



Application for Certificate of Site Compatibility

# Border Winds Wind Energy Project

Rolette and Towner Counties, North Dakota

October 2008



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Exhibit 3 from Nov. 3, 2009 Hearing

Office of Administrative Hearings

Prepared for:



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October 23, 2008

Darrell Nitschke  
Executive Secretary  
North Dakota Public Service Commission  
600 East Boulevard, Dept 408  
Bismarck, ND 58505-0480

**RE: Sequoia Energy US Inc. application for a Certificate of Site Compatibility for the Border Winds Project, Rolette County and Towner County, North Dakota.**

Dear Mr. Nitschke,

Pursuant to North Dakota Century Code 49-22-08 and 49-22-08.1 under the Energy Conversion and Transmission Facility Siting Act and promulgated rules, Sequoia Energy US Inc (Sequoia) has enclosed the following:

1. An original and ten copies of an Application for a Certificate of Site Compatibility for the Border Winds Wind Energy Project, Docket Number PU-08-797.
2. A check for the fee in the amount of \$100,000.

Sequoia proposes to submit final plans and drawings at least 14 days prior to the public hearing.

Please contact me by phone at 204-523-7079 or e-mail [iwitherspoon@sequoia-energy.com](mailto:iwitherspoon@sequoia-energy.com) should you have any questions or further information needs with respect to this filing.

Sincerely,

A handwritten signature in blue ink, appearing to read "Ian Witherspoon".

Ian Witherspoon  
Manager, Project Development

**Application to the North Dakota Public  
Service Commission  
Certificate of Site Compatibility  
Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Case No.: PU-08-797

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October 24, 2008

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## **APPENDICES**

- Appendix A: Sequoia Energy U.S. Inc. Environmental Policy
- Appendix B: Design Data Report
- Appendix C: Project Studies and Assessments
- Appendix D: Pre-Construction Investigation Protocols
- Appendix E: Agency Letters

## **1.0 INTRODUCTION**

Sequoia Energy U.S. Inc. (Sequoia) is submitting this application for a Certificate of Site Compatibility (Certificate) to construct the Border Winds Wind Energy Project (Project). The Project is located in Rolette and Towner Counties, North Dakota, (Exhibit 1) and will be configured as a wind energy conversion facility. The Project will use up to 66 turbines with a total nameplate capacity of approximately 150 megawatts (MW). Additional facilities include a collection system consisting of buried electrical cables, access roads, an operations and maintenance (O&M) facility, and a substation that will connect the system to an existing Xcel Energy transmission line within the project area. The facility will be constructed to serve the electric power needs of people and industries in North Dakota and the Upper Midwest Region of the United States.

Sequoia is a renewable energy company with a head office in Winnipeg, Manitoba. Registered in Delaware, Sequoia is licensed to conduct renewable energy work in North Dakota. As a pioneer in developing a “community first approach” to wind energy development, Sequoia has been instrumental in demonstrating that wind energy is a safe, reliable, economically sound, and socially responsible source of energy for North America. Sequoia prides itself in acting responsibly and collaboratively with key stakeholders. The company seeks to facilitate a smooth introduction of renewable energy into established energy production and transmission networks. Further information regarding Sequoia’s Safety and Environmental Policy is included in Appendix A.

### **1.1 Statement Concerning Submission of Preliminary Information**

On August 25, 2008, FERC conditionally approved Midwest Independent System Operator's (MISO) Queue Reform Tariff filing. The Order date was August 25, 2008 with an effective date of August 25, 2008. On August 27, 2008, Sequoia received notice from MISO that the Project’s queue position in the MISO Interconnection Queue would now be required to follow a transition plan. As part of that plan, the Project would need to achieve certain milestones in order for the interconnection application to be determined valid by MISO. The achievement of milestones was given 60 days. One of the necessary milestones involved submission of this application for a North Dakota Public Service Commission (PSC) Certificate of Site Compatibility by October 24, 2008. Prior to the new transition plan, this was not a requirement in the interconnection queue process. A project proponent was able to wait until receipt of detailed information from MISO regarding interconnection capacity availability before applying to the PSC for a Certificate of Site Compatibility. Under the new transition period, which applies to the Project, MISO is requiring that Sequoia apply to the PSC for a Certificate of Site Compatibility before receipt of sufficient information to fully design the interconnection to the MISO line. For this reason, some of the information provided in this site compatibility application is preliminary and subject to change once the interconnection evaluation process with MISO progresses. The preliminary status of information in this application is identified as such where appropriate. This preliminary information will be subject to change and more

detailed information will be provided to the PSC prior to a PSC Public Hearing for the Border Winds Project.

**1.2 Compliance with the Energy Conversion and Transmission Facility Siting Act Chapter 49-22**

The North Dakota Energy Conversion and Transmission Facility Siting Act requires an application for a Certificate to meet the criteria set forth in North Dakota Century Code (NDCC) 49-22. The siting of an energy conversion facility is to be made in an orderly manner compatible with environmental preservation and the efficient use of resources (NDCC 49-22-02).

To the extent available, Sequoia has presented information required by the North Dakota Energy Conversion and Transmission Facility Siting Act. Sequoia has considered exclusion and avoidance areas in the selection criteria, and the policy criteria in the design of the Project. In addition, sufficient project design, wind resource, and technical information have been provided for a thorough evaluation of the proposed site. Table 1-1 outlines the information required to fulfill the requirements for a Certificate with the Commission and where these requirements are addressed in this document.

Sequoia will submit an application for Conditional Use Permits and Building Permits from Rolette and Towner counties for the project. Additional permits needed from Rolette County include pre- and post-haul road inspections and a permit for facilities in road right-of-ways. Towner County will require a certificate of compliance.

<b>Table 1-1: Certificate Completion Checklist</b>		
<b>State Authority</b>	<b>Description</b>	<b>Section</b>
<b>Chapter 49-22</b>	<b>PSC Guidelines: Energy Conversion and Transmission Facility Siting</b>	<b>1.1</b>
<b>Section A</b>	<b>Description</b>	<b>1.2, 1.3, 1.5, 4.4, 6.0-6.6, 9.0</b>
1.	Type: Describe the type of energy conversion facility proposed and provide a diagram of the major process system or a flow diagram.	1.0, 4.1, Exhibits 7 and 8
2.	Product: Describe in general terms and technical terms the products to be produced by the proposed facility.	1.3.2, 6.1, 6.3
3.	Size and Design: Provide the following description of the production capacity and design	1.3.2, 4.1, 4.2, 4.3, 6.0
a.	Gross design capacity;	1.3.2
b.	Net design capacity;	1.3.2
c.	Estimated thermal efficiency of the energy conversion process and the assumptions upon which the estimate is based;	N/A
d.	The number of acres that the proposed facility will occupy; and	5.1

<b>Table 1-1: Certificate Completion Checklist</b>		
<b>State Authority</b>	<b>Description</b>	<b>Section</b>
e.	One (1) copy of all design data reports separate from the application.	Appendix B
4.	Time Schedule: Provide the anticipated time schedule for the accomplishment of the following:	1.4
a.	Certificate of Site Compatibility;	1.4
b.	Land acquisition complete;	1.4
c.	Construction start date;	1.4
d.	Construction complete;	1.4
e.	Test operations;	1.4
f.	Commercial production date;	1.4
g.	100 percent capacity factor; and	1.4
h.	Any expansion or additions.	1.4
<b>Section B</b>	<b>Studies</b>	
	Provide a copy of any evaluative studies or assessments of the environmental impact of the proposed facility submitted to any federal, regional, state or local agency.	Appendix C
<b>Section C</b>	<b>Need for Facility</b>	<b>2.0</b>
1.	An analysis of the need for the proposed facility based on present and projected demand for the product or products to be produced by the proposed facility, including the most recent system studies supporting the analysis of the need.	2.1
2.	A description of any feasible alternative methods of serving the need.	2.2
3.	A statement justifying any deviations from the most recent Ten-Year Plan which the proposed facility may present.	2.3
<b>Section D</b>	<b>Location</b>	<b>1.3.1</b>
1.	Select a study area, which includes the proposed facility site, of sufficient size to enable the Commission to evaluate the factors addressed in Section 49-22-09, NDCC.	1.3.1, 1.3.2, 10.0-10.11, Exhibits 2, 5 and 6
2.	Discuss the utility's policies and commitments to limit the environmental impact of its facilities, including copies of board resolutions and management directives.	Appendix A
3.	Identify and map the criteria that led to the proposed facility location within the study area.	1.2, 3.0, Exhibits 5 and 6
4.	Discuss in detail the relative value of each criteria and how the proposed facility location was selected giving consideration to all criteria.	3.0
5.	The criteria to be evaluated shall include at a minimum all of the following which are within the study area:	3.0
a.	Exclusion areas;	3.1, Exhibit 5 and 16
b.	Avoidance areas;	3.2, Exhibits 6 and 18
c.	Selection criteria;	3.3
d.	Policy criteria;	3.4

<b>Table 1-1: Certificate Completion Checklist</b>		
<b>State Authority</b>	<b>Description</b>	<b>Section</b>
e.	Design and construction limitations; and	3.5
f.	Economic considerations.	3.6
6.	Discuss the mitigative measures that will be taken to minimize adverse impacts which result from the location, construction, and operation of the proposed facility.	7.2.3, 7.3.3, 7.4.3, 7.5.3, 7.6.3, 7.7.3, 7.8.3, 7.9.3, 7.10.3, 7.11.3, 7.12.3, 7.13.3, 7.14.3, 7.15.3, 7.16.3, 7.17.3
7.	List the qualifications of the people in the various disciplines that contributed to the facility site location study	11.0
8.	Maps	Exhibits
a.	Map the criteria within the study area showing the proposed facility location. Several different criteria may be shown on each map, depending on the map scale and the density and nature of the criteria. Minimum map scale shall be ½ inch = 1 mile. All maps shall be at the same scale unless otherwise specified.	Exhibits
b.	Furnish one Mylar map, separate from the application, of the same scale as the criteria maps and showing the same basic features as the criteria maps, including the study area, but not the proposed facility location.	Exhibits (Mylar map not needed for application per PSC direction)
<b>NDCC 49-22-09</b>	<b>Factors to be considered in evaluating applications and designation of sites, corridors, and routes.</b>	<b>10.0</b>
1.	Available research and investigations relating to the effects of the location, construction, and operation of the proposed facility on public health and welfare, natural resources, and the environment.	10.1
2.	The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects.	10.2
3.	The potential for beneficial uses of waste energy from a proposed energy conversion facility	10.3
4.	Adverse direct and indirect environmental effects which cannot be avoided should the proposed site or route be designated.	10.4
5.	Alternatives to the proposed site, corridor or route which are developed during the hearing process and which minimize adverse effects.	10.5
6.	Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designated.	10.6
7.	The direct and indirect economic impacts of the proposed facility.	10.7

<b>State Authority</b>	<b>Description</b>	<b>Section</b>
8.	Existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site, corridor, or route.	10.8
9.	The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.	10.9
10.	The effect of the proposed site or route on areas which are unique because of biological wealth or because they are habitats for rare and endangered species.	10.10
11.	Problems raised by federal agencies, other state agencies, and local entities.	10.11

### **1.3 Flexibility in Siting**

Wind facility siting is a process through which input is considered from several different entities. When considering where to locate the wind farm in North Dakota, Sequoia identified the current project area for further investigation due to its pre-existing infrastructure and its expected wind resource and transmission availability. Sequoia subsequently conducted environmental desktop and field studies of the project area, the results of which are embodied in the appropriate sections of this application, and further assessed wind resource and transmission. The project area was identified as an optimal site from environmental, wind resource, transmission, and economic perspectives.

The next step in the development process was to secure the site by entering into agreements with landowners that were interested in having Sequoia place wind turbines and associated facilities on their property.

Once the site was selected and secured, the next step in the process was to identify preliminary turbine locations based on initial site inspection, topographic maps, known environmentally sensitive areas, review of North Dakota's power plant siting exclusion and avoidance areas, review of county siting requirements, and communications with Local, State and Federal agencies. These preliminary turbine locations, or site plan, are the commonly accepted standard for applications in other jurisdictions.

Sequoia is not seeking a permit for each wind turbine. Instead, Sequoia suggests that the Certificate define the site, maximum number of turbines, and structures related to wind generation to be located within the site. Within the permitted site, Sequoia proposes to locate turbines and other structures related to wind generation subject to required setbacks from environmentally sensitive areas, roads, residences or other setbacks described in the permit. A preliminary layout indicates areas of the site with good wind resource and no known siting issues.

Once the Commission issues the Certificate, Sequoia will complete the additional studies required by the Certificate or Sequoia's siting process including more detailed wetland, biological, and cultural resource surveys. Sequoia will also further evaluate the site based on efficient construction of the Project. In addition, Sequoia will seek further input from landowners regarding the location of wind facilities. Once these additional studies and communications are completed, preliminary turbine locations are re-evaluated for their appropriateness with the Certificate conditions and buffers. A final site plan for the Project will be submitted to the Commission prior to construction and a pre-construction meeting held with Commission staff to ensure that the site plan conforms to the Certificate requirements.

Wind project siting is unique in that the project occupies a large area and must not only conform to Certificate conditions but must also optimize the wind resource at the site. Ideally, the Certificate provides the parameters within which the developer may optimize the site. With Certificate conditions in place, the developer is able to proceed with planning and development. Early approval of a Certificate is not only consistent with circumstances unique to wind project siting but it is also essential to timing given the uncertainty and limited duration of the federal Production Tax Credit (PTC) necessary for wind project development.

Sequoia believes that the aforementioned siting process is consistent with North Dakota siting rules and provides Sequoia the flexibility necessary to develop a timely, cost-effective project in an environmentally responsible manner.

## **1.4 Project Summary**

Sequoia studied potential wind resources in North Dakota for siting an approximately 150 MW wind generation facility. Based on these studies, Sequoia selected a project area in northeastern North Dakota near the community of Rolla for additional study and preparation of a Certificate to the Commission. This selected Project Area is shown in Exhibit 2. The Project Area was identified as optimal from wind resource, transmission interconnection, environmental, and economic perspectives. The proposed Project Area was selected considering the exclusion and avoidance criteria outlined in North Dakota Administrative Code (NDAC) 69-06-08 and was therefore, chosen as the location for the proposed wind generation site. The exclusion and avoidance criteria used to define the Project Area are further discussed in Section 3.0. No alternative project areas were considered during the initial project planning phases.

### **1.4.1 Proposed Site**

The Project Area is primarily located in northwestern Rolette County, North Dakota, and extends east into Towner County, North Dakota and north to the U.S.-Canadian Border (Exhibits 1 and 2). The City of Rolla occurs in the southwestern portion of

the Project Area (Exhibits 1 and 2). Table 1-2 lists the Township, Range, and Sections included within the Project Site.

<b>Table 1-2: Project Location</b>		
<b>Township</b>	<b>Range</b>	<b>Sections</b>
164N	69W	25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
164N	70W	25, 26, 27, 28, 33, 34, 35, 36
163N	68W	7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30, 31, 32, 33, 34
163N	69W	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
163N	70W	1, 2, 3, 4, 9, 10, 11, 12, 13, 24, 25, 36
162N	68W	3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 22
162N	69W	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30

The Project Area encompasses approximately 122 square miles (78,080 acres). Sequoia will site the equipment and facilities within the 122 square mile permit area to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to the environmental resources. The Project location and preliminary layout are presented on Exhibits 3 and 4. As shown on these exhibits, turbines will be placed throughout the Project Area; however, the preliminary Project site layout will generally occupy one to two percent of the total Project Area.

#### **1.4.2 Projected Output**

The Project will have an approximate nameplate (gross) capacity of up to 150 MW. Assuming net capacity factors of between 37 and 40 percent, the projected average annual output is estimated between 486,000 to 526,000 MWhs. As with all wind projects, output is dependent upon wind resource, final design, site-specific features, and equipment.

### **1.5 Project Schedule**

The commercial operation date is dependent upon permitting, equipment deliveries, and other development activities. Sequoia is targeting construction for July 2009 provided all pre-construction permits and approvals have been obtained. As such, the preliminary schedule for the Project is as follows:

1. Certificate of Site Compatibility: Sequoia anticipates the Certificate will be approved in late November or December 2008.

