unique Flora

Please see Section 5.1.6.1 for a general discussion on rare and unique flora in the Proposed Project area.

The Proposed Project area was once part of the prairie grassland region of Minnesota, and areas along the proposed corridor may contain prairie remnants. Approximately 99 percent of the prairie that was present in the state before settlement has been destroyed making prairie remnant areas one of Minnesota's rare and unique resources. According to the MCBS dataset, there are three segments of high quality native prairie remnants within section 2-1 (see Section 3.2.2 for a detailed description of route) of Route 2. The total area of these prairie remnants is approximately 400,000 square feet (about 9.2 acres) within the railroad right-of-way, (assuming the prairie habitat is present throughout the majority of the 150-foot wide railroad right-of-way along the identified segments).

5.2.6.2 Rare and Unique Fauna

Please see Section 5.1.6.2 for a description of rare and unique fauna within the Proposed Project area.

5.2.6.3 Impact and Mitigation For Route 2-Rare and Unique Natural Resources

Several areas of concern have been identified along the Route 2 corridor that may consist of native prairie remnants. Due to the known presence of prairie remnants within the Route 2 corridor, and sensitive habitat

and endangered, threatened, or special concern species in the vicinity of the Proposed Project, the Applicant will conduct a comprehensive onsite biological assessment of the determined transmission line route, substation parcel, and switching station parcel prior to construction activities, to confirm that sensitive species are not impacted. Where impacts to these areas can not be avoided, the Applicant will coordinate with the MDNR and USFWS to implement appropriate mitigative measures.

The construction of the transmission line would result in temporary, construction related, and long-term loss of habitat in the small patches of native grassland habitat, woodlands, and agricultural fields within the Proposed Project area. In addition, activities such as road construction and tree clearing can result in the loss of or disruption to habitats and allow for the introduction of unwanted plant species.

Due to the known presence of several Greater prairie chicken booming grounds in the vicinity of the Proposed Project area, the MDNR recommended close coordination with the MDNR Area Wildlife Manager to obtain the most recent data on prairie chicken use in the area. Based on a review of this data, the Proposed Project is not anticipated to directly impact any known prairie chicken booming grounds. Due to the known presence of sensitive habitat and endangered, threatened, or special concern species in the vicinity of the Proposed Project, the Applicant will conduct a comprehensive onsite biological assessment of the determined transmission line route, substation parcel, and switching station parcel prior to construction activities, to confirm that sensitive species are not impacted. Similarly, as discussed in the Section 5.1.5.9, the Applicant will conduct avian and bird field surveys in the Proposed Project area to document the intensity of resident and migratory bird and bat use and identify sites where effects could be further minimized as practicable.

According to the MDNR, several mussel species of concern have been documented in the Buffalo River in the vicinity of the Proposed Project area. Erosion and sediment control practices would be implemented and maintained for any work conducted near the river or stream areas. As described previously, sound water and soil conservation practices will be maintained during construction and the operation of the project to protect topsoil and adjacent water resources and minimize soil erosion.

5.2.7 Unavoidable Adverse Impacts – Route 2

The unavoidable adverse impacts caused by the construction of the Proposed Project along Route 1 are minimal. However, impacts that are unavoidable include land use, noise, aesthetics, agriculture, air, water, wetlands, flora, and fauna impacts (**Table 5-14**).