2. Land Acquisition: Sequoia has secured sufficient easements from landowners to develop an approximately 150 MW project.
3. Permits: Sequoia is responsible for undertaking all required environmental studies, and will obtain all permits and licenses that are required following issuance of the Certificate. Completing permits is on the “critical path” for the Project and will allow Sequoia to move forward with other commitments on the Project including ordering long-lead time equipment.
4. Equipment Procurement, Manufacture and Delivery: Sequoia will order the wind turbine components as soon as practicable.
5. Construction: Construction is targeted to begin in July 2009 and is subject to road restrictions and weather. The engineering, procurement, and construction (EPC) contractor will be responsible for completing all Project construction, including roads, wind turbine assembly, electrical, and communications work. The construction will take a maximum of 18 months to complete.
6. Test and Operations: Sequoia anticipates testing and operations to begin October 2010.
7. Commercial Operation: Sequoia anticipates commercial operation of the Border Winds Wind Energy conversion facility to begin December 2010.

Sequoia does not anticipate expansions or additions to the Project at this time.

## **1.6 Project Ownership**

It is anticipated that Sequoia will construct and own all equipment and associated facilities related to the Project. Sequoia will likely select a third-party contractor to perform the majority of the engineering and construction of the wind farm. Sequoia, however, will procure the turbine/tower package.

The interconnection study for Midwest Independent System Operator ‘s (MISO) interconnection queue position G904 will begin in November 2008. An interconnection agreement is scheduled for May 2009.

## **2.0 NEED FOR FACILITY**

### **2.1 Need Analysis**

According to the report (PanAero Corporation 1999) prepared for the State of North Dakota Division of Community Services, “North Dakota is motivated to become a leading state in non-polluting wind generated electricity.” North Dakota’s goals include the following: general economic development, new wind project investments and construction, new landowner income, and new long-term jobs from broad professional services (such as

wind project design, wind resource monitoring, legal and accounting services), from commercial project O&M, and from the manufacturing of wind turbine components.” In support of this effort, Sequoia is cooperating with regional utilities to add wind generation to their energy portfolio.

North Dakota has been identified as having more available wind for development than any other state. In recent years the Mid-Continent Area Power Pool (MAPP) has consistently reinforced the regional need for increased generating capacity in the coming decade. Cost fluctuations and reliability problems serve to reinforce the need for sufficient capacity, low-cost energy, and diverse generation sources. Independent power producers such as Sequoia are widely recognized as essential to meeting regional energy needs, stabilizing energy costs, and enhancing energy reliability. The Project offers North Dakota and the MAPP/MISO region the opportunity to add to capacity adequacy requirements, to stabilize wholesale power prices, and to provide electricity from a clean, cost-effective renewable energy generation facility.

There is a critical need for additional energy production in the MAPP/MISO region. The June 1, 2008, MAPP Load and Capability Report indicates that under the minimum reserve requirements, deficits are expected by 2013. Table 2-1 outlines the MAPP surplus/deficit forecasts through 2017.

<b>Table 2-1: MAPP Summer Season Surplus/Deficit</b>		
<b>Year</b>	<b>MW</b>	<b>Reserve Margin Percentage</b>
2008	1721	6.5%
2009	1186	4.3%
2010	665	2.3%
2011	490	1.7%
2012	336	1.1%
2013	-8	-0.0%
2014	-261	-0.8%
2015	-976	-3.1%
2016	-1448	-4.6%
2017	-1804	-5.6%

Source: Pages III-3 and III-4 of the MAPP 2008 Load and Capability Report

While the deficits have been identified, the alternative sources to fill these voids have not. North Dakota has a unique opportunity to begin providing capacity to meet those forecasted deficits with clean, efficient, renewable energy. The Project intends to be a significant source of energy for meeting the region’s needs over the next 30 years.

## **2.2 Alternatives**

Feasible technology alternatives to wind include generation using coal, natural gas, or biomass. No technology alternatives were considered because these other technologies do not meet the state's goal of adding new wind energy.

## **2.3 Ten Year Plan**

Sequoia will file a Ten-Year Plan with the Commission by July 2009.

## **3.0 SITE SELECTION CRITERIA**

Sequoia is evaluating the proposed 122 square miles (78,080 acre) site to determine the best locations for up to 66 wind turbines. As discussed previously in Section 1.2, the optimal siting of turbines involves a process through which environmental, wind resources, transmission, and economic characteristics are considered. The Project Area was identified as exhibiting a maximum balance of these characteristics, when combined. West of the Project includes the Turtle Mountains and the Turtle Mountain Indian Reservation. While the higher elevations in the Turtle Mountains represent greater potential wind resources, locating the project within Reservation boundaries and also within sensitive environmental resources (described in Section 7.0) represents potential impacts to these resources. In addition, the point of interconnection distance is increased, which increases the cost of the Project. Expanding the Project boundary north increases the complexity of the permitting because the Project would extend into Canada. And finally, locating the Project farther east would include topographic qualities that are not as desirable when selecting wind sites.

Sequoia has secured voluntary wind option agreements with landowners and then identified preliminary turbine locations based on site inspection, topographic maps, known environmentally sensitive areas, review of North Dakota's power plant siting exclusion and avoidance areas, review of County and State wind siting requirements, and communications with Local, State, and Federal agencies. Through this process, Sequoia will address environmental issues while working within the parameters of State codes. North Dakota has several site selection criteria that are considered by the Commission to determine suitability of the site. Sequoia has reviewed the criteria in Chapter 69-06-08 and has factored these criteria into site design. These criteria are discussed in this section.

## **3.1 Exclusion Areas**

Per Section 69-06-08-01-1, the geographical areas listed in Table 3-1 shall be excluded in the consideration of a site for an energy conversion facility, and shall include a buffer zone of a reasonable width to protect the integrity of the area. Exclusion areas are mapped for the Project Area on Exhibit 5.

<b>Exclusion Area</b>	<b>Present within Project Site?</b>	<b>Proposed Buffer</b>	<b>Section Addressed</b>
Designated or registered national areas: parks; memorial parks; historic sites and landmarks; natural landmarks; historic districts; monuments; wilderness areas; wildlife areas; wild, scenic, or recreational rivers; wildlife refuges; and grasslands	Present	Sequoia is consulting with the USFWS. Sequoia recommends establishing a buffer of 0.25 miles from Waterfowl Production Areas and Waterfowl Rest Areas.	7.8, 7.14, 7.1, Exhibit 5
Designated or registered state areas: parks; forests; forest management lands; historic sites; monuments; historical markers; archaeological sites; grasslands; wild, scenic, or recreational rivers; game refuges; game management areas; management areas; and nature preserves.	None		7.8, 7.9, 7.15
County parks and recreational areas; municipal parks; parks owned or administered by other governmental subdivisions; hardwood draws; and enrolled woodlands.	None		7.9
Prime farmland and unique farmland, as defined by the land inventory and monitoring division of the soil conservation service, United States department of agriculture, in 7 C.F.R. part 657; provided, however, that if the Commission finds that the prime farmland and unique farmland that will be removed from use for the life of the facility is of such small acreage as to be of negligible impact on agricultural productions, such exclusion shall not apply.	Present	No buffer is proposed. Prime farmland has been avoided to the extent practicable. Impacts to prime farmland will affect less than 0.4 percent of the yearly production for the top five commodities in Rolette and Towner counties.	7.10, 7.11, Exhibit 16
Irrigated land	None	No Conflicts with irrigated land are anticipated.	7.10

<b>Exclusion Area</b>	<b>Present within Project Site?</b>	<b>Proposed Buffer</b>	<b>Section Addressed</b>
Areas critical to the life stages of threatened or endangered animal or plant species	None	No areas critical to threatened and endangered species have been identified in the Project site.	7.17
Areas where animal or plant species that are unique or rare to North Dakota would be irreversibly damaged.	Present	No unique or rare areas have been identified in the Project site. Sequoia is working with USFWS and ND Game and Fish to avoid potential impacts.	7.12, 7.13, 7.14, 7.16, 7.15, 7.17

### 3.2 Avoidance Areas

Per Section 69-06-08-01-2, the geographical areas listed in Table 3-2 shall not be approved as a site for an energy conversion facility unless the applicant shows that under the circumstances there is no reasonable alternative. In determining whether an avoidance area should be designated for a facility the Commission may consider among other things, the proposed management of adverse impacts; the orderly siting of facilities; system reliability and integrity; the efficient use of resources; and alternative sites. Economic considerations alone shall not justify approval of these areas. A buffer zone of a reasonable width to protect the integrity of the area shall be included. Natural screening may be considered in determining the width of the buffer zone. Avoidance areas are also mapped for the Project Area on Exhibit 6.

<b>Avoidance Areas</b>	<b>Present within Project Site?</b>	<b>Proposed Buffer</b>	<b>Section Addressed</b>
Historical resources which are not designated as exclusion areas	None	In consultation with the North Dakota SHPO, a professional archaeologist will survey the project area once exact turbine locations have been established and will establish buffers around identified resources.	7.8, Appendix C
Areas within the city limits of a city or the boundaries of a military installation	City limits- Present Military- None	No buffers than those already proposed for cultural resources	7.3

<b>Avoidance Areas</b>	<b>Present within Project Site?</b>	<b>Proposed Buffer</b>	<b>Section Addressed</b>
Areas within known floodplains as defined by the geographical boundaries of the 100-year flood	None		7.13
Areas that are geologically unstable	None		7.12
Woodlands and wetlands	Present	Wetland resources will be avoided to the extent practicable. Woodland impacts are not anticipated.	7.14, 7.15, Exhibits 6, 15 and 18
Areas of recreational significance which are not designated as exclusion areas	None		7.9
Areas where animal or plant species that are unique or rare to this state would be irreversibly damaged.	Present	One rare plant community (calcareous fen) is known to occur within the Project Area. This plant community is associated with wetland and will be avoided to the extent feasible along with other wetlands. Sequoia will work with USFWS and NDPRD to avoid potential impacts.	7.14, 7.15, 7.16, 7.17

### 3.3 Selection Criteria

Per Section 69-06-08-01-3, a site shall be approved in an area only when it is demonstrated to the Commission by the applicant that significant adverse effects resulting from the location, construction, and operation of the facility in that area, as they relate to the following, will be at an acceptable minimum, or that those effects will be managed and maintained at an acceptable minimum. Table 3-3 lists selection criteria for the Project.

<b>Selection Criteria</b>	<b>Potential Adverse Effects</b>	<b>Section Addressed</b>
<b>The impact upon agriculture:</b>		
Agricultural Production	Assuming up to 66 turbines and all turbines are between 2.3-2.4 MW, an estimated maximum of 34 acres of land will be impacted due to turbine placement and an additional 84 acres due to access roads. Wind turbine configuration will not result in significant impacts to agricultural production.	7.3, 7.10

<b>Table 3-3: Selection Criteria</b>		
<b>Selection Criteria</b>	<b>Potential Adverse Effects</b>	<b>Section Addressed</b>
Family Farms and Ranches	No turbines will be placed within 1000 feet of family homes. Land area would be lost to the construction of access roads and turbines; however, wind lease payments to farmers will provide a supplemental source of income.	7.2, 7.3
Land in which the owner has demonstrated soil, topography, drainage, and an available water supply that cause the land to be economically suitable for irrigation	No owner, where impacts are expected, has expressed concerns related to economically suitable irrigation on their land. Currently no irrigation is occurring within the Project Area.	7.11, 7.10, Exhibits 17 and 18
Surface drainage patterns and ground water flow patterns	No impacts to surface drainage patterns or groundwater flow patterns will occur.	7.12, 7.13, 7.14, Exhibit 18
The agricultural quality of the cropland	No impacts to the agricultural quality of the cropland are anticipated. If compaction of soils occurs during construction, Sequoia will work with the landowners to minimize the compaction.	7.10, 7.11
<b>The impact upon the availability and adequacy of:</b>		
Law enforcement	No impacts are anticipated.	7.4
School systems and education programs	No adverse effects are expected.	7.4
Governmental services and facilities	Governmental services and facilities will not be impacted.	7.4
General and mental health care facilities	General and mental health care facilities will not be impacted.	7.4
Recreational programs and facilities	No impacts are anticipated.	7.4
Transportation facilities and networks	During construction an increase in vehicle trips per day is anticipated for the duration of Project construction. During facility operation no significant impacts are anticipated.	7.4
Retail service facilities	No adverse impacts anticipated.	7.4
Utility services	Sequoia will utilize station service from MISO. MISO will suggest appropriate configurations for the electrical system, and Sequoia will abide by the recommendations to prevent impacts to the transmission system.	2.0, 6.0, 7.4
<b>Other impacts upon:</b>		
Local institutions	No impacts are anticipated.	7.4

<b>Table 3-3: Selection Criteria</b>		
<b>Selection Criteria</b>	<b>Potential Adverse Effects</b>	<b>Section Addressed</b>
Noise sensitive land uses	The noise sensitive land uses within the Project site are the residences near turbine locations. As long as no turbines are sited within 1,000 feet of a sensitive land use, noise levels will not exceed the generally accepted 50 dBA standard.	7.6, Exhibits 12
Rural residences and businesses	No turbines will be placed within 1,000 feet of family homes	7.2, 7.3
Aquifers	No impacts will occur	7.11
Human health and safety	If mitigative measures are implemented as discussed in Section 7.5.3 and maintenance schedules are met, no impacts to human health and safety are anticipated	7.4, 7.5
Animal health and safety	No impacts to livestock are anticipated from operation of the facility. Based on biological surveys, there is a potential for small numbers of avian species and bat collisions with the turbines for the Project, but the impact is expected to be minimal. Mitigative measures in turbine siting will minimize the potential for these impacts. Sequoia is considering conducting pre-construction monitoring of avian species.	7.10, 7.15, 7.16, Appendix C and D
Plant life	Assuming all turbines are between 2.3-2.4MW, approximately 120 acres of land will be used for the turbines and access roads. Land where the turbines will be sited is primarily agricultural.	7.15, 7.17, Exhibit 14
Temporary and permanent housing	Temporary housing will be utilized during construction. No adverse impacts are anticipated.	7.2
Temporary and permanent skilled and unskilled labor	No adverse effects are anticipated. Local contractors employed for construction will result in increased wages.	7.2
The cumulative effect of the location of the facility in relation to existing and planned facilities and other industrial development	No impacts are anticipated to existing and planned facilities and other industrial development.	7.2

### 3.4 Policy Criteria

Per Section 69-06-08-01-4, the Commission may give preference to an applicant that will maximize benefits that result from the adoption of the policies and practices listed in Table 3-4 and in a proper case may require the adoption of such policies and practices.

<b>Table 3-4: Policy Criteria</b>		
<b>Policy Criteria</b>	<b>Suitable Policy or Practice of Applicant</b>	<b>Section Addressed</b>
Recycling of the conversion byproducts and effluents	None	N/A
Energy conservation through location, process, and design	Sequoia is developing the site to maximize the energy output. Sequoia will develop a site layout that optimizes wind resources while minimizing the impact on land resources and potentially sensitive areas. Wind-powered electric generation is entirely dependent on the availability of the wind resource at a specific location. The energy available from the wind increases at the third power of the wind speed. In other words, a doubling of the wind speed will increase the available energy by a factor of eight times.	4.2
Training and utilization of available labor in this state for the general and specialized skills required	Sequoia will use local labor to the extent practicable.	7.2.
Use of a primary energy source or raw material located within the state	The energy generated at the site will utilize the wind resources of the state of North Dakota.	5.2
Non-relocation of residents	No residents will be relocated as a result of the Project.	7.2
The dedication of an area adjacent to the facility to land uses such as recreation, agriculture, or wildlife management	The Project will not interfere with adjacent land uses. As such, it is not anticipated that areas adjacent will be dedicated to recreation, agriculture, or wildlife management issues.	7.3, 7.9 7.10, 7.16
Economies of construction and operation	Sequoia will utilize local contractors to the extent practicable.	7.2
Secondary uses of appropriate associated facilities for recreation and enhancement of wildlife	None	N/A
Use of citizen coordinating committees	Sequoia will work with landowners of properties for the Project.	8.0
A commitment of a portion of the energy produced for use in this state	Energy transmitted will be sold at Sequoia's substation to a regional utility.	2.1, 6.1
Labor relations	No labor relations will be affected.	6.5, 7.2
The coordination of facilities	Existing facilities and facility corridors were considered in the location of the wind farm and the associated facilities.	3.0, 3.6

<b>Policy Criteria</b>	<b>Suitable Policy or Practice of Applicant</b>	<b>Section Addressed</b>
Monitoring of impacts	Sequoia and EPC will employ BMPs during construction to monitor soil impacts and segregate topsoil. Disturbance sites exceeding appropriate size criteria will be addressed under storm water prevention plans.	7.11, 7.15

### **3.5 Design and Construction Limitations**

When building a wind farm, wind resources and landowner easements are the two main limitations to consider in project design and construction. The wind resource is essential to selecting and designing a wind farm. Therefore, for each project, Sequoia conducts a thorough analysis of sites they select to ensure that the site has ample wind energy to generate revenue for the wind farm. Lack of sufficient number of easements can be another limitation to the design and construction of the Project. However, for the Border Winds Wind Energy Project, Sequoia has secured voluntary land agreements with landowners necessary to develop the wind project.