Table 5-14
Summary of Impacts and Mitigation – Route 2

Resource	Impact	Mitigation
Land Use	Temporary impact from construction activities on the land surrounding the poles and the access road used for construction; Minor permanent impact from placement of poles. About 20 acres of land will be permanently impacted by construction of the substation and switching station.	Routes were identified that avoided areas with dense populations. The route will avoid homes and use existing railroad or roadway corridors for 5.1 miles or the 9.9-mile length of Route 2. Additionally, individuals with the route on their land will be compensated through easement dollars.
Noise	Temporary impact from construction activities on the land surrounding the poles and the access road used for construction; Minor permanent impact from substation noise.	Line routing avoided areas with dense populations. The route will avoid homes to the greatest extent possible. Construction will be conducted consistent with local ordinances. Additionally, buffer areas will be used around the substation and switching station.
Aesthetics	There are no areas with significant visual importance that will be impacted by the transmission line. However, minor visual impact will occur in areas where poles will be placed, and around the substation and switching station. Route 2 passes through the town of Glyndon and there may additional aesthetic impacts in these areas.	Line routing avoided areas with a large number of homes and to use existing linear corridors that are already disturbed to the greatest extend possible. Additionally, the Applicant proposes to work with land owners and homeowners to identify aesthetic concerns. Buffer areas will be also used around the substation and switching station.
Agriculture	Temporary impact from construction activities to crop cycle and physical impact to the land along the access road and around the poles; Minor permanent impact from placement of poles, and on the substation and switching station parcels. About 4.8 miles of new right-of-way will be created for Route 2 where farm fields will be bisected.	The line was routed along existing railroad and road right-of-way to decrease impacts to production areas. Landowners will be compensated for crop damage. Additionally, landowners will be compensated for all easements and parcel acquisitions.
Archaeological & Architectural History	A number of previously document archaeological site and architectural history properties are known to occur near the proposed routes. Additional undocumented cultural resources may also be present along the Route 2 corridor.	The Applicant will conduct a Phase IA pedestrian survey along the final route to document any cultural resources within the anticipated area of impact. The Applicant will provide the results of all field surveys and identified historic properties in the vicinity of the Proposed Project area to the MN SHPO for formal review and comment.
Air	Temporary impacts will occur in the areas where Noble is actively constructing the transmission line.	Best management practices will occur during construction to minimize the amount of fugitive dust that is created.
Water	Route 2 will cross approximately ½-mile of floodplain adjacent to the Buffalo River.	Design of the structures placed in these areas will consider flooding possibilities and will be engineered and constructed to withstand temporary inundation and forceful currents without significantly obstructing stream flow.

Wetlands	Six wetland areas were identified along the Route 2 corridor, and may be impacted by the proposed route. Temporary impacts will occur during construction.	Wetlands will be spanned if possible. Upon the final determination of the transmission route, wetlands within the corridor will be delineated to minimize any impacts. If wetlands cannot be avoided Noble will minimize impacts as described in Section 5.1.5.9.
Flora	Several areas of concern were identified by USFWS and MDNR in areas primarily to the east the Proposed Project area. MCBS data identified three segments of high quality mesic prairie along railroad right-of-way within Route 2.	The line route was chosen to avoid these identified sensitive areas to the east. Additionally, Noble will conduct a comprehensive onsite biological assessment of the determined transmission line route, substation parcel, and switching station parcel prior to construction activities to identify any sensitive habitat or species. Where impacts to these areas can not be avoided, the Applicant will coordinate with the MDNR and USFWS to implement appropriate mitigative measures.
Fauna	The possibility of birds and bats colliding with the lines is possible, especially in areas of high use by waterfowl and other species during migration.	Field surveys for resident and migrant avian and bat species will be conducted to evaluate potential impacts. Noble will work with the MDNR to identify areas along the new transmission line where additional measures are needed to protect the wildlife that may be impacted. Typical measures may include swan flight diverters and the use of H-frame structures.

5.3 Preferred Route Summary

In determining whether to issue a permit for a high voltage transmission line, the PUC considers 14 factors, which are listed in Minnesota Rule 7849.5910. A discussion of each of the relevant factors for the Route 1 and Route 2 are provided side by side in Table 5-15 below.

The deciding factors in selection of Route 1 as the Applicant's preferred route for the Proposed Project are as follows:

- Route 1 uses less new right-of-way. Route 1 uses existing right-of-way corridors for the entire 11.4 mile route. In contrast, Route 2 relies upon 4.8 miles new right-of-way to be obtained along portions of the 9.9 mile route.