Specific to the Project, there are several additional items that are limiting factors when designing and constructing the Project. Sequoia proposes setbacks from transmission lines consistent with Rolette and Towner county regulations and ordinances. These setbacks limit the amount of land available for wind development. In addition, as discussed further in Section 3.6, the wind project needs to be sited in close proximity to adequate transmission.

The (U.S. Fish and Wildlife Service) USFWS administers fee title Waterfowl Protection Areas (WPA) and wetland and grassland easements on private property as part of their National Wildlife Refuge System. There are limitations to construction on these lands. Sequoia proposes setbacks from WPAs and plans to avoid wetlands to the extent practicable, especially those within USFWS wetland easement lands. There are no USFWS grassland easement lands in the Project Area. Direct impacts to wetlands within USFWS easements will result in a compatibility assessment by local USFWS staff. The process considers the magnitude of the impact, the type or quality of the habitat which is impacted, and the feasibility of avoiding the impact. If compatibility is found, a right-of-way (ROW) permit will be issued for the impact. Exhibit 5 identifies the USFWS WPAs and wetland easement lands within the Project site.

### **3.6 Economic Considerations**

Economics were considered when selecting a location for the Project. As discussed above, it is important to select a site with a wind resource capable of generating energy. Sequoia

has identified ample wind resources in the area. Information on the wind resource at the site is discussed in Sections 5.2 and 5.3.

Another economic consideration is the availability of a transmission system in the vicinity of the Project site. Ideally, an existing transmission system is available in which case the primary consideration is obtaining permission to interconnect into transmission system. If no transmission system is present, the cost of interconnection can increase substantially. This is due to the need to construct a lengthy transmission line and large substation in order to connect to the existing electricity service provider. In the Project area, there is currently ample transmission injection capacity and the Project interconnects to the existing Xcel 230 kilovolt (kV) transmission line located approximately two miles east of Rolla, North Dakota. Sequoia has initiated the interconnect request process with MISO that will allow a connection from the proposed Substation into the existing transmission line.

One of the most important economic considerations related to the Project is the need to qualify for the Federal PTC. The PTC is an approximately 2.0-cent per kWh (kilowatt-hour) benefit for the first 10 years of a renewable energy facility's operation. The Project will not be viable without receiving PTC. However, the PTC program is set to expire in 2008, and may not receive additional extensions. Approval of permits will help ensure Border Winds qualifies for PTC before its 2009 expiration date.

## **4.0 GENERAL DESCRIPTION OF THE PROPOSED FACILITY**

### **4.1 Wind Power Technology**

As the wind passes over the blades of a wind turbine, it creates lift and causes the rotor to turn. The rotor is connected by a hub and main shaft to a system of gears, which are connected to a generator. Exact turbine models are subject to change to ensure selection of a turbine that is both cost effective and optimizes land and wind resources. Sequoia is proposing to use up to 66 turbines. This application is based on unspecified 2.3-2.4 MW turbines. Sequoia is considering a number of turbine models from different turbine vendors. Wind turbine model selection will be finalized as project development advances.

The turbines under consideration for selection are 2.3 and 2.4 MW utility-grade wind turbines that have a nominal nameplate rating of 2,300 and 2,400 kilowatts (kW), respectively. Each turbine will have a hub height of 70-80 meters (230-262 ft) and a rotor diameter (RD) of 70-95 meters (230-312 ft) (Exhibit 7). The turbines will begin operation in wind speeds of 3.0-5.0 meters per second (m/s), or 6.7-11.2 miles per hour (mph). The turbines will reach their rated capacity (2.3-2.4 MW) at wind speed of 12-14 m/s (26.8-31.3 mph). The selected turbine will be designed to operate in wind speeds of up to 25 m/s (56 mph) and to withstand wind gusts of 55 m/s (123 mph).

Each tower will be secured by a concrete foundation that can vary in design depending on the soil conditions. A control panel inside the base of each turbine tower houses communication and electronic circuitry. Each turbine is equipped with a wind speed and direction sensor that communicates to the turbine's control system to signal when sufficient winds are present for operation. The turbines under consideration feature variable-speed control and individual blade pitch control or full span pitching to assure aerodynamic efficiency.

The electricity generated by each turbine is brought to a pad-mounted transformer where the voltage is raised (stepped up) to power collection line voltage of 34.5 kV. The electricity is collected by a system of underground power collection lines within the Project Site. Both power collection lines and communication cables will be direct-buried on private property or public ROW. Typically, this infrastructure is run adjacent to the Project access roads or along public ROWs or easements. In cases where such infrastructure must be sited on property that is not governed by the existing wind easement and land lease options, Sequoia will obtain easements for the necessary property.

Each wind turbine will be accessible via all-weather aggregate-surfaced roads that are typically 16 to 18 feet in width, providing access to the turbines off of public roads. Roads will be temporarily somewhat wider during construction to allow for construction crane access to turbine installation sites. At the point where the access and public roads meet, the communication and power lines will continue as underground feeder lines. Exhibit 8 is a diagram of the path of energy from the wind farm to energy users. Exhibit 9 shows a typical wind farm facility layout. The feeder system distributes power to the proposed Project Collector Substation. At the Project Collector Substation, the power will be stepped up to 230 kV and transmitted via overhead 230 kV transmission lines, interconnecting to Xcel's existing 230 kV transmission line. Depending on the outcome of the pending interconnection agreement, the Project could include a second 230 kV at the point of interconnection. The proposed substation, proposed 230 kV interconnection, and associated facilities of the transmission system will conform to MISO standards.

## **4.2 Wind Energy Center Layout**

Sequoia will develop a site layout that optimizes wind resource while minimizing the impact on land resources and potentially sensitive areas. Wind-powered electric generation is entirely dependent on the availability of the wind resource at a specific location. The energy available from the wind increases at the third power of the wind speed. In other words, a doubling of the wind speed will increase the available energy by a factor of eight times. Analysis of wind direction data suggests that the optimal turbine string alignments are from northeast to-southwest. Design of the turbine array and collection system will minimize energy loss due to wind turbine wakes and turbulence and electrical line losses.

Based on established Rolette and Towner County setbacks wind towers from property boundaries, road ROWs, and occupied residences and ordinances limiting turbine height,

Sequoia proposes setbacks of 0.25 miles from USFWS WPAs, 460 feet from transmission lines, roads, and railroads, and 1,000 feet from occupied residences. Table 4-1 identifies the minimum setbacks applicable to the Project. Sequoia will request Conditional Use Permits from Rolette and Towner Counties that will allow tower heights up to 80 meters with turbine rotor diameters up to 95 meters for a maximum turbine height of 127.5 meters (418.3 feet).

<b>Table 4-1: Setback Distances for Wind Turbines</b>	
<b>Setback Type</b>	<b>Distance</b>
Property Boundary	460 feet <sup>1</sup>
Occupied Residence	1,000 feet
USFWS WPA	0.25 miles
Overhead Transmission and Distribution Lines	460 feet

<sup>1</sup> Setback distance applies to neighboring land that is not under lease with Sequoia.

### 4.3 Associated Facilities

An O&M building will be constructed within the Project site pending the interconnection study and the location of the Project Substation. See Section 6.5.3 for a description of the O&M building.

The electricity generated by each turbine is stepped up by a pad-mounted transformer at the base of each turbine to power collection line voltage of 34.5 kV. The electricity generated at each turbine is collected by a system of underground power collection lines within the Project site and brought to the proposed Project Collector Substation.

The Project Collector Substation will be a 230/34.5 kV substation and will facilitate the relaying of the wind-generated energy to the potential new 230 kV substation at the point of interconnection, and ultimately to the existing Xcel 230 kV transmission line. The footprint of the Project Collector Substation and O&M building will be determined as project design advances, but the total footprint is expected to be less than 10 acres.

Sequoia has erected two meteorological towers within the Project site boundary. Sequoia has also used meteorological data collected by the Rolla Job Development Authority (JDA) from a meteorological tower that the JDA erected. Ultimately, these three temporary meteorological towers will be removed and permanent meteorological towers will be installed in association with the turbine arrays.

### 4.4 Land Rights

Sequoia has obtained lease option agreements for an approximately 150 MW project. Land rights will encompass the proposed wind farm and associated facilities, including but not

limited to wind and buffer easements, wind turbines, access, underground collector and feeder lines and overhead transmission lines located on public roads when necessary.

## **5.0 PROPOSED SITE**

### **5.1 Identification of Project Site**

In addition to wind resource considerations, the Project Site was selected based on its close proximity to existing transmission infrastructure, support from the Rolla Job Development Authority, and landowners' interest in participating in the Project. Land-use patterns and environmentally sensitive features were also factored into the site selection criteria. The site boundary encompasses an area of approximately 122 square miles (78,080 acres). However, the land occupied by the wind farm will be less than one percent of this area, assuming up to 66, 2.3-2.4 MW capacity turbines with access roads. It is anticipated that the area of direct land use for the turbines and associated facilities will be approximately 120 acres, including aggregate-surfaced access roads up to about 18 feet wide for the approximately 66 turbines in the 2.3-2.4 MW range. In areas with substantial topographic variation such as drainage crossings, the road construction zone width could be approximately 45 feet wide. See Section 7.0 for a detailed description of the Project Site impacts. Exhibits 3 and 4 show preliminary turbine locations for proposed 2.3-2.4 MW turbines. These locations are subject to change during the upcoming micro-siting process.

### **5.2 Wind Resource Areas – General**

The United States Department of Energy (DOE) and the North Dakota Division of Community Services have conducted wind resource assessment studies in North Dakota. The May 2004 DOE wind map for the state of North Dakota indicates that the wind resources within the Project vicinity include Class 3 and 4 winds or greater (Exhibit 10). Class 3 winds have an average annual wind speed of 6.4 to 7.0 m/s (14 to 15 mph). Whereas Class 4 winds have an average annual wind speed of 7.0 to 7.5 m/s (15 to 16 mph).

### **5.3 Wind Characteristics in Project Site**

Sequoia utilized wind data from three meteorological towers within the Project Site. Data were collected from the Rolla Job Development Authority for four years and from Sequoia's two towers for up to two and a half years. The locations of these towers can be seen on Exhibit 3. WindPRO software was used to analyze the available wind data from the Rolla meteorological tower in conjunction with the data from the Project Site to predict the spatial wind variations at the Project Site. Various site layouts and wind turbine generator parameters can be tested to predict the energy production and array efficiency to optimize the site layout and turbine selection.

## **6.0 ENGINEERING AND OPERATIONAL DESIGN ANALYSIS**

This section provides a summary description of the Project, which includes a description of the Project layout, turbines, electrical system, and associated facilities. A summary of this information is included in the Design Data Report (Appendix B). Additional information addressed in this section is project construction, schedule, operation, and decommissioning of the site. Currently, Sequoia wishes to preserve the right to evaluate and select turbine equipment of varying sizes and outputs. There are other turbines that are feasible choices for the Border Winds site that are available from various manufacturers. Turbine type may affect the number and configuration of the turbine array. The current turbine array proposed utilizes up to 66 wind turbines. There are many turbines that are feasible choices for the Project that are available from various manufacturers, and include turbines between 2.3-2.4 MW in size. The turbine model selection may affect the number and configuration of the turbine array. It is anticipated that turbine model selection will be completed prior to final micro-siting.

### **6.1 Border Winds Project Layout and Associated Facilities**

The Project will consist of arrays of wind turbines and transformers. The turbines will be interconnected by communication and electric power collection cable within the wind farm. In addition, the wind farm facilities will include feeder lines and 34.5 kV collector lines

Land will be graded on-site for the turbine pads. Drainage systems, access roads, storage areas, and O&M facilities will be installed as necessary to fully accommodate all aspects of Project construction, operation, and maintenance.

The interconnection study with MISO will begin in November 2008 with an interconnection agreement anticipated for May 2009. The electrical system design and interconnection details will be determined as a result of these studies and discussions with MISO.

The Project includes a computer-controlled communications system that permits automatic, independent operation, and remote supervision, thus allowing the simultaneous control of many wind turbines. Sequoia will be responsible for Project operation and maintenance for the life of the Project. Sequoia will contract with the most appropriate supplier of operations and maintenance services at the time of operation, to assure timely and efficient operations. Sequoia will maintain a computer program and database for tracking each wind turbine's operational history.

### **6.2 Description of Wind Turbines**

Sequoia anticipates using up to 66, 2.3-2.4 MW turbines. Sequoia seeks the flexibility to select the most appropriate technology at the time for the Project to ensure optimization of wind and land resources and cost efficiency. Sequoia will update the site layout, consistent

with the parameters laid out in the Certificate, when equipment is selected and if information regarding the wind resource identifies opportunities to further optimize the site.

### **6.2.1 Turbine**

In this application Sequoia uses specifications and design parameters of typical 2.3-2.4 MW turbines as a proxy for the turbine to be selected for this project as the design and development process continues. Exhibit 7 shows the components of a typical wind turbine. The turbines to be selected will begin operation in wind speeds of 3-5 m/s (6.7-11.2 mph) and reach their rated capacity (2.3-2.4 MW) at wind speeds of approximately 12 to 14 m/s (26.8 to 31.3 mph). The turbines are designed to operate in wind speeds of up to 25 m/s (55 mph) and can withstand wind gusts of 55 m/s (123 mph).

The turbines have active yaw and pitch regulation and asynchronous generators. The turbines use a bedplate drive train design where all nacelle components are joined on common structures to improve durability.

The turbines have Supervisory Control and Data Acquisitions (SCADA) communication technology to control and monitor the wind farm. SCADA communications system permits automatic, independent operation and remote supervision, thus allowing the simultaneous control of many wind turbines. Operations, maintenance and service arrangements between the turbine manufacturer and Sequoia will be structured so as to provide for timely and efficient operations. The computerized data network will provide detailed operating and performance information for each wind turbine. Sequoia will maintain a computer program and database for tracking each wind turbine's operational history.

Other specifications of typical turbines include:

- Rotor blade pitch regulation.
- Gearbox with three-step planetary spur gear system.
- Double fed three-phase asynchronous generator and an asynchronous 4-pole generator with a wound rotor.
- A braking system for each blade (three self contained systems) and a hydraulic parking brake (disc brake).
- Yaw systems are electromechanically driven.

### **6.2.2 Rotor**

The rotor consists of three blades mounted to a rotor hub. The hub is attached to the nacelle, which houses the gearbox, generator, brake, cooling system and other electrical and mechanical systems. The design of the preliminary range of turbines under consideration for selection identifies a 70-95 meter (230-312 ft) RD, with a swept area of 5,280-7,090 m<sup>2</sup> (56,830-76320 ft<sup>2</sup>), respectively. The rotor speed will be 6 to 18 revolutions per minute (rpm).

### **6.2.3 Tower**

The towers are conical tubular steel with a hub height of 70-80 meters (230-262 feet). The turbine towers, on which the nacelle is mounted, consist of three to four sections manufactured from certified steel plates. Welds are made in automatically controlled power welding machines and ultrasonically inspected during manufacturing per American National Standards Institute (ANSI) specifications. Surfaces are sandblasted and multi-layer coated for protection against corrosion. Access to the turbine is through a lockable steel door at the base of the tower.