- Route 1 will have lesser impact on aesthetics and residences. Route 1 utilizes the existing MN Highway 9 corridor. Route 2 will cross through the town of Glyndon and impacts residential areas within the town.

- Route 1 will impact less agricultural areas. Route 1 follows the existing MN Highway 9 corridor so minimal impacts to agricultural areas and production are expected. In contrast, portions of the former Burlington Northern railroad right-of-way along Route 2 has been repurchased by landowners and some of this land has been put back into agricultural production.

- Construction time for Route 1 will be less than the time to construct Route 2. The Noble Flat Hill Windpark I is scheduled to be constructed and operational by December 2010. Route 1 was chosen to assure that this schedule could be met. Route 2 will take longer due to the need to acquire new right-of-way, this will delay the construction of the Proposed Project and the in-service date of the 201 MW Noble Flat Hill Windpark I wind energy generating facility until at least December 2011. The socioeconomic impacts from this construction delay are discussed in Section 5.2.2.11.

- Route 1 will have less impact on native vegetation and remnant prairie areas than Route 2. Route 1 follows existing right-of-way along MN Highway 9 and so no prairie remnant is anticipated to be impacted. In contrast, Route 2 is anticipated to contain three segments of remnant prairie.

Table 5-15
Factors Considered for the Proposed Project Route

Factor	Route 1	Route 2	Lesser Impacts
Effects on human settlement and aesthetics			
Displacement	None	None	----------
Noise	Noise levels will be within state levels. Transmission line and associated facilities noise levels will also be below background noise levels.	Same as Route 1	----------
Aesthetics	Poles and line will affect the landscape view. However, 100% of the route will follow an existing disturbed corridor. Furthermore, an existing 5 mile transmission line already exists along this corridor. Placement of the line will likely not cause any visual impacts for homes along the route.	Poles and line will affect the landscape view. However, 51% of the route will follow an existing disturbed corridor. Placement of the line will potentially cause visual impacts to one home along the route.	Route 1
Cultural values	None	None	----------
Recreation	No direct impacts to recreational areas are anticipated.	Same as Route 1	----------
Public services	None	None	----------
Socioeconomic	Minor positive short-term effects from construction activities to local economy expected.	Minor positive short-term effects from construction activities to local economy expected. A delay of in-service date will cause negative impacts to the region.	Route 1
Effects on public health and safety	None	None	----------
Effects on land-based economics	Temporary impact from construction activities to crop cycle and physical impact to the land along the access points to poles. Minor permanent impact from placement of poles, and on the substation and switching station parcels.	Temporary impact from construction activities to crop cycle and physical impact to the land along the access road and around poles. Minor permanent impact from placement of poles, and on substation and switching station parcels. About 4.8 miles of new R-O-W will be created and farm fields will be bisected.	Route 1
Effects on archaeological and historic resources	No archeological sites and one historical architectural site have been documented within one mile of the route.	One archeological site and 13 historical architectural sites have been documented within one mile of the route.	Route 1
Effects on the natural environment			

Factor	Route 1	Route 2	Lesser Impacts
Air	There will be no measurable impacts relating to ozone. Temporary impacts to air quality will be caused by construction related activities.	Same as Route 1	----------
Water	This route will cross approximately 2 miles of floodplain adjacent and to the north of the Buffalo River. Additionally 3 wetland areas were identified along the route corridor and may be impacted; however, the Applicant will attempt to span the wetland in these areas. Temporary impacts to wetlands during construction.	This route will cross approximately ½ mile of floodplain adjacent to the Buffalo River. Additionally 6 wetlands were identified along the route and may be impacted; however, the Applicant will attempt to span the wetland in these areas. Temporary impacts to wetlands during construction.	Route 1
Flora/Fauna	Nominal impacts are expected to flora given that the majority of the route follows an already altered landscape. Impacts to fauna such as line collision are possible.	Nominal impacts are expected to flora in the areas of the route that follow an already altered landscape. However, MCBS data has identified 3 segments of high quality mesic prairie along the railroad R-O-W. Impacts to fauna such as line collision are possible.	Route 1
Effects on rare and unique natural resources	None	MCBS data has identified 3 segments of high quality mesic prairie along the route. Impact to the remnant prairie is anticipated; however, the Applicant will attempt to span the remnant prairie in these areas.	Route 1
Application of design options that maximize energy efficiencies, mitigate adverse environmental effects and could accommodate expansion of transmission capacity	The Applicant will work with the affected landowners to use a design that mitigates the impact on the affected landowner and the R-O-W. Future expansion designs are no included in the project because no known or likely plans exist to expand the route. The current design is appropriate for this project.	Same as Route 1	----------
Use or paralleling of existing rights-of-way, survey lines, natural division lines and agricultural field boundaries	The route is designed to follow existing R-O-W, survey lines, and agricultural field boundaries. Refinements will be made during construction with input from landowners.	The route is designed to follow existing R-O-W, survey lines and agricultural field boundaries. However, 49% of the line will require purchase of new R-O-W along the railroad bed. Refinements to route design will be made during construction with input from landowners.	Route 1

Factor	Route 1	Route 2	Lesser Impacts
Use of existing large electric power generating plant site	Not Applicable	Not Applicable	----------
Use of existing transmission, pipeline and electrical transmission systems or rights-of-way	100% of the route will follow existing R-O-W along Highway 9.	51% of the route will follow existing R-O-W along the former Burlington Northern Railroad bed (this is all but 4.9 miles).	Route 1
Electrical system reliability	Line and route designed to provide reliable outlet capability to Noble Flat Hill Windpark 1. However, the line would be double circuited for 44% of the route. A double circuit line may be less reliable than a single circuit line.	Line and route designed to provide reliable outlet capability to Noble Flat Hill Windpark 1.	Route 2
Costs of construction, operating and maintaining the facility which are dependant on design and route	Construction costs estimated to $16,800,000.	Construction costs estimated to $14,300,000. However, construction of this route will result in a delay of in service date.	Route 1
Adverse human and natural environmental effects which cannot be avoided	The unavoidable impacts to human and natural environment are minimal. Construction related activities would cause short-term impacts, mainly in the form of disturbed soils and vegetation. Long-term, the installation of poles and conductors along the route will create some aesthetic impacts that can not be avoided.	Same as Route 1. However, existing high quality mesic prairie along the R-O-W may be impacted by construction and placement of the poles.	Route 1
Irreversible and irretrievable commitments and resources	The proposed route does not require any irreversible or irretrievable commitment of resources. If the line were removed in the future, the land could be restored.	Same as Route 1	----------

6.0 AGENCY AND PUBLIC CONTACTS

6.1 Agency Contacts

Agency interactions for the Noble Flat Hill Windpark I and the associated transmission line began in November 2007 with initial information requests sent to the USFWS, MDNR, and MN SHPO. These requests were components of a 'Fatal Flaw Analysis' that was conducted by Noble to guide the placement of the wind energy facility and the proposed transmission line.

The area searched as part of the Fatal Flaw Analysis included sections of Clay County within Spring Prairie and Riverton Townships. This area incorporated land currently outside the Proposed Project area, as it is defined in Section 2.4, which included numerous areas of sensitive habitat. These resources are associated with the Agassiz Beach Ridge formations to the east of the Proposed Project area and included prairie remnants, natural areas managed by The Nature Conservancy, and segments of Bluestem Prairie Scientific and Natural Area (SNA).

The details of this initial correspondence and subsequent communications between Noble and the various agencies are detailed below. Refer to Appendix C for copies of all agency correspondence letters.