### **6.2.4 Lightning Protection**

Each turbine is equipped with a lightning protection system. The turbine is grounded and shielded to protect against lightning. The grounding system will be installed during foundation work, and must be designed for local soil conditions. The resistance to neutral earth must be in accordance with local utility or code requirements. Lightning receptors are placed in each rotor blade and in the tower. The electrical components are also protected.

## **6.3 Description of Electrical System**

At the base of each turbine a step-up transformer will be installed to raise the voltage to power collection line voltage of 34.5 kV. Power will be run through an underground collection system to the Project feeder system that will feed power to the Project Substation and eventually the point of interconnection. The electrical lines will be buried in trenches adjacent to the Project access roads. At the point where the access and public roads meet, the collection system will continue as underground lines.

An interconnection study for the Project will occur with MISO in November 2008. The electrical system design and interconnection details will be determined as a result of studies and discussions with MISO.

Utility protection and metering equipment will meet National Electric Safety Code (NESC) standards for parallel operations. The construction manager will ensure that proper interconnection protection is established.

#### **6.4 Border Winds Wind Energy Project Construction**

Several activities must be completed prior to the proposed commercial production date. The majority of the activity relates to equipment ordering lead-time, as well as design and construction of the facility. Below is a preliminary list of activities necessary to develop the Project. Pre-construction, construction, and post-construction activities for the Project include:

- ordering of necessary components including towers, nacelles, blades, foundations, and transformers;
- final turbine micrositing;
- complete survey to microsite locations of structures and roadways;
- soil borings, testing and analysis for proper foundation design and materials;
- complete construction of access roads to be used for construction and maintenance;
- construction of overhead or underground feeder lines;
- design and construction of the Project Substation;
- installation of tower foundations;
- installation of underground cables;
- tower placement and wind turbine setting;
- acceptance testing of facility; and
- commencement of commercial production date.

Private turbine access roads will be built to access the towers, allowing access to the turbines during and after construction. These roads will generally be up to 18 feet wide, have an aggregate surface as cover, and be adequate to support the size and weight of maintenance vehicles. Roads will be temporarily wider during Project construction to accommodate the movement of construction cranes. The specific turbine placement will determine the amount of private roadway that will be constructed for the Project.

During the construction phase, several types of light, medium and heavy-duty construction vehicles will travel to and from the site, as well as private vehicles used by the construction personnel. Sequoia estimates that there will be approximately 44 trips per day in the area during peak construction periods. That volume will occur during the peak time when the majority of the road, foundation and tower assembly are taking place. At the completion of each construction phase, surplus equipment will be removed from the site.

### **6.4.1 Construction Management**

An engineering, procurement and construction (EPC) contractor will be primarily responsible for the construction management of the Project. The EPC contractor will use the services of local contractors, where possible, to assist in Project construction. The EPC contractor, in coordination with local contractors, will undertake the following activities:

- Securing building, electrical, grading, road, and utility permits
- Perform detailed civil, structural and electrical engineering
- Schedule execution of construction activities
- Complete surveying and geotechnical investigations
- Forecast Project labor requirements and budgeting

The EPC contractor also serves as key contact and interface for subcontractor coordination. The EPC contractor will oversee the installation of communication and power collection lines as well as the substation. The EPC contractor will also oversee the installation of roads, concrete foundations, towers, machines, and blades, as well as the coordination of materials receiving, inventory, and distribution. The Project will be constructed under the direct supervision of on-site construction manager with the assistance of local contractors. The construction consists of the following tasks:

- Site development, including roads
- Foundation excavation
- Concrete foundations
- Electrical and communications installation
- Tower assembly and machine erection
- System testing

The construction team will be on site to handle materials purchasing, construction, quality control, testing and start-up. The EPC contractor will manage local subcontractors to complete the various aspects of construction.

Throughout the construction phase, ongoing coordination occurs between the Project development and the construction teams. The on-site project construction manager helps to coordinate various aspects of the Project, including ongoing communication with local officials, citizens groups and landowners. Even before the Project becomes fully operational, the O&M staff is integrated into the construction phase of the

Project. The construction manager and the O&M staff manager work together continuously to ensure a smooth transition from construction through wind farm commissioning and, finally, operations.

#### **6.4.2 Foundation Design**

The wind turbines' freestanding tubular towers will be connected by anchor bolts to underground concrete foundation. Geotechnical surveys, turbine tower load specifications and cost considerations will dictate final design parameters of the foundations. The type of turbine foundations to be used has not yet been determined, but two alternatives will be considered. Spread footing foundations for similar sized turbines are generally octagonal, approximately 40 to 60 feet across at the base, and extend approximately 7 to 10 feet below grade. An alternative foundation is the Patrick and Henderson (P&H) tensionless pier, which are cast-in-place piers, typically measure 20 to 25 feet in diameter, and typically extend 25 to 32 feet below grade. The wind turbine foundation design shall be prepared by a registered professional engineer licensed to practice in the State of North Dakota.

#### **6.4.3 Civil Works**

Completion of the Project will require various types of civil works and physical improvements to the land. These civil works may include the following:

- Improvement of existing public access roads to the Project site,
- Construction of roads adjacent to the wind turbine strings (turbine access, roads) to allow construction and continued servicing of the wind turbines,
- Clearing and grading for wind turbine tower foundation installations,
- Trenching for underground cabling for connecting the individual wind turbines,
- Installation of an on-site feeder system for connecting wind turbine strings for delivery to the electricity collection/metering location,
- Clearing and grading for the O&M building,
- Installation of site fencing and security, and
- Restoration and re-vegetation of disturbed land when construction activities are completed.

Improvements to existing public access roads will consist of re-grading and filling of the surface to allow access even in inclement weather. No asphalt or other paving is anticipated. Turbine access roads will be constructed along turbine strings or arrays. These roads will be sited in consultation with local landowners and completed in

accordance with local building requirements where these roads interface with public roads. They will be located to facilitate both construction (cranes) and continued operation and maintenance. Siting roads in areas with unstable soil will be avoided wherever possible. Roads will include appropriate drainage and culverts while still allowing for the crossing of farm equipment. The finished surface of roads will typically be 16 to 18 feet wide and will be covered with road base designed to allow passage under inclement weather conditions. The roads will consist of graded dirt and will be covered with an aggregate surface. The graded cross-section of the roads will extend out beyond 18 feet in certain areas, and may be approximately 45 feet wide in areas with substantial topographic variation. Roads will be temporarily wider during construction to allow for the passage of construction cranes. Once construction is completed, the roads will be regraded, filled, and dressed as needed.

#### **6.4.4 Commissioning**

The Project will be commissioned after completion of the construction phase. The Project will undergo detailed inspection and testing procedures prior to final turbine commissioning. Inspection and testing occurs for each component of the wind turbines, as well as the communication system, meteorological system, obstruction lighting, high voltage collection and feeder system, and the SCADA system.

### **6.5 Project Operation and Maintenance**

Each wind turbine in the Project will communicate directly with the SCADA system for the purposes of performance monitoring, energy reporting and trouble-shooting. Under normal conditions each wind turbine operates autonomously, making its own control decisions. The Project will be operated and maintained by a service/O&M contract with the turbine manufacturer used for the Project.

Sequoia and the appropriate supplier will control, monitor, operate, and maintain the Project by means of a SCADA computer software program. In addition to regularly scheduled on-site visits, the wind farm may be monitored via computer.

The SCADA system offers access to wind turbine generation or production data, availability, meteorological, and communications data, as well as alarms and communication error information. Performance data and parameters for each machine (generator speed, wind speed, power output, etc.) can also be viewed, and machine status can be changed. There is also a “snapshot” facility that collects frames of operating data to aid in diagnostics and troubleshooting of problems.

The primary functions of the SCADA system are to:

- monitor wind farm status,
- allow for autonomous turbine operation,

- alert operations personnel to wind farm conditions requiring resolution,
- provide a user/operator interface for controlling and monitoring wind turbines,
- collect meteorological performance data from turbines,
- monitor field communications,
- provide diagnostic capabilities of wind turbine performance for operators and maintenance personnel,
- collect wind turbine and wind farm material and labor resource information,
- provide information archive capabilities,
- provide inventory control capabilities, and
- provide information reporting on a regular basis.

### **6.5.1 Maintenance Schedule**

Sequoia will remotely monitor the Project on a daily basis. This will be accompanied by a visual inspection by the on-site operating staff. Several daily checks will be made in the first three months of commercial operation to see that the Project is operating within expected parameters.

Once installed, the Project service and maintenance is carefully planned and divided into the following intervals, further discussed below:

- First service inspection,
- Semi-annual service inspection,
- Annual service inspection,
- Two years service inspection, and
- Five years service inspection.

**First Service Inspection.** The first service inspection will take place one to three months after the turbines have been commissioned. At this inspection, particular attention is paid to the tightening up of bolts by 100 percent, a full greasing, and filtering of gear oil.

**Semi-Annual Service Inspection.** Regular service inspections commence six months after the first inspection. The semi-annual inspection consists of lubrication and a safety test of the turbine.

**Annual Service Inspection.** The yearly service inspection consists of a semi-annual inspection plus a full component check. Bolts are checked with a torque wrench. The check covers 10 percent of every bolt assembly. If bolts are found to be loose, the loose bolts in that assembly are tightened 100 percent and the event is logged.

**Two Years Service Inspection.** The two years service inspection consists of the annual inspection, plus checking and tightening of terminal connectors.

**Five Years Service Inspection.** The five years inspection consists of the annual inspection, an extensive inspection of the wind braking system, checking and testing of oil and grease, balance check, and tightness of terminal connectors.

### **6.5.2 General Maintenance Duties**

The O&M field duties include performing scheduled and unscheduled maintenance including periodic operational checks and tests, regular preventive maintenance on turbines, related plant facilities and equipment, safety systems, controls, instruments, and machinery, including:

- Maintenance on the wind turbines and on the mechanical, electrical power, and communications system.
- Performance of routine inspections.
- Maintenance of oil levels and changing oil filters.
- Maintenance of the control systems, Project structures, access roads, drainage systems and other facilities necessary for the operation.
- Maintenance of O&M field maintenance manuals, service bulletins, revisions, and documentation for the Project.
- Maintenance of parts, price lists, and computer software.
- Maintenance and operation of Project Substation.
- Provide labor, services, consumables, and parts required to perform scheduled and unscheduled maintenance on the wind farm, including repairs and replacement of parts and removal of failed parts.
- Cooperate with avian and other wildlife studies that may be required to include reporting and monitoring.
- Manage lubricants, solvents, and other hazardous materials as required by Local and/or State regulations.
- Maintain appropriate levels of spare parts in order to maintain equipment. Order and maintain spare parts inventory.

- Provide necessary equipment including industrial cranes for removal and reinstallation of turbines.
- Hire, train, and supervise a work force necessary to meet the general maintenance requirements.
- Implement appropriate security methods.

### **6.5.3 Operations and Maintenance Facility**

The final location and layout of the O&M facility will be provided prior to construction. Typically buildings used for this purpose are approximately 5,000 square feet, which house the necessary equipment to operate and maintain the Project. Generally, an associated septic system and a well are installed near the O&M building.

## **6.6 Decommissioning and Restoration**

Sequoia has a contractual obligation to the landowners to remove the wind facilities when the wind easement expires. These facilities include towers, turbine generators, transformers, cables, buildings, ancillary equipment, and foundations to a depth of four feet below grade. Access roads will be removed unless the affected landowner provides written notice that the road or portions of the road shall be retained. Additionally, Project-related disturbed surface shall be graded, reseeded, and restored as nearly as possible to its preconstruction conditions.

Sequoia also reserves the right to explore alternatives regarding Project decommissioning at the end of the Project Certificate term. Retrofitting the turbines and power system with upgrades based on new technology may allow the wind farm to produce efficiently and successfully for many more years. Based on estimated costs of decommissioning and the salvage value of decommissioned equipment, the salvage value of the wind farm will exceed the cost of decommissioning. This ensures that sufficient funds will be available to cover decommissioning and restoration costs.

## **7.0 ENVIRONMENTAL ANALYSIS**

This section provides a description of the environmental conditions that exist within the Project Area. Consistent with North Dakota Energy Conversion and Transmission Facility Siting Act, the exclusion and avoidance criteria were considered as well as selection and policy criteria in the selection and design of the site. To support this siting process, maps of the site were generated that indicate the presence or absence of many of the criteria highlighted in NDCC 69-06-08. In addition, Sequoia's Environmental Policy is included in Appendix A. This policy summarizes Sequoia's focus on environmental and community responsibility for wind energy projects. In developing this approach, Sequoia has been a pioneer in demonstrating that wind

energy is a safe, reliable, economically sound, and socially responsible source of energy for North America.

Sequoia sent letters to various regulatory and governmental authorities to request review of the Project for applicable comments and concerns. Those agencies that responded with comments regarding the proposed Project are discussed in the following sections, as applicable. Further discussion regarding the agency comment request, including a list of the agencies that received the request letter, is provided in Section 10.11.

## **7.1 Description of Environmental Setting**

The Project Area is located in Rolette and Towner Counties in North Dakota, a primarily rural agricultural area located north of North Dakota Highway 5 and east of North Dakota Highway 30. The economic base of both Rolette and Towner Counties consists predominantly of employment in farming and agricultural services. In 2007, Rolette County had a population of 14,002, an increase of 2.3 percent from the 2000 census level. The 2007 population of Towner County was 2,703; a decrease of 6.0 percent from the 2000 census level. Cities and small unincorporated towns near the Rolette County portion of the Project Area include Rolla (population 1,417), St. John (population 358), and Belcourt (population 2,440). Cities and small unincorporated towns near the Towner County portion of the Project Area include Rock Lake (population 194), and Bisbee (population 167).

## **7.2 Demographics**

### **7.2.1 Description of Resources**

The Project is located within a sparsely populated rural area in north-central North Dakota. There is no indication of new residential construction within the defined project area. Information on demographics and housing for this section was taken from the 2000 U.S. Census with population statistics for both Rolette and Towner counties derived from 2007 updated statistics.

The defined project area is located in portions of Baxter (T163 & 164N, R70W), Fairview (T163 & 164N, R69W), and Mt. Pleasant (T162N, R69W). Townships in Rolette County and Mount View (T162N, R68W) and Mount View (T163N, R68W) in Towner County, North Dakota.

Table 7-1 summarizes the population and economic characteristics within the Project site. The combined population of Rolette and Towner Counties is 16,705 with populations of the Townships included within the defined Project area. The per capita income is much lower in Rolette County and as compared to Towner County, Rolette has a greater percentage of population below poverty level. According to the

2000 U.S. Census, the largest industries employing residents of both counties are Agriculture and Services.

<b>Table 7-1: Population and Economic Characteristics</b>			
<b>Location</b>	<b>Population</b>	<b>Per Capita Income</b>	<b>Percentage of Population Below Poverty Level</b>
Rolette County	14,002	\$14,451	31.0%
Towner County	2,703	\$23,210	8.9%
<b>Total</b>	16,705		

### 7.2.2 Impacts

Short-term impacts to socioeconomic resources will be relatively minor. Under the 2.3-2.4 MW turbine development scenario (for up to 66 turbines), approximately 120 acres of agricultural land will be removed from production due to conversion to turbine sites and associated access roads. Landowner compensation will be established by individual lease agreements. In general, agricultural areas surrounding each turbine can still be farmed. In addition, in an environment of uncertain and often declining agricultural prices and yields, the supplemental income provided to farmers from wind energy leases will provide stability to farm incomes and thus will help assure the continued viability of farming in the Project area. Project construction will not cause additional impacts to leading industries within the Project site. There is no indication that a minority or low-income population is concentrated in any one area of the Project, or that the wind turbines will be placed in an area occupied primarily by a minority group.

To the extent that local contractors are used for portions of the construction, total wages and salaries paid to contractors and workers in both Rolette and Towner counties will contribute to the total personal income of the region. Additional personal income will be generated for residents in the counties as well as the state by circulation and recirculation of dollars paid out by the applicant as business expenditures and state and local taxes. Expenditures made for equipment, energy, fuel, operating supplies and other products and services benefit businesses in the counties and the state. It is likely that general skilled labor is available either at the county or the state level to serve the basic infrastructure and site development needs of the Project. Specialized labor will be required for certain components of the wind farm development; it is likely that this labor will be imported from other areas of the State or from other states as the relatively short duration of construction does not warrant special training of Local or Regional labor. Balancing the use of local contractors and imported specialized contractors will likely alleviate potential labor relation issues.

No effects on permanent housing are anticipated. During construction, out-of-town laborers will likely use lodging facilities in and around Rolla. Operation and maintenance of the facility will require few laborers; sufficient permanent housing is available within the county to accommodate these laborers. Long-term beneficial impacts to the counties' tax base as a result of the construction and operation of the wind farm will contribute to improving the local economy in this area of North Dakota. The development of wind energy in this region will be important in diversifying and strengthening the economic base of north central North Dakota.

Continuing to establish the north-central region of North Dakota as an important producer of renewable energy sources, such as wind, may spur the development of wind-related businesses in the area, in turn contributing to the economic growth in the region.

### **7.2.3 Mitigative Measures**

Effects to regional socioeconomic as a result of the proposed Project will be primarily positive. This can be attributed to an anticipated influx of wages and expenditures made at local businesses during the Project construction and an increase in the counties' tax bases from the construction and operation of the wind turbines and associated infrastructure. In addition, the lease payments paid to landowners will offset potential financial losses associated with removing the land from agricultural production. Therefore, because no impacts are anticipated, no mitigative measures are proposed.

## **7.3 Land Use**

### **7.3.1 Description of Resources**

The land in Rolette and Towner Counties within the defined Project area is predominantly agricultural with private residences and farmsteads located throughout. Initial project permitting coordination with county officials has indicated that Rolette and Towner Counties have retained zoning rights at the county level.

The Project will be located in north-eastern Rolette County and north-western Towner County, North Dakota near the towns of Rolla, St. John, and Hansboro. The majority of the Project Area occurs north of North Dakota Highway 5 up to the North Dakota-Canadian border. The Project proposes to install approximately 150 MW of wind power, consisting of up to 66 wind turbines within the 122 square mile (78,080 acres) Project area. The current land use within the Project area is rural agricultural land used for crops and livestock grazing. The development of the proposed Project will not displace residences or existing or planned industrial facilities. Wind turbines will be sited a minimum of 1000 feet from occupied residences.

Based on a review of aerial photographs, land use database information, database information, and visits to the Project site, it was determined that the majority of the land area at the site is agricultural land use. Table 7-2 identifies current land use in the Project site based on the USFWS database. Over eighty (81) percent of the Project site is used for agricultural purposes. Native grasslands form approximately 10 percent of the site and are primarily used for grazing livestock. Approximately 2,420 acres are enrolled in the Conservation Reserve Program (CRP). Native grasslands include remnant native prairie of various quality dependent on grazing pressure and herbicide applications to control weed species. The remaining approximately nine (9) percent of the site is wetland, forest, open water, or urban/developed.

**Table 7-2: Major Habitats and Their Relative Abundance in the Project Site**

Habitat	Acreage	Percent of Project Site
Cropland	64,391	81.0
Grassland	8200	10.3
Wetland	5049	6.4
Forest	807	1.0
Urban/Developed	536	0.7
Water	509	0.6

**7.3.2 Impacts**

The development of the wind project will not result in a significant change in land use. The area will retain the rural sense and remote characteristics of the vicinity. Wind turbines will be sited a minimum of 1000 feet from occupied residences. At other wind developments in the upper Midwest, landowners frequently plant crops and/or graze livestock to the edge of the access roads and turbine pads. The access roads are 16 to 18 feet wide and low profile except in areas of drainage crossings, so they are easily crossed while farming. Sequoia Energy will work closely with the landowners in locating access roads to minimize land use disruptions to the extent possible. Consideration will be taken in locating access roads to minimize impact on current or future row crop agriculture and environmentally sensitive areas. During the construction of the wind power facilities, additional area may be temporarily disturbed for contractor staging areas and underground power lines. These areas will be graded to original contour and if necessary reseeded with appropriate species mix of vegetation.

The permanent site layout has not been determined, but the preliminary layout will result in the conversion of approximately 34 acres of land assuming 66 2.3-2.4 MW

turbines and 84 acres of land for aggregate-surfaced access roads. The Project facilities will also include an O&M facility, Project Substation, and transmission line. These areas will be permanently converted from agricultural land use into wind facilities. Approximately two acres will be converted for the Project Substation and one acre will be converted for the O&M facility. Approximately 10 acres of land will be temporarily impacted for contractor staging and lay down areas.

### **7.3.3 Mitigative Measures**

Sequoia is working closely with the landowners, the USFWS, and other agencies in locating wind turbines and access roads to minimize land use disruptions and impacts to environmentally sensitive areas to the extent possible. Operation of the wind farm will not change the land use in the Project Area. The proposed land use will not involve ongoing industrial use of non-renewable resources or emissions into the environment.

## **7.4 Public Services**

### **7.4.1 Description of Resources**

#### **Local Services**

The Project is located in a sparsely populated, rural area in north-central North Dakota. There is an established transportation and utility network that provides access and necessary services to the light industry, small cities, homesteads, and farms existing near the Project site. The City of Rolla (City) is located within the Project site and is the Rolette County seat. The City provides sanitary sewer, water, utility services, educational facilities, and recreational facilities such as parks. Additionally, the City's local services include emergency services, ambulance service, a hospital and a sheriff. There are also several local retail service facilities and organizations.

#### **Electrical Service**

Otter Tail Power Company provides electricity to 423 communities across portions of north eastern South Dakota, western Minnesota, and eastern North Dakota, including the Project area. For those consumers in more rural areas within the Project area that are not serviced by Otter Tail Power Company, electricity is provided by Northern Plains Electric. Northern Plains Electric is a co-operative that distributes electricity supplied by Basin Electric Power Co-operative. There are two utility corridors that run through the Project site. Xcel owns a 230 kV transmission line that runs north-south through the central portion of the Project. In addition, a Central Power transmission line runs east-west and intersects Xcel's 230 kV transmission line approximately two miles east of Rolla.

## Roads

County and township (section line) roads characterize the existing roadway infrastructure in and around the Project site. There are two North Dakota State Highways (Hwy) within and adjacent to the Project site. Hwy 30 runs through the western portion of the Project site along a southeast to northwest transect. Hwy 5/U.S. Highway 281(US 281) runs parallel to the southern boundary of the Project site and runs west to east.

## Traffic

Determining the specific capacity of a highway is a complex process; however, general estimates can be used for planning purposes. North Dakota Department of Transportation (NDDOT) has measured traffic volumes within the Project area and vicinity. NDDOT's information for selected roads within the Project area are presented in Table 7-3 and shown on Exhibit 11. The highest existing Average Daily Traffic (ADT) in the project area is 3,850, which occurs along Hwy 30/US 281 west of Rolla. This reduces to 800 approximately 4.5 miles east of Rolla within Towner County. Higher traffic volumes are also observed near St. John. The ADT for Hansborod Road/106<sup>th</sup> Street north of the city is 1,000 which reduces to 150 approximately 1.5 miles east of St. John. Roadways south of St. John and south of Rolla also experience elevated levels of traffic. The ADTs for these roadways are 875 and 725 for south of St. John and Hwy 30 south of Rolla, respectively. Along the remaining major county roadways, ADT is minimal and below 500. For purposes of comparison, the functional capacity of a two-lane paved rural highway is approximately 5,000 vehicles per day. Therefore, when compared to 5,000 ADT, the roadways in and near the Project site have the capacity to carry higher levels of traffic than they are currently experiencing.

<b>Roadway Segment Description</b>		<b>Existing Average Annual Daily Traffic (ADT)</b>
Rolette County	Hwy 5/US 281 west of Rolla	3850
	Hansborod Rd/106 <sup>th</sup> St NE north of St.John	1000
	Foussard Ave SE along railline south of St. John	875
	Hwy 30 south of Rolla	725
	Hwy 30 south of Hansborod Rd/106 <sup>th</sup> St NE	240
	Airport Road north of Rolla	190
	Hansborod Rd/106 <sup>th</sup> St NE west of Hwy 30	150
Towner County	Hwy 5/US 281 between 56 <sup>th</sup> and 57 <sup>th</sup> avenues NE	800

Source: 2006-2008 Traffic Volumes from NDDOT, Bismarck

### **Water Supply**

The City's water is supplied via five underground storage wells and the City has a maximum water storage capacity of 407,000 gallons. Wastewater for the City is treated with a four-cell lagoon system. The City's stormwater collection system is separate from this wastewater treatment system. Townships within the Project area have limited public infrastructure services, which is typical of most townships. Homes not serviced by the City utilize septic systems and water wells for their household needs.

### **Telephone, Fiber Optic and Microwave Communications**

Telephone service is provided by Qwest and other local telephone companies to farmsteads, rural residences, and businesses in the area. On behalf of Sequoia, Comsearch assessed potential impacts of proposed construction and operation of the Project on existing non-Federal government microwave telecommunication systems (Comsearch 2008). The assessment identified no microwave paths that intersect the Project Area.

### **7.4.2 Impacts**

The Project is expected to have a minimal effect on the existing services and infrastructure. The following is a brief description of the impacts that may occur during the construction and operation of the Project.

#### **Local Services**

No impact is expected to local services.

#### **Electrical Service**

No disruption of power to residences or local businesses is anticipated to occur as a result of construction or operation of the Project. However, the Project will require station service from the local electric provider when the wind project is not generating electricity.

#### **Roads**

Constructing the Project will require up to 20 miles of aggregate-surfaced access roads assuming 66 2.3-2.4 MW turbines. In addition, during operation of the Project, the access roads will be used by operation and maintenance crews while inspecting and servicing the wind turbines. The access roads will be between towers, offset as necessary to allow for adequate crane access. One road will be required for each string. The permanent access roads will be approximately 18 feet wide and low profile to allow cross-travel by farm equipment.

## **Traffic**

The maximum construction workforce is expected to generate approximately 44 additional vehicle trips per day. Using a combination of roadways throughout the Project site, the traffic impacts are considered negligible. Since many of the area roadways have minimal ADT currently, the addition of 44 vehicle trips represent a large percentage increase (and likely will be perceptible), but will still be less than seasonal variations such as autumn harvest. The capacity of travel routes and Level-of-Service to the traveling public will not be impacted.

Truck access to the Project site is served by Hwy 5/US 281 and Hwy 30 into Rolla. Hwy 5/US 281 is a four-lane highway through the Project area but changes into a two-lane highway as Hwy 5 and US 281 separate near Rocklake. Hwy 5 continues east and connects to I-29 in Pembina County, approximately 106 miles to the east of the Project area. Hwy 30 is a two-lane highway that travels north to the Canadian border and south to Lehr, approximately 174 miles from the Project. From Rolla, Highway 5 will serve as the primary truck access into the Project site. Specific additional truck routes will be dictated by the location required for delivery. Additional operating permits will be issued by the State, counties and/or townships for over-sized truck movements.

## **Water Supply**

Construction and operation of the Project will not affect the water supply. The Project will not require appropriation of surface water or permanent dewatering; however, temporary dewatering of groundwater may be required during construction of turbine foundations. In addition, it is likely that the Project will require a single domestic-sized well for the O&M facility. No abandonment of wells is anticipated for the Project. If it is determined that wells do need to be abandoned, they will be done so in accordance with applicable laws.

## **Telephone, Fiber Optic and Microwave Communications**

Construction and operation of the proposed wind farm will not affect the telephone service to the Project area. The results of the microwave beam path analysis determined that there are no microwave beam paths intersecting the Project area. Therefore, no detrimental impacts to radio and television reception are anticipated. Sequoia will not operate the wind farm so as to cause microwave, radio, telephone, television, or navigation interference contrary to FCC regulations or other law. If operation of the Project causes such interference, the Applicant will take the necessary steps to correct the problem.

### **7.4.3 Mitigative Measures**

Construction and operation of the wind farm Project will be in accordance with associated local, federal and state permits and laws, as well as industry construction and operation standards. Because of only minimal effects expected to occur on the

existing infrastructure during Project construction and operation, extensive mitigation measures are not anticipated. Proposed mitigation measures, where necessary, are described below.

### **Local Services**

With the addition of substation and transmission capacity, no impact to local services is anticipated, and no required mitigation is required.

### **Electrical Service**

Sequoia will purchase station service from a local electrical utility. MISO will suggest appropriate configurations for the electrical system and Sequoia will abide by the recommendations to prevent impacts to the transmission system. Sequoia has established a setback of 460 feet from existing transmission lines. No additional mitigation is necessary.

### **Roads**

Sequoia will work with local governments and NDDOT regarding roadway concerns, right-of-way work, as needed, and setbacks during construction of the project. In addition, Sequoia is also working closely with the landowners in the placement of access roads to minimize land-use disruptions during construction and operation of the Project to the extent possible. A map depicting the preliminary layout of the turbines and access roads is shown on Exhibit 3.

### **Traffic**

Sequoia will coordinate with local highway departments regarding traffic, access, and permitting oversized loads during construction of the project. No other mitigation measures are necessary.

### **Water Supply**

In the event wells are abandoned, they will be sealed as required by North Dakota law. If temporary dewatering of groundwater is required during construction activities, discharge of dewatering fluid will be conducted under the requirements of the National Pollutant Discharge Elimination System (NPDES) permit and Storm Water Pollution Prevention Plan (SWPPP).

### **Telephone, Fiber Optic and Microwave Communications**

North Dakota One Call will be contacted prior to construction to locate and avoid underground facilities. To the extent Project facilities cross or otherwise affect existing telephone or fiber optic lines or equipment, Sequoia will enter into agreements with service providers so as to avoid interference with their facilities.

## **7.5 Human Health and Safety**

### **7.5.1 Description of Resources**

#### **Air Traffic**

The Rolla Municipal Airport is located approximately one mile north of Rolla in Section 5, Township 162 North, Range 69 West. The airport is located 1.5-half miles east of the western Project boundary and five miles north of the southern Project boundary. There are multiple runways at the facility. The longest runway is 4,300 feet in length and is oriented along a northwest-southeast axis. The airport is at an elevation of approximately 1,822 feet above mean sea level. This airport includes a height limitation zone (Exhibit 5). This height limitation zone includes an approximate three mile radius surrounding the runways where structures are limited to a height of 372 feet (with topographical variation taken into account). The Rolla Municipal Airport airport supports local single-engine airplanes. The nearest airport certified for carrier operations is Devils Lake Municipal Airport located approximately 58 miles southeast of Rolla.

Local medical facilities, including Presentation Medical Center, are not currently equipped with a heliport and cannot transport patients directly to or from their facilities. Helicopter or airplane transport is directed to Rolla Municipal Airport when local emergency care is required. Other local air traffic may include aerial application (crop dusting) of agricultural fields. Aerial application is typically done during the day by small, highly maneuverable aircraft. Local aircraft applicators may be familiar with flying in areas where existing wind farms are currently operating.

#### **Electromagnetic Fields**

The term electromagnetic fields (EMF) refers to electric and magnetic fields that are present around an electrical device. Electric fields arise from the voltage or electrical charges and magnetic fields arise from the flow of electricity or current that travels along transmission lines, power collection (feeder) lines, substation transformers, house wiring, and electrical appliances. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors (wire). EMF can occur indoors and outdoors. However, there are no known discernible health impacts from power lines. Turbines and collector lines will be no closer than 1000 feet to occupied residences where EMF will be at background levels.

#### **Hazardous Materials / Hazardous Waste**

The site is located in a rural area of North Dakota. Hazardous wastes from large industrial or commercial activities are not likely. Potential hazardous materials within the Project area would be associated with agricultural use of the land, which includes use of petroleum products (diesel fuel, gasoline, natural gas, heating oil, lubricants, and maintenance chemicals), pesticides, and herbicides. Older farmsteads

may also contain lead-base paint, asbestos-containing building materials, and polychlorinated biphenyls in electrical transformers. Unmarked farmstead waste dumps which may contain various types of wastes are also commonly found in rural/farming areas. A Phase I Environmental Site Assessment (ESA) of the Project site will be considered to identify Recognized Environmental Conditions (RECs) that may exist.

During construction, vehicles and equipment will use gasoline, diesel and other petroleum products. In operation, the Project is not expected to generate significant amounts of hazardous waste or materials. The wind turbines will use synthetic gear box oil, hydraulic fluid, and gear grease. Diesel and gasoline may be stored at the O&M facility for use by operation and maintenance personnel. The transformers contain mineral oil.