6.1.1 Minnesota Department of Natural Resources

The Minnesota DNR Natural Heritage and Nongame Research Program were contacted to request a review of the Minnesota Natural Heritage database for listings located within the search area. The request was submitted on November 30, 2007, and was responded to on January 9, 2008. In their initial response, the MDNR identified 157 known occurrences of rare species or native plant communities in the search area. In addition, they noted several areas of special concern including native plant communities that provide habitat for numerous rare features (as discussed previously in Sections 5.1.5, 5.1.6, 5.2.5, and 5.2.6).

Due to the presence of these unique habitats and the known occurrences of sensitive flora and fauna in these areas, the MDNR encouraged Noble to consider project alternatives that would avoid direct or indirect impacts to these ecologically significant areas. Their response also recommended that Noble communicate with the Nature Conservancy's Northern Tallgrass Prairie Office, the Buffalo River State Park, the MDNR Area Wildlife Manager, and the MDNR Prairie Management Specialist regarding the details of the proposed wind project and transmission line.

Subsequent communications were sent to all the recommended parties. The responses from these individuals and organizations are included in Appendix C. Specifically, the most recent field data identifying Greater prairie chicken booming grounds in the vicinity of the Proposed Project area was obtained from the MDNR Area Wildlife Manager.

A meeting was also held between Noble, USFWS, Minnesota State Parks, and MDNR staff on April 8th, 2008. Noble presented modifications to their proposed wind project and transmission line based on the feedback that had been received from the various agency contacts. Specific modifications to the project included placement of all turbine, substation, and electrical collection system facilities to the west of MN Highway 9 (as specifically recommended in the Nature Conservancy response letter dated March 11, 2008, Appendix C), and aligning the proposed transmission line along the MN Highway 9 corridor.

Based on these modifications to the Proposed Project, it is not anticipated that any of the rare species or habitats identified by the MDNR would have the potential to be adversely affected by the Proposed

Project. The details of any potential impacts and associated mitigation procedures are explained in Sections 5.1.5.9, 5.1.6.3, 5.2.5.9, and 5.2.6.3.

6.1.2 Minnesota State Historic Preservation Office (SHPO)

A letter was sent to SHPO requesting their review of the Minnesota Archaeological Inventory and Historic Structures Inventory database for the project area for previously-known resources that could potentially be impacted by the Proposed Project. Their response to this request was received via e-mail on November 30, 2007 (see Appendix C). Their search revealed no previously-known Historic resources within the project search area. A supplementary review of the Minnesota Archaeological Inventory and Historic Structures Inventory database was requested in August 2008 due to the addition Route 2 and the time lapse between the original request and the submittal of the route permit. Their response to this request was received via e-mail on August 19, 2008 (see Appendix C). Their search revealed no previously-known Historic resources within the project search area.

6.1.3 United States Fish and Wildlife Service

An inquiry was sent to the United States Fish and Wildlife Service (USFWS) to identify federally listed species within the search area. The request was submitted on November 30, 20078, and responded to on February 13, 2008. The USFWS identified several Wildlife Management Areas and Waterfowl Production Areas located to the northeast of the search area, as well as suitable habitat for the Western prairie fringed orchid, a plant species listed as threatened under the Endangered Species Act. The letter included six recommendations considered essential for evaluation of environmental resources and potential mitigation measures for the proposed wind project and transmission line, including:

- Locating turbines outside sensitive habitat areas, including grasslands, prairie, and wetlands
- Burying collection system transmission line and using existing poles and alignments to the maximum extent possible
- Pre-and post-project monitoring methodology to focus on avian resources most likely to be affected by the project.

A meeting was also held between Noble, USFWS, Minnesota State Parks, and MDNR staff on April 8th, 2008. Noble presented modifications to their proposed wind project and transmission line based on the feedback that had been received from the various agency contacts. Specific modifications to the project included placement of all turbine, substation, and electrical collection system facilities to the west of MN Highway 9 (as specifically recommended in the Nature Conservancy response letter dated March 11, 2008, Appendix C), and aligning the proposed transmission line along the MN Highway 9 corridor.