### **Security**

The Project site is located in an area that has a low population density. Construction and operation of the Project is not anticipated to have impacts on the security and safety of the local populace.

## **7.5.2 Impacts**

### **Air Traffic**

No turbines or other tall project facilities are proposed within the airport's height limitation zone. Wind turbines and meteorological towers will be visible from a distance. The wind turbines and meteorological towers will have lighting and markings that comply with Federal Aviation Administration (FAA) requirements. In addition, the FAA's review will include evaluation of potential interference with air traffic.

### **Electromagnetic Fields**

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. Based on the most current research on electromagnetic fields, and the distance between turbines or collector lines and houses, the Project will have no impact to public health and safety due to EMF.

### **Hazardous Materials / Hazardous Waste**

Sequoia will design and construct the Project to avoid farmsteads and other occupied buildings by at least 1000 feet, thereby avoiding potential hazardous materials and unmarked waste dumps. Therefore, impacts from hazardous materials are not anticipated. Hydraulic oils and lubricants used within the wind turbines will be contained within the turbine nacelle, or within the O&M facility in accordance with

applicable regulation for such storage. Fuels and lubricants for vehicles and maintenance equipment will be properly stored and contained according to applicable local, state, and federal regulations at the O&M facility. Transformer oil will be contained within the electric transformers, and fluid levels will be monitored during maintenance at each turbine and transformer location. Small amounts of hydraulic oil, lube oil, grease, and cleaning solvent may be stored in the O&M facility. When fluids and lubricants are replaced, the waste products will be handled and disposed of according to local, state, and federal regulations through an approved waste firm.

### **Security**

Project construction and operation will have minimal impacts to security and safety of local residences. As with any large construction project, some risk of worker or public injury exists during construction. However, Sequoia and its construction representatives and workers will prepare and implement work plans and specifications in accordance with applicable worker safety requirements during construction of the Project. Sequoia will also control public access to the Project during construction and operation.

### **7.5.3 Mitigative Measures**

#### **Air Traffic**

Sequoia Energy is coordinating with FAA on the Project layout. The wind turbines and meteorological tower will be equipped with lighting in compliance with FAA requirements. Temporary meteorological towers (if used) will have supporting guy wires which will be marked with colored safety shields, and permanent meteorological towers will be painted red at the top to improve visibility. Permanent meteorological towers will be free-standing with no guy wires. Sequoia will notify local airports and aerial applicators regarding the new towers and turbines to reduce the risk to local aircraft.

#### **Electromagnetic Fields**

Although there is no conclusive evidence of harmful effects of EMFs, increasing the distance between source and receptors decreases the strength of EMFs. Therefore, the planned distances between occupied residences and proposed facilities should mitigate possible harmful effects of EMFs and, therefore, no impacts due to EMFs are anticipated. Consequently, no mitigative measures are proposed.

#### **Hazardous Materials / Hazardous Waste**

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

### **Security**

While no impact to the security of local residents is expected as a result of construction or operation of the Project, Sequoia will use the following security

measures to reduce the chance of physical and property damage, as well as personal injury, at the site:

- Towers will be placed at least 460 feet from public road ROW and at least 1,000 feet from occupied homesteads. These distances are considered to be safe based on developer experience and are consistent with the required local setbacks. This will also serve to reduce noise;
- Contractors will use proper construction and maintenance methods to ensure minimal impacts to workers and public health and safety;
- Sequoia and its contractors will provide temporary (safety) and permanent fencing, warning signs, and locks on equipment and wind power facilities during construction and operation of the Project;
- Sequoia will conduct regular operation and maintenance and inspections during the life of the Project to address potential blade failures, minimizing the potential for blade throw. If problems are identified, Sequoia will perform immediate repairs;
- Turbines will be situated on solid steel enclosed tubular towers where electrical equipment will be located, except for the pad-mounted transformer. Access to the tower will only be allowed through a solid steel door that will be locked when not in use. External electrical equipment will be clearly marked with appropriate warning signs; and
- Where necessary or requested by landowners, Sequoia will construct gates or fences around the facilities.

## **7.6 Noise**

### **7.6.1 Description of Resources**

Noise is defined as unwanted sound (Rogers et al. 2006). The sound generated by wind turbines becomes noise only when humans perceive it to be objectionable. Noise concerns of humans can depend upon: (1) the intensity and frequency of sound, (2) background or ambient noise or sound levels, (3) terrain and vegetation, and (4) the nature and attitude of the receptor (i.e., the person hearing the noise) (Rogers et al. 2006).

Wind turbines generate two types of sound (Rogers et al. 2006). Mechanical sound originates from the mechanical components in a wind generator. Aerodynamic sound originates from the flow air around wind turbine blades. Aerodynamic sound is typically louder than mechanical sound and it generally increases with wind speed (Rogers et al. 2006). In natural environments, the sound emitted by wind turbines combines with background ambient sound levels to produce the sound level detected by the receptor. The sound from wind turbines is described in terms of sound

pressure, and is typically expressed in dBA, which are decibels corrected or A-weighted for the sensitivity of the human ear (National Research Council 2007).

Background noise levels in the Project site are typical of those in rural settings, where existing nighttime noise levels are in the low to mid-30 dBA. Higher levels exist near roads and other areas of human activity. The windy conditions in this region tend to increase ambient noise levels compared to other rural areas.

## **7.6.2 Impacts**

Sequoia is proposing to install up to 66 wind turbines over an approximate 122 square mile permit area near Rolla, North Dakota. The turbines will be in the 2.3-2.4 MW range. One model of 2.3 MW turbine under consideration results in a mean A-weighted sound power level of 107 dBA at wind speeds from 7 m/s to cutout speed (about 25 m/s) when measured using IEC standard procedures. The primary source of noise from these turbines is from the wind interacting with the rotor blades, producing a swishing sound that is relatively constant over the wind speed range indicated above. However, the level of background noise created by the wind continues to increase as the speed increases. At these higher wind speeds, the turbine noise is masked by the wind-generated noise.

The equipment located in the nacelle of the turbines also produces noise but it is controlled through design features and is well contained by the nacelle housing. It is often overpowered by the sound from the rotor blades. Operation and maintenance of the wind turbines and associated facilities will create increased noise levels within the Project Area. The sound level varies with the speed of the turbine and the distance of the listener from the turbine. The turbine speed, in turn, depends on the weather conditions. In general, on more windy days, turbines can create more sound. However, increases in noise levels within the Project area are expected to be minimal. In addition, the noise level of the wind itself tends to mask or overcome turbine noises, especially as distance from the turbines increases.

The State of North Dakota has no ascertainable noise standards that apply to wind energy projects. The North Dakota State Code Section 49-22-16(2) requires that energy conversion facilities be consistent with county zoning regulations (North Dakota Public Service Commission 2005). Towner County requires that wind turbine noise at property lines be limited to 50 dBA. Although the 50 dBA noise limit would not specifically apply to the Border Wind Project if a Conditional Use Permit is obtained, some assurance that noise levels will be reasonable may be desirable prior to commencement of construction. Therefore, the generally accepted average noise impact level for wind turbines of less than 50 dBA at a residence, day or night will be used. An analysis of predicted noise attenuation is displayed in Exhibit 12.

### **7.6.3 Mitigative Measures**

Possible noise impacts to nearby rural residences/farmsteads and other potentially affected parties will be considered in the design, siting, and construction of the proposed Project. In order to (ensure) that measurable noise levels at occupied residences is maintained at 50 dBA or less a specific setback distance was determined. Distance attenuation estimates for sounds emanating from a point source are determined using the doubling rules of logarithmic measurement. In this scenario the measured decibel level decreases by a factor of six for each doubling of distance from the point source. Using these calculations, the estimated distance from the point source required to achieve 50 dBA is 1,000 feet. Sequoia is committed to the 1,000-ft setback distance from occupied residential property lines. This setback distance has proven sufficient and acceptable to the communities in North Dakota where other installed wind farms are currently in operation.

## **7.7 Visual Resources**

### **7.7.1 Description of Resources**

The topography of the Project site is undulating to rolling prairies with the edge of the Turtle Mountains adjacent to the western edge of the Project boundary. Elevations range between 1750 and 1900 feet above sea level. The highest elevations occur at the foothills of the Turtle mountains on the western edge of the Project. The dominant landforms in the site are glacial till deposits. A topographic map of the Project site is shown in Exhibit 4.

Within the Project site the dominant land use is agriculture. The most widely grown crops in the Project Site are oats, durum wheat, and other small grains. Wetland areas are dominated by cattails, sedges, and rushes. A mix of deciduous and coniferous trees planted for windbreaks typically surrounds farmsteads. Generally, these forested areas are isolated groves or windrows established by the landowner/farmers to prevent wind erosion and shelter dwellings. Typical tree species include box elder, bur oak, and cottonwood. Exhibit 13 shows the typical landscape in the site.

### **7.7.2 Impacts**

The placement of turbines will have an effect on the visual quality within the site and vicinity. However, discussion of the aesthetic effect of the proposed wind farm is based on subjective human response. The wind farm would have a combination of effects on the visual quality/rural character of the area. For some viewers, the Project could be perceived as a visual intrusion, characterized as metal structures, 70 to 80 meters (230 to 262 feet) high at hub height, intruding on the natural aesthetic value of

the landscape. Exhibit 14 shows a photo simulation of what a view of the wind farm would look like in the northeast portion of the Project site.

For other viewers, wind farms have their own positive aesthetic qualities, distinguishing them from other non-agricultural land uses. First, the Project will not generate much traffic or significantly increase day-to-day human activity in the area. Therefore, the Project site would retain the rural aesthetic and remote characteristic of the vicinity. Second, although “industrial” in form and purpose, turbines are essentially “farming” the wind for energy. The proposed land use would not involve an ongoing industrial use of non-renewable resources or emissions into the environment. Although the turbines are high-tech in appearance, they are compatible with the rural and agricultural heritage of the area.

Visual impacts will be most evident to people traveling north and south along Highway 30 and east and west along Highway 281. These impacts will affect the rural visual quality of the landscape and the experience of the persons utilizing those areas. While the turbines in background views of highway travelers will affect the visual characteristics of the landscape, the same could be said of other types of human habitation or activity in the vicinity, and the presence of turbines may be less intrusive than many such activities. Nonetheless, this may be an impact that some viewers perceive to be negative.

### **7.7.3 Mitigative Measures**

The following are proposed mitigative measures:

- Turbines will not be located in biologically sensitive areas such as wetlands.
- Turbines will only be illuminated to meet the minimum requirements of FAA regulations.
- Existing roads will be used for construction and maintenance where possible. Road construction will be minimized.
- Access roads created for wind farm facility will be located on gentle grades to minimize visible cuts and fills.
- Temporarily disturbed areas will be reseeded per USFWS and NRCS recommendations to blend in with existing vegetation.

To attain maximum efficiency, wind power technology requires as much exposure to the wind as possible. Mitigation measures that would result in shorter towers or placement of the turbines at alternate locations off the ridgelines would result in less efficiency per unit.

## 7.8 Cultural and Archaeological Impacts

### 7.8.1 Description of Resources

A Class I Cultural Resources Literature Review was conducted which produced a catalog of previously identified and recorded cultural resources for the area. The data was compiled from the records maintained at the Historical Preservation Division (HPD) of the North Dakota State Historical Society Library and Archives in Bismarck, North Dakota. The data collected from these sources includes the state archaeological site files, historic property files, the North Dakota National Register inventory, and archival collections of published and unpublished reports of previous cultural resource investigations. Historic documents were consulted in order to identify potential cultural features relating to the proto-historic to early historic periods that may exist in the project area. A total of nine recorded archaeological properties were identified within the project boundaries. Seven of the identified archaeological properties are recorded as archaeological site leads. A total of 29 recorded historic properties were identified within the project boundary.

Previous recorded cultural resource investigations within the defined project area and the proscribed one-mile buffer yielded evidence of nine archaeological properties. A summary of these nine properties are shown in Table 7-4. Properties identified with an X (i.e. 32ROX23) are site leads. Site leads have been identified through historical records, reported to the SHSND but not verified by a professional archaeologist, or were identified with less than five artifacts and no features. Regardless of status as recorded site or site lead five of the nine identified properties are located within the boundaries of the defined project area. Four of the sites are located in the one-mile buffer surrounding the project area. Three of the buffer sites are identified as historic sites. The only prehistoric site is also located in the buffer. This site (32ROX98) is the location at which a single chipped stone artifact was recovered. No associated materials were reported. The five sites recorded within the defined project area are historic period sites.

Site Number	Site Type	Cultural Period
32 RO 65	Burlington Northern Railroad Bed	Historic
32 RO x23	Galloway Post Office	Historic
32 RO x29	Boydton Post Office	Historic
32 RO x30	Rolla Roller Mill	Historic
32 RO x57	Boundary Post Office	Historic
32 RO x98	Isolate (debitage)	Prehistoric
32 TO 13	Historic Site House Site	Historic

**Table 7-4: Previously Identified Archaeological Sites within the Project Area**

Site Number	Site Type	Cultural Period
32 TO x42	Historic Site	Historic
32 TO x48	Picton Post Office	Historic

A review of the History/Architecture Inventory Files at the HPD of the SHSND identified historic properties recorded within the project area and the proscribed one-mile buffer (Table 7-5). Previous architectural surveys of the area identified 29 properties within the defined project area. The majority of these properties were inventoried, but were not evaluated for National Register for Historic Places (NRHP) eligibility. None of the properties within the buffer are listed on the NRHP. It is interesting to note that a majority of the properties identified in this survey are clustered within Rolla, North Dakota. The few locations in rural portions of the project area are a farmstead, a national border station and a private residence.

**Table 7-5: Previously Recorded Architectural Resources**

Site Number	Description	Location	Rolla City Limit
32RO20	W.M. Langer Jewel Bearing Plant	T162N R 69W, Sec 7	Y
32RO36	Our Savior Lutheran	T162N, R69W, Sec 9	Y
32RO37	Apostolic Lutheran	T162N, R69W, Sec 17	Y
32RO38	Rolla Assembly of God	T162N, R69W, Sec 17	Y
32RO39	Immanuel Lutheran	T162N, R69W, Sec 17	Y
32RO40	Rolla Presbyterian	T162N, R69W, Sec 17	Y
32RO41	St. Joachim Catholic	T162N, R69W, Sec 17	Y
32RO42	United Methodist	T162N, R69W, Sec 17	Y
32RO50	St. John Border Station	T164N, R70W, Sec 25	N
32RO51	Coghlan House	T163N, R69W, Sec 19	N
32ROX68	Law Office	T162N, R69W, Sec 16	Y
32ROX69	Coast to Coast	T162N, R69W, Sec 17	Y
32ROX70	Obrien Store	T162N, R69W, Sec 17	Y
32ROX71	Residence	T162N, R69W, Sec 17	Y
32ROX84	Olson Farm	T162N, R69W, Sec 21	N
32ROX85	Unnamed	T162N, R69W, Sec 16	Y
32ROX86	Unnamed	T162N, R69W, Sec 17	Y
32ROX87	Unnamed	T162N, R69W, Sec 17	Y

<b>Site Number</b>	<b>Description</b>	<b>Location</b>	<b>Rolla City Limit</b>
32ROX88	Unnamed	T162N, R69W, Sec 8	Y
32ROX89	Unnamed	T162N, R69W, Sec 16	Y
32ROX90	Unnamed	T162N, R69W, Sec 17	Y
32ROX91	Unnamed	T162N, R69W, Sec 17	Y
32ROX92	Unnamed	T162N, R69W, Sec 17	Y
32ROX93	Unnamed	T162N, R69W, Sec 17	Y
32ROX94	Unnamed	T162N, R69W, Sec 8	Y
32ROX95	Unnamed	T162N, R69W, Sec 16	Y
32ROX96	Unnamed	T162N, R69W, Sec 16	Y
32ROX97	Unnamed	T162N, R69W, Sec 16	Y
32TO8	Bridge 48-101-060	T163N, R68W, Sec 30	N

Key: Site Number = reference number for recorded property; Description = name of historic structure or description of type of structure; Location = amended legal description of recorded property; Rolla City Limits = notes if the historic architectural property is located within the city limits of Rolla, North Dakota.