A response letter was received on July 8, 2008, in response to the April 8th meeting, and on-going discussions between Noble and the USFWS regarding the proposed Noble Flat Hill Windpark I and the associated transmission line stating that "the revised project has met these [six] criteria, including avoidance of potential Western prairie fringed orchid habitat." Details of additional monitoring and mitigation measures that will be pursued by the Applicant in accordance with USFWS guidance are included in Sections 5.1.5.9, 5.1.6.3, 5.2.5.9, and 5.2.6.3. Copies of all USFWS correspondence are included in Appendix C.

6.1.4 The Nature Conservancy

The Nature Conservancy (TNC) was contacted via telephone on February 6, 2008, to discuss the siting of the proposed wind energy facility and transmission line. A response letter was received from TNC on March 11, 2008 which included a list of suggestions for way in which the Proposed Project could be improved, including:

- Site project in areas away from native prairie
- Site project away from greater prairie chicken leks
- Investigate wind turbine impacts on bat species in the project area
- Make wind turbines more visible to birds and bats
- Avoid introduction and spread of invasive species during all phases of construction

Due to the sensitive natural resources identified in the greater project area, the letter specifically recommended placement of all turbine, substation, and electrical collection system facilities to the west of MN Highway 9 and aligning the proposed transmission line along the MN Highway 9 corridor or further to the west. Details of additional monitoring and mitigation measures that will be pursued by the Applicant in accordance with TNC recommendations are included in Sections 5.1.5.9, 5.1.6.3, 5.2.5.9, and 5.2.6.3. Copies of all TNC correspondence are included in Appendix C.

6.1.5 Minnesota State Park Service

The Buffalo River State Park was contacted via telephone on February 6, 2008 and via email on February 8, 2008, to discuss the siting of the proposed wind energy facility and transmission line. A response letter was received from Brian Nelson, Park Manager for the Buffalo River State Park on February 11, 2008 stating that park staff had reviewed the map of the Proposed Project and saw no immediate concerns regarding the Proposed Project and Buffalo River State Park.

A meeting was also held between Noble, USFWS, Minnesota State Parks, and MDNR staff on April 8th, 2008. Noble presented modifications to their proposed wind project and transmission line based on the feedback that had been received from the various agency contacts. Specific modifications to the project included placement of all turbine, substation, and electrical collection system facilities to the west of MN Highway 9 (as specifically recommended in the Nature Conservancy response letter dated March 11, 2008, Appendix C), and aligning the proposed transmission line along the MN Highway 9 corridor. Jade Templin, a representative from the Minnesota State Parks, was present at the meeting and stated that he did not have any additional comments on the Proposed Project as it appeared the newly proposed turbine layout and transmission corridor did not appear to have significant impacts to State Parks.

6.1.6 Clay County/Township Officials

The following meetings regarding the Proposed Project were conducted by Noble with Clay County and Township officials:

- Two meetings were held with Jerry Waller, Clay County District 2 Commissioner – August 2007 and July 2008
- A meeting was held with Spring Prairie Township Board – November 2007
- A meeting was held with one member of the Moland Township Board – July 2008
- A meeting was held with two members of the Riverton Township Board – July 2008
- A public hearing was held for Spring Prairie Township – October 2007
- A public hearing was held for Clay County – October 2007

6.2 Adjacent Landowners

The Applicant has conducted the following public outreach efforts regarding the Proposed Project.:

- A public hearing was held for Spring Prairie Township – October 2007
- A public hearing was held for Clay County – October 2007
- Noble presented a wind energy seminar and a project update at the Glyndon Senior Center – May 2008
- Noble presented a wind energy seminar and a project update at the Moorhead Senior High School – July 2008
- Noble held a public information booth at the Clay County Fair – July 2008
- Noble will publish a quarterly newsletter to be distributed to all residents within the Proposed Project area – will begin September 2008.

Appendix D includes a list of all landowners located along the proposed transmission line route defined in this permit application.