### **7.8.2 Impacts**

Westwood archaeologists, on behalf of Sequoia, consulted with the North Dakota State Historic Preservation Office (SHPO) and the parties agreed that a Class III archaeological investigation of the defined Project Area should be conducted prior to the commencement of wind farm construction. Sequoia will make every effort to avoid impacts to identified archaeological resources. In the event that an impact would occur, Sequoia would determine the nature of the impact and consult with the SHPO on whether or not the resource was eligible for listing in the National Register of Historic Places (NRHP).

### **7.8.3 Mitigative Measures**

Mitigation for project-related impacts on NRHP-eligible archaeological resources may include adjustment of the array during the micrositing phase of the project if necessary to minimize Project impacts on a resource and/or additional documentation through data recovery.

Should previously unknown archaeological resources or human remains be inadvertently encountered during Project construction and/or operation, the

discoveries will be reported to the SHPO. With regard to a discovery of human remains, procedures would be followed to ensure that the appropriate authorities would become involved quickly and in accordance with local and state guidelines.

Although there are no reservations or Bureau of Indian Affairs trust lands within defined Project area in either Rolette or Towner Counties, the following Tribal Historic Preservation Officers (THPO) or Tribal Cultural Preservation Officers (TCPO) may need to be contacted if archaeological resources or other properties of Tribal interest are identified prior to or during construction:

Brady Grant, THPO  
PO Box 900  
Belcourt, ND 58316  
Phone: 701-477-2604  
Fax: 701-477-3593

The Native American Graves Protection and Repatriation Act of 1990 allows Tribes to protect American Indian graves and to repatriate human remains. Westwood has not received a response from the THPO or TCPO regarding a query letter requesting a list of archeological sites within the Project area. The proponent must comply with this act if a burial site is encountered during construction as the aforementioned Act applies to all developments regardless of the funding source. Any burial site identified, including Tribal or pioneer, must be referred to the North Dakota Intertribal Reinternment Committee and the North Dakota State Historical Society.

The North Dakota Intertribal  
Reinternment Committee (NDIRC)  
Ms. Jane Martin  
Turtle Mountain Housing Authority  
P.O. Box 620  
Belcourt, ND 58301

North Dakota State Historical Society  
Mr. Paul Picha, Chief Archeologist  
North Dakota Heritage Center  
612 East Boulevard Avenue  
Bismarck, ND 58505-0830  
ppicha@state.nd.us

## **7.9 Recreational Resources**

### **7.9.1 Description of Resources**

Recreational opportunities in Rolette and Towner counties include hiking, hunting, fishing, and nature observation. A review of state and federal databases indicates that there are lands designated federal WPAs and also state Waterfowl Rest Areas (WRA) and Land and Water Conservation Fund (LWCF) sites within the Project Area. In addition, there are private properties over which the USFWS has an

easement for protection of wetland resources. WPA and WRA resources and wetland easements are further discussed in Section 7.14.

LWCF sites are areas open to the public and active for recreation. They are considered public lands and are held in perpetuity. The North Dakota Parks and Recreation Department (NDPRD) provides funding for the purchase of LWCF sites but the management and maintenance is the responsibility of the sponsoring agency/entity. NDPRD provided information on the location of three LWCF sites within the Project area and vicinity. Site 38-00018 is located within the city limits of the City of Rolla. Site 38-00388 is located in T163N, R70W, Sec 35 SE<sup>1</sup>/<sub>4</sub>, south of the City of St. John. This site is immediately adjacent to and outside of the northwestern boundary of the Project Area. Site 38-00070 is located approximately one mile east of the Project along Hwy 5/US 281 (T162N, R68W Sec 1, 12; T162N, R67W, Sec 6,7).

### **7.9.2 Impacts**

In general, recreational impacts will be visual in nature and limited to individuals using public or private property in the Project site for hiking, hunting, fishing, or nature observation. See Section 7.7 for detailed discussion of anticipated visual impacts and proposed mitigative measures. Project features will be located to avoid WPAs and WRAs, as described in Section 7.14. Two of the LWCF sites (38-00388 and 38-00070) occur outside of the Project Area and will not be impacted by Project construction or operation. The remaining LWCF site (38-00018) occurs within the city limits of Rolla and within existing areas excluded from Project activities (see Exhibit 5). No impacts are anticipated to LWCF sites as a result of the Project.

### **7.9.3 Mitigative Measures**

Since it is not anticipated that significant recreational resources will be removed from service by implementation of the Project, no adjacent land will be converted or dedicated to recreational use or wildlife management. No other mitigation is anticipated to be necessary.

## **7.10 Effects of Land-Based Economics**

### **7.10.1 Description of Resources**

#### **Agriculture / Farming**

The majority of the defined Project Area is cultivated farmland, pasture, and grasslands as shown in the USFWS Land Use Map, Exhibit 15. Cultivated land comprises approximately 81% of the total acreage contained within the Project site. Native grasslands comprise 10% of the land.

According to 2007 data, wheat is the most widely grown crop within the defined Project Area. Hay, sunflowers, and corn are additional crops in the Project site (USDA, 2008). According to the 2002 Census of Agriculture, Rolette County has approximately 523 farms, of which the primary commodity is grain and seed crops. Towner County has approximately 418 farms, of which the primary commodity is grain and seed crops. Cattle are the primary livestock in both Rolette and Towner counties. The amount of land in farms increased one percent in Rolette County while Towner County experienced a six percent decrease. The combined market value of agricultural products from both Rolette and Towner counties in 2002 was approximately \$76,870,000. Crop sales account for approximately 82 percent of the total value of agricultural products sold (USDA, 2002).

Since crops comprise a large percentage of the value and the land, areas identified as prime farmland are important to production. Prime farmland is the land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops. The National Resource Conservation Service (NRCS) has two classifications for prime farmland. The first is where all areas of the soil series are classified prime farmland. The second is where only the drained areas of the soil series are prime farmland. The NRCS also identifies farmland of statewide and local importance, which is land that is important for the production of food, feed, fiber, forage and oilseed crops. Generally, additional farmlands of statewide or local importance include those that are nearly prime and that produce high yields of crops in an economic manner when treated and managed according to acceptable farming methods. Some may produce as high a yield as prime farmland soils if conditions are favorable. Table 7-6 lists the soils considered prime farmland and soils of statewide or local importance within the Project site. Exhibit 16 shows the prime farmland soil distribution in the Project site.

<b>Soil Map Unit</b>	<b>Soil Map Unit Name</b>	<b>Prime Farmland</b>	<b>Farmland of Statewide Importance</b>	<b>Prime Farmland Only When Drained</b>
137	Barnes-Hamerly loams, 0-3 percent slopes	X		
510	Divide loam, 0-2 percent slope	X		
863	Hamerly loam, 0-3 percent slope	X		
1104	Lanona-Swenoda fine sandy loam, 0-6 percent slope	X		
2046	Wyndmere fine sandy loam, 0-2 percent slope	X		

**Table 7-6: Prime Farmlands Rolette and Towner Counties**

Soil Map Unit	Soil Map Unit Name	Prime Farmland	Farmland of Statewide Importance	Prime Farmland Only When Drained
154	Barnes-Svea loams 0-3 percent slope	X		
F596B	Darnen loam 2-6 percent slope	X		
F144B/118	Barnes-Buse loams 3-6 percent slope		X (Towner County Only)	
F146B	Barnes-Buse-Parnell complex 0-6 percent slope		X	
F147C	Barnes-Buse-Darnen loams 3-9 percent slope		X	
F143C	Barnes-Buse-Langhei loams 6-9 percent slopes		X	
F596C	Darnen loam 6-9 percent slope		X	
450	Colvin silt loam, 0-1 percent slope			X
1269	Marysland silt loam, 0-1 percent slope			X
F112A/883	Hamerly-Tonka-Parnell complex 0-3 percent slope			X (Towner County Only)
1871	Vallers loam, 0-1 percent slope			X

**Woodlands**

Economically important forestry resources are not found in the Project Area. Woodlands are primarily associated with homes in the form of woodlots and windbreaks within the Project Area. Woodlands are found in the Turtle Mountains, adjacent to the western boundary of the Project Area as shown on Exhibits 6 and 15.

**7.10.2 Impacts**

**Agriculture / Farming**

No impacts are anticipated to animal health and safety due to the construction or operation of the wind farm and associated facilities. Except for the physical locations of the turbines and access roads, the land surrounding the facility will be available for grazing and farming.

Actual impacts to agriculture production will be determined once turbine and road locations are finalized. Each turbine will impact approximately 0.5 acres of land due to turbine placement. Finished surfaces of roads will typically be 16 to 18 feet wide, with the graded area being up to 45 feet wide in areas with substantial topography, and will vary in length. Currently, road impacts are estimated at a maximum of 84 acres assuming up to 66 2.3-2.4 MW turbines. Approximately 10 acres of land will be temporarily impacted for contractor staging and lay down areas. It is possible that some of this land is not used for agricultural purposes, thus the actual impacts to agriculture production cannot be determined until turbine and road locations are finalized.

Soils considered prime farmland are located throughout the entire Project Area (Exhibit 16). Approximately 51% of the Project Area is comprised of prime farmland with an additional 6.25% considered prime farmland when drained. The final layout will minimize the number of turbines and facilities in prime farmlands. However, prime farmlands are abundant in the Project Area, and therefore complete avoidance of prime farmland is not practicable. The preliminary layout includes portions of up to 66 turbines, access roads, other Project facilities in prime farmland. Assuming all turbines and associated facilities will be placed within prime farmland areas, approximately 132 acres of prime farmland will be impacted, which is approximately 0.17% of the total prime farmland acreage in the Project Area. Using the scenario with all turbines and facilities located in prime farmland, the estimated 0.17% impact to the prime farmland site acreage will be an even smaller percentage of the prime farmlands in Rolette and Towner Counties. This will have a negligible impact to agricultural production, affecting less than 1% of the yearly production for the primary agricultural commodities in the area. As noted earlier, wind lease payments will provide farmers with a supplemental source of income, helping assure that farmers can continue to operate financially viable farms, and thus helping to assure the continuation of farming in Rolette and Towner Counties.

No turbines will be placed within 1,000 feet of occupied residences. Other impacts to residences are discussed throughout Section 7.0. Although family farms will be impacted due to the loss of land associated with the construction of the turbines and access roads, based on the prime farmland discussion above, the impacts are not expected to be significant.

### **Woodlands**

No significant impacts are anticipated to woodlands. Since a majority of the woodlands are associated with homesteads and windbreaks, and the acreage of woodlands in the Project Area are negligible, no impacts are anticipated.

### 7.10.3 Mitigative Measures

#### Agriculture / Farming

The wind turbines and access roads will be located so that the most productive farmland (prime farmland) will be avoided to the extent practicable. Only land for turbines and access roads will be unavailable for crop production. Sequoia will work with landowners to minimize impacts to their land. Once the wind turbines are constructed, land surrounding the turbines and access roads will still be available for farming or grazing livestock. Construction areas will be separated from grazing animals by temporary or permanent fencing.

#### Woodlands

No significant impacts are anticipated to woodlands.

### 7.11 Soils

#### 7.11.1 Description of Resources

Forty-eight soil map units are currently mapped at the NRCS Order III level within the defined Project Area (Exhibit 17). Eleven of the identified soil map units comprise over 89% of the total defined project area. These eleven that comprise the majority of soils within the Project area are listed in Table 7-7 and discussed below.

<b>Soil Map Unit</b>	<b>Soil Unit Name</b>	<b>Total Project Area Acreage</b>	<b>Acreage Percent</b>	<b>Soil Map Unit Status</b>
F144B/118	Barnes-Buse loams 3-6 percent slope	33553	42.11%	State Important/Prime
F112A/883	Hamerly-Tonka Parnell complex 0-3 percent slope	13775	17.29%	Prime Drained/None
137	Barnes-Hamerly loams 0-3 percent slope	9703	12.18%	Prime
120	Barnes-Buse loams 6-9 percent slope	4770	5.99%	None
154	Barnes-Svea loams 0-3 percent slope	2932	3.68%	Prime
510	Divide loam 0-2 percent slope	2003	2.51%	Prime

<b>Soil Map Unit</b>	<b>Soil Unit Name</b>	<b>Total Project Area Acreage</b>	<b>Acreage Percent</b>	<b>Soil Map Unit Status</b>
1426	Parnell silt loam 0-1 percent slope	1122	1.41%	None
864	Hamerly loam, saline 0-3 percent slope	1032	1.30%	None
863	Hamerly loam 0-3 percent slope	989	1.24%	Prime
76	Arvilla sandy loam 0-6 percent slope	904	1.13%	None
1871	Vallers loam, saline 0-1 percent slope	816	1.02%	None

The Barnes-Buse loams, 3-6% slope (F144B/118) represent over 42% of the soils identified within the defined Project Area. These soils are very deep, undulating, well drained soils located on till plains, derived from glacial till. The Barnes component soils are generally located on side slopes and the summits of topographic high points. The Buse component soils are located on knolls and shoulder slopes. Individual parcels of the Barnes-Buse loams range from as small as 6 acres to over 500 acres in size. Most areas composed of Barnes-Buse loams are cultivated and are considered soils of statewide importance in Towner County and prime farmland in Rolette County.

The Hamerly-Tonka-Parnell complex, 0-3% slope (F112A/883) represent over 17% of the soils identified within the defined Project Area. These soils are very deep located on till plains, derived from glacial till. The Hamerly component soils are generally level to nearly level, somewhat poorly drained, highly calcareous soils on flat topographic areas. The Tonka component soils are level, poorly drained soils located in shallow depressions. The Parnell component soils are level, very poorly drained soils located in moderately deep depressions. Both the Tonka and Parnell soils are subject to occasional ponding. Individual parcels of the Hamerly-Tonka-Parnell complex, 0-3% slope range from 7 acres to over 150 acres in size. Most areas composed of Hamerly-Tonka-Parnell complex, 0-3% soils are cultivated and are considered prime farmland soils if drained in Towner County and are not classified as prime farmlands or soils of statewide importance in Rolette County.

The Barnes-Hamerly loams, 0-3% slope (137) represent 12.18% of the soils identified within the defined Project Area. These soils are deep, level and nearly level soils located on till plains, derived from glacial till. The Barnes component soils are generally located on rises. The Hamerly component soils are located on flats.

Individual parcels of the Barnes-Hamerly loams, 0-3% slope range from 10 acres to over 250 acres in size. Most areas composed of Barnes-Hamerly loams, 0-3% slope are cultivated and are considered prime farmlands.

The Barnes-Buse loams, 6-9% slope (120) represent nearly 6% of the soils identified within the defined Project Area. These soils are very deep, gently rolling, well drained soils located on till plains, derived from glacial till. The Barnes component soils are generally located on side slopes and the summits of topographic high points. The Buse component soils are located on knolls and shoulder slopes. Individual parcels of the Barnes-Buse loams, 6-9% slope range from 5 acres to over 100 acres in size. Most areas composed of Barnes-Buse loams are cultivated and are not classified as prime farmlands or soils of statewide importance.

The Barnes-Svea loams, 0-3% slope (154) represent nearly 3.7% of the soils identified within the defined Project Area. These soils are very deep, well drained to moderately well drained soils located on till plains, derived from glacial till. The Barnes component soils are generally located on side slopes and the summits of topographic high points. The Svea component soils are located in flats and swales. Most areas composed of Barnes-Buse loams are cultivated and are not classified as prime farmlands or soils of statewide importance.

The Divide loam, 0-2% slope (510) represents nearly 2.5% of the soils identified within the defined Project Area. These soils are very deep, level, somewhat poorly drained, highly calcareous soils located on flats and in swales and drainageways on outwash plains, derived from glacial till. Individual parcels of the Divide loam, 0-2% slope range from 10 acres to over 150 acres in size. Most areas composed of Divide loam are cultivated and are classified as prime farmlands.

The Parnell silt loam, 0-1% slope (1426) represents nearly 1.5% of the soils identified within the defined Project Area. These soils are very deep, level, very poorly drained soils located in moderately deep depressions on till plains derived from glacial till. The Parnell silt loam, 0-1% slope are subject to occasional ponding. Individual parcels of the Parnell silt loam, 0-1% slope range from 4 acres to over 20 acres in size. Most areas composed of Divide loam are utilized as range, hay, pasture or wetland wildlife habitat and are not classified as prime farmlands or soils of statewide importance.