7.0 REFERENCES

Association for Biodiversity Information. 2007. NatureServe. http://www.natureserve.org/.

CEQ (Council on Environmental Quality). 1997. Environmental Justice: Guidance Under the National Environmental Policy Act. Accessed on December 20, 2007. Available online at http://www.lm.doe.gov/env_justice/pdf/justice.pdf.

Clay County. 2002. *Comprehensive Plan*. Prepared by Dahlgren, Shardlow & Uban, Inc. Adopted July 2, 2002. Available at http://www.co.clay.mn.us/Depts/PlanEnvi/CompPlan.

Clay County. 2005. *Zoning Code.* Adopted July 19, 2005. Available at http://www.co.clay.mn.us/AboutUs/CoCode.htm

Clay County. 2007. Communication between Planning Department/Public Works Department and Tetra Tech, Inc. Clay County, Moorhead, Minnesota. December 13, 2007.

Cowardin et al. 1979. "Classification of Wetlands and Deepwater Habitats of the U.S." U.S. Fish and Wildlife Service Northern Prairie Wildlife Research Center. December 1979. Available at http://el.erdc.usace.army.mil/emrrp/emris/emrishelp2/cowardin_report.htm.

Cummins, J.F., and D.F. Grigal. 1981. *Legend to Map: Soils and Land Surfaces of Minnesota, 1980*. Miscellaneous Publication 11, Soil Series No. 110. Department of Soil Science, University of Minnesota, St. Paul.

Edison Electric Institute. 1994. Mitigating Bird Collisions with Power Lines: The State of the Art in 1994. Waldorf, Maryland. Available online at www.eei.org.

Edison Electric Institute. 1996. Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996. Waldorf, Maryland. Available online at www.eei.org

Environmental Laboratory. 1987. Corps of Engineers Wetland Delineation Manual. U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS. Technical Report Y-87-1.

Farm Services Administration (FSA). Color Orthophotos 2003-2004. Clay County, Minnesota.

FEMA (Federal Emergency Management Agency). 2007. FEMA Issued Flood Maps: Clay and Wilkin counties, Minnesota. Accessed on December 12, 2007. Available online at http://msc.fema.gov/webapp/wcs/stores/servlet/CategoryDisplay?catalogId=10001&storeId=10001&categoryId=12001&langId=-1&userType=G&type=1&dfirmCatId=12009.

Hobbs, Howard C. and Joesph Goebel. 1982. *Geologic Map of Minnesota Quaternary Geology*. University of Minnesota Press, Minneapolis.

Kaufmann, Kira E. 1999. Guidelines for Archaeological Investigations in Minnesota. Jointly sponsored by the Association of Minnesota Archaeologists, Office of the State Archaeologist, and the State Historic Preservation Office. Available at the Minnesota State Historic Preservation Office, St. Paul.

Keely B. 2001. "Bat Ecology and Wind Turbine Considerations. Bat Interactions with Utility Structure," in Proceedings of NWCC National Avian-Wind Power Planning Meeting IV, Carmel California, May 16-17, 2000. Available online at http://www.nationalwind.org/pubs/avian00/default.htm

LMIC. 1999. *International Coalition Land Use/Land Cover, Clay County, Minnesota.*

LMIC. United States Geological Survey (USGS). *Fargo, Minnesota, 30x60 Minute Series Topographic Map*.

League for the Hard of Hearing. 2007. Noise Center: Noise Levels in Our Environment Fact Sheet. Accessed on December 12, 2007. Available online at http://www.lhh.org/noise/decibel.htm.

Minnesota Deparment of Natural Resources (DNR). 2007. http://www.Minnesotadnr.com.

Minnesota DNR, Division of Waters. 1996. "*Protected Waters and Wetlands, Clay County, MN*." Available at http://files.dnr.state.mn.us/waters/watermgmt_section/pwi/CLAY1OF1.pdf. Retrieved July 2008.

Minnestota DNR Natural Heritage and Nongame Research Program. **2007 and 2008.** Communication between Ms. Lisa Joyal, Endangered Species Environmental Review Coordinator for the MDNR, and Ms. Melissa Doperalski, Wildlife and Conservation Biologist for Tetra Tech via electronic mail. December 2007 and January 2008.

Minnesota DNR Natural Heritage and Nongame Research Program. **2007.** Short and Long Report of Element Occurrences within 1 mile radius of: Flat Hill I and Flat Hill II Windpark, Multiple TRS, Clay and Wilkin Counties.

Minnesota Department of Trade and Economic Development. Community Profile for Glyndon, Minnesota. Available at http://www.mnpro.com, Retrieved July 2008.

Minnesota Department of Transportation (Mn/DOT). Aggregate Unit. "*Clay County Pit Map.*" http://www.dot.state.mn.us/materials/maps/copitmaps/clay.pdf. Retrieved July 2008.

Minnesota Ornithological Union. 2007. http://moumn.org/index.html.

Minnesota Rules, Revisor of Statutes. Chapter 7030. *Minnesota Pollution Control Agency, Noise Pollution Control.* Accessed on December 14, 2007. Available at http://www.revisor.leg.state.mn.us/arule/7030/0040.html.

Minnesota Rules, Revisor of Statutes. Chapter 7849. *Minnesota Public Utilities Commission, Power Plants and Transmission Lines.* Accessed between May 2008 and August 25, 2008. Available at https://www.revisor.leg.state.mn.us/rules/?id=7849.

Mitsch, W., and J. Gosselink. 1993. Wetlands; Second Edition. Van Nostrand Reinhold, New York.

National Resource Conservation Service (NRCS). 2007. http://www.nrcs.usda.gov/

National Wind Coordinating Committee (NWCC). 2004. Wind Turbine Interactions with Birds and Bats. A summary of Research Results and Remaining Questions. November 2004.

Tipler P. 1991. "Physics for Scientists and Engineers", 3rd Edition, Worth Publishers, pp. 464-468.

US Army Corps of Engineers, St. Paul District. 2006 "Regional General Permit RGP-03-MN In the State of Minnesota Except Within the Exterior Boundaries of Indian Reservations." Available at http://www.mvp.usace.army.mil/docs/regulatory/Special%20Notices/2005006862RGP-003-MN.pdf

US Census Bureau. 2007a. Clay and Wilkin counties, Minnesota Quick Facts. Accessed on December 12, 2007. Available online at http://quickfacts.census.gov/qfd/.

US Census Bureau. 2007b. Small Area Income and Poverty Estimates: Clay and Wilkin counties, Minnesota. Accessed on December 12, 2007. Available online at http://www.census.gov/hhes/www/saipe/saipe.html.

USDA NRCS. Web Soil Survey. On-line address: http://websoilsurvey.nrcs.usda.gov/app/ Accessed: December 2007.

US Fish and Wildlife Service (USFWS). 2007. Threatened, Endangered, Candidate and Proposed Species. Twin Cities Field Office, Minnesota Ecological Services Field Office. Accessed on

December 11, 2007. Available online at http://www.fws.gov/midwest/endangered/lists/minnesot-spp.html.

USFWS. 2007 and 2008. Communication between Ms. Laurie Fairchild of the USFWS and Ms. Melissa Doperalski, Wildlife and Conservation Biologist of Tetra Tech via electronic mail. December 2007 – January 2008.

USFWS. National Wetlands Inventory. Available at http://www.nwi.fws.gov.

Wetland Training Institute, Inc. 1995. Field Guide for Wetland Delineation; 1987 Corps of Engineers Manual, Glenwood, NM. WTI 02-1 143pp.

APPENDIX A

FIGURES

APPENDIX B

EMF AND STRUCTURE GRAPHICS

APPENDIX C

CORRESPONDENCE

APPENDIX D

LANDOWNER CONTACT LIST