The Hamerly loam, saline, 0-3% slope (864) represents 1.3% of the soils identified within the defined Project Area. These soils are very deep, level and nearly level, somewhat poorly drained, highly calcareous, moderately saline soils located on flats on till plains derived from glacial till. Individual parcels of the Hamerly loam, saline, 0-3% slope range from 5 acres to over 50 acres in size. Most areas composed of Hamerly loam, saline, 0-3% slope are cultivated and are not classified as prime farmlands or soils of statewide importance.

The Hamerly loam, 0-3% slope (863) represents nearly 1.3% of the soils identified within the defined Project Area. These soils are very deep, level and nearly level, somewhat poorly drained, highly calcareous soils located on flats on till plains derived from glacial till. Individual parcels of the Hamerly loam, 0-3% slope range from 5 acres to over 50 acres in size. Most areas composed of Hamerly loam, 0-3% slope are cultivated and are classified as prime farmlands.

The Arvilla sandy loam, 0-6% slope (76) represents nearly 1.2% of the soils identified within the defined Project Area. These soils are very deep, level to undulating, somewhat excessively drained located on flats and rises on outwash plains derived from glacial till. Individual parcels of the Arvilla sandy loam, 0-6% slope range from 4 acres to over 100 acres in size. Most areas composed of Arvilla sandy loam, 0-6% slope are cultivated and are not classified as prime farmlands or soils of statewide importance.

The Vallerys loam, saline, 0-1% slope (1871) represents over 1.0% of the soils identified within the defined Project Area. These soils are very deep, level, poorly drained, highly calcareous, moderately saline soils located on flats on till plains derived from glacial till. Individual parcels of the Vallerys loam, saline, 0-1% slope range from 6 acres to over 40 acres in size. Most areas composed of Vallerys loam, saline, 0-1% slope are utilized as range, hay or pasture lands with limited cultivation. The Vallerys loam, saline, 0-1% slope soils not classified as prime farmlands or soils of statewide importance.

The remaining 37 identified soil map units represent less than 10% of the total defined Project Area and are each representative of less than 1% (ca. 800 acres). Soils in the Project area are generally comprised of deep loams with a varying ranges of drainage capacities. The soils are generally derived from continental glacial till deposits.

### **7.11.2 Impacts**

The impact to soils in the site will be limited to areas removed from agricultural production and road construction. Both of these impacts will be relatively minor. Turbine foundations are comparatively small, and access roads will be single lane aggregate-surfaced roadways. In isolated cases, grading may be required for roadway construction. Exact impact acreages will not be known until turbine siting is finalized, but expected impacts will be approximately 0.5 acres per turbine for access roads and turbine foundations. The total impact assuming up to 66 2.3-2.4 MW turbines, is expected to be six acres. Approximately 10 acres of land will be temporarily impacted for contractor staging and lay down areas. Since land immediately adjacent to the turbines and access roads can be used for pasture or row crops, the Project will only impact those lands used directly for turbine foundation or

roadway construction. A discussion of impacts to prime farmland soils is in Section 7.10.

The potential for wind and water erosion exists in the soil types found on the site. Construction practices will minimize soil erosion during and after turbine construction, and impacts are not expected to be measurable.

### **7.11.3 Mitigative Measures**

Wind and water erosion are potential hazards for the soils found on the site. To minimize erosion during and after construction, and to decrease the amount of sediment available to enter waterways Best Management Practices (BMP) for erosion and sediment control (SN 19389 9/99) will be utilized. Since turbines will not be located on significant slopes, only non-structural practices will be utilized including: revegetation of disturbed areas with native species, mulching, filter strips, erosion blankets, grassed waterways, silt fences, and sod stabilization. Top soil will be segregated if cuts are made during construction. This exposed top soil will be protected and reapplied after final contours have been graded.

## **7.12 Geologic and Groundwater Resources**

### **7.12.1 Description of Resources**

Both Rolette and Towner counties are covered by glacial till deposited towards the close of the Pleistocene.

The surface deposits are referred to as the Coleharbor Formation (Bluemle, 1977). In the majority of both Rolette and Towner counties the Coleharbor Formation is comprised of drift material from different periods of glacial advances including pre- and Early Wisconsinan, and late Wisconsinan. The surficial geology in the vicinity of the Project Area includes stagnation moraine (till), sand and gravel outwash deposits, and silty/sandy lacustrine deposits. Isolated sand and gravel deposits associated with kames and eskers are also present within the Project Area. Glacial material is approximately 100 feet thick in the Project Area, and the area is characterized by rolling topography.

The uppermost bedrock unit in the Project Area generally is the Cretaceous Pierre Formation, although remnants of the Cretaceous Fox Hills Formation may overlie the Pierre Formation depending on location and bedrock topography. No areas of geologic instability (e.g., fault zones, karst topography) were identified.

Groundwater resources in the vicinity of the Project Area are generally derived from buried glacial outwash deposits of sand and gravel or the Pierre Formation. Review

of the North Dakota State Water Commission database indicates that wells in and around the Project Area are either screened in the unconsolidated glacial drift aquifer or the Dakota aquifer. Depths of these wells range from approximately 60 to 150 feet. The State Water Commission database did not identify wells within the Project Area. Given the number of residences in the Project Area, it appears that the majority of the existing wells at the site are not recorded in the State Water Commission database. This indicates that more domestic wells are in the site than have been documented; it is assumed that each residence has at least one water supply well. Domestic groundwater supply appears to be fairly accessible in the Project Area and is dependent on the relative occurrences of sand and gravel aquifers at any given area.

Groundwater likely occurs at shallow depths locally, as evidenced by the presence of multiple isolated wetlands in the Project Area. Groundwater flow direction of the water table aquifer varies greatly and is controlled primarily by topography.

### **7.12.2 Impacts**

Impacts to groundwater resources are not anticipated as water supply needs will be limited. It is probable that O&M water requirements will be satisfied with a single domestic sized water well. Depending on the location of wind turbines and supporting infrastructure, it is possible that sand and gravel resources could be made unavailable for development.

### **7.12.3 Mitigative Measures**

Wind turbine locations will not impact the use of existing water wells because the turbines will not be sited within 1000 feet of occupied structures. No mitigation is anticipated to be necessary.

## **7.13 Surface Water and Floodplain Resources**

### **7.13.1 Description of Resources**

Surface water and floodplain resources for the Project area were identified by reviewing U.S. Geological Survey topographic maps, Flood Insurance Rate Maps (FIRM) produced by the Federal Emergency Management Agency (FEMA), and USFWS National Wetlands Inventory (NWI) data. The major surface waters located within the site include wetlands and numerous unnamed intermittent streams. Waters of the United States, including wetlands and potentially some intermittent streams, are further discussed in detail in Section 7.14. The water resources within the Project boundary are shown on Exhibit 18.

The site encompasses three subbasins and basins: The Pembina subbasin of the Lower Red basin, the Devil's Lake Subbasin of the Devil's Lake Sheyenne Basin, and the Willow subbasin of the Souris basin. Intermittent streams drain primarily to the east and south. Seasonal variations in precipitation and groundwater recharge are the primary drivers of lake elevations.

Review of Federal Emergency Management Agency (FEMA) floodplain maps indicate that the site and its surroundings are not within a 100-year or 500-year floodplain, nor they are not mapped on a published Flood Insurance Rate Map (FIRM). Therefore, the area is considered "not flood prone."

### **7.13.2 Impacts**

Construction of the wind turbines, transformer pads, associated facilities, and access roads will disturb approximately 132 acres of land within the Project site. However, the wind turbines will be constructed on uplands to the maximum extent practicable. This will avoid impacts to surface water features and floodplain resources within the Project area as well as those resources located in the lower positions in the landscape. Access roads to the turbines will be built to avoid impacts to surface waters. The Project will not impact floodplain areas.

### **7.13.3 Mitigative Measures**

Access roads constructed adjacent to intermittent streams and drainageways will be designed in a manner so runoff from the upper portions of the watershed can flow unrestricted to the lower portion of the watershed. An application (Notice of Intent) to obtain coverage under the NDPDES general permit for storm water discharges associated with construction activity will be submitted to the North Dakota Department of Health prior to construction of the Project.

## **7.14 Wetlands**

### **7.14.1 Description of Resources**

Wetlands and riparian areas are important resources because they provide habitat for both resident and migratory wildlife. Wetlands also perform a variety of hydrologic (flood attenuation and groundwater recharge) and water quality (sediment attenuation and nutrient removal) functions.

The Project Area was field inspected in June 2008; however, no formal wetland delineations have been completed. The initial field study was supplemented with a review of publically available wetland mapping sources to identify wetlands within the Project Area, prior to conducting a formal delineation. These mapping sources

include the NWI, National Hydrography Dataset, North Dakota Farm Service Agency wetland mapping, and the most recent aerial photographs available.

As shown on Table 7-8, the majority of wetlands on the Project are palustrine and emergent. Within the Project Area, there are a total of 11,075 palustrine-type wetlands with a combined area of 6,883 acres. Some of these wetlands are associated with creeks and unnamed intermittent streams and some of the wetlands are isolated basins. Some of the wetlands within the Project Area are drained through drain tiles and ditching. No lacustrine, riverine, or wetlands associated with floodplains were identified from the available maps. Exhibit 18 identifies the locations of the NWI wetland types occurring within the Project Area.

<b>Cowardin Classification</b>	<b>Count</b>	<b>Acres<sup>a</sup></b>
Palustrine Emergent Seasonally Flooded (PEMC)	3,760	2,842
Palustrine Emergent Seasonally Flooded Drained/Ditched (PEMCd)	786	1,108
Palustrine Emergent Semipermanently Flooded (PEMF)	273	915
Palustrine Emergent Temporarily Flooded (PEMA)	4,878	836
Palustrine Emergent Temporarily Flooded Partially Drained/Ditched (PEMAd)	1,186	495
Palustrine Aquatic Bed Semipermanently Flooded (PABF)	63	365
Palustrine Emergent Semipermanently Flooded Drained/Ditched (PEMFd)	60	292
Palustrine Scrub-Shrub Temporarily Flooded (PSSA)	69	30
<b>Total</b>	11,075	6,883

<sup>a</sup>Wetland acreages calculated using USFWS NWI data

According to the NWI database, wetlands comprise approximately nine percent of the Project Area and include both isolated wetlands and wetlands potentially under the jurisdiction of the U.S. Army Corps of Engineers (USACE). Private properties over which the USFWS has easements for protection of wetland resources are also present within the Project Area. These represent an additional 16 percent of the Project Area that are considered wetlands. In the case of USFWS wetland easements, the landowner cannot drain, fill, or burn the wetlands within the easement.

Within the Project Area, there are also areas of land designated as federal WPAs and wetland easements and state WRAs. WPAs and WRAs are wetlands that provide resting and feeding areas for birds on spring and fall migration. Their purpose is to preserve wetland and grassland habitat critical to waterfowl and other wildlife. WPAs within the Project Area are managed through the Devils Lake and J. Clark Salyer Wetland Management Districts (WMDs). The WRA occurring within the

Project Area receives support from the North Dakota Game and Fish Department (NDGFD). USFWS wetland easement lands are also found within the Project Area. These easements are created when the private landowners enter into perpetual contracts with the USFWS that state they are willing to protect wetlands on their property from draining and filling with soil. WPAs, WRAs, and wetland easements that occur within the Project Area boundaries are presented on Exhibit 5.

### **7.14.2 Impacts**

Proposed turbine locations have been sited to take advantage of higher elevations and, therefore, avoid low-lying areas. However, proposed access roads, collector lines, and transmission lines may cross some potential wetland features which could be disturbed during construction. A field delineation of potential jurisdictional wetland resources will occur prior to construction of the Project. This delineation will identify those wetlands most likely to be impacted, and facilitate wetland avoidance where practicable during final micrositing. The wetland inventory protocol that Sequoia intends to follow is contained in Appendix D.

Based on the Site visit and review of available cartographic information, impacts to wetlands in the proposed Project Area are largely avoidable through minor modification to the Project layout and avoidance of these habitats during the construction phase. Identified wetlands will be avoided to the extent practicable. Those areas designated as WPAs and WRAs will be completely avoided. Special efforts will be employed to avoid wetlands within the USFWS wetland easement lands. The preliminary layout shows that only one turbine is proposed to be sited within properties enrolled in USFWS wetland easements.

### **7.14.3 Mitigative Measures**

All jurisdictional resources will be avoided to the extent practicable during the construction phase of the Project. If impacts to these resources are unavoidable, then Sequoia will submit Section 404 and 401 permit applications to the USACE and State of North Dakota, respectively. Permanent impacts to jurisdictional wetlands and waters will be mitigated according to USACE requirements.

Wind turbines and supporting infrastructure will be located a minimum of 0.25 miles from WPAs and will avoid wetlands within USFWS wetland easement lands to the extent practicable. However, if impacts are proposed within these lands, then the USFWS will perform a compatibility analysis and, if acceptable, issue a Special Use (temporary impact) or ROW Permit (permanent impact). Sequoia will follow permit conditions for site restoration and replacement.

Sequoia will use BMPs during construction and operation of the Project to minimize soil erosion in order to protect topsoil and adjacent aquatic resources. Practices may include containing excavated material, stabilizing restored material, and other measures listed in Section 7.11.

## **7.15 Vegetation**

### **7.15.1 Description of Resources**

The ecoregions near the Project Area are characterized by a flat to gently rolling landscape comprised of a thick mantle of glacial till. The subhumid conditions foster a grassland transitional between the tall and shortgrass prairie. High concentrations of temporary and seasonal wetlands create favorable conditions for duck nesting and migration. Most of the soils in Rolette and Towner counties are conducive to cultivated crops, pasture, and hay, especially in flat-lying areas. The Northern Black Prairie represents a broad phenological transition zone marking the introduction from the north of a boreal influence in climate. Aspen and birch appear in wooded areas, willows grow on wetland perimeters, and rough fescue, common to the Rocky Mountain foothills, becomes evident in grassland associations. This ecoregion has the shortest growing season and the lowest January temperatures of any level IV ecoregion in the Dakotas. Most of the area is used for growing small grains, with oats and durum wheat being the major crops (USGS 2006).

The diversity of vegetation communities provides valuable habitat to a wide variety of wildlife species. Native grasslands, which are largely shortgrass-prairie and riparian habitat (especially in drainage bottoms) provide important nesting and brooding habitat for many avian species. Since the 1800's, approximately 75 to 90 percent of North Dakota's native grasslands have been lost due to cropland conversion. The USFWS (Towner 2008) stated interest in native prairie for the following reasons:

- Grasslands provide habitat for a number of migratory grassland birds whose populations are declining;
- Grasslands provide nesting habitat for waterfowl;
- Native plants provide plant diversity (genetic) important to agriculture and medicine;
- Grasslands provide habitat for a variety of insects;
- Grassland habitats are crucial for soil and water conservation; and,
- Grasslands provide opportunities for scientific research and recreation.

Historically, the plant communities within the vicinity of the Project Area consisted of tallgrass and shortgrass prairie. However, the majority of native grass plant communities in the Project Area have been converted into crop-producing land. There are a few small tracts of native prairie located on private lands in the Project Area. These areas are shown on Exhibit 6. While some of this prairie has been grazed, other areas still contain remnant species of the tallgrass and shortgrass prairies. Other federal or state managed lands within the Project Area, including WPAs, WRAs, and wetland easements, also contain remnants of native species. Section 7.14 contains a discussion on WPAs, WRAs, and wetland easements as they occur within the Project Area.

Also shown on Exhibit 6 are those lands enrolled in CRP within the Project Area. The CRP program is jointly managed by NRCS, Farm Service Agency, and the Commodity Credit Corporation and encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover. CRP land is typically covered by tame or native grasses such as brome grasses, orchard grass, and alfalfa, or also wildlife plantings, trees, filterstrips, or riparian buffers. Land put into CRP is generally set aside for 10-year cycles.

Woodland and shelter belt areas within the Project Area and immediate vicinity are presented in Exhibits 6 and 14. The Turtle Mountains, west of the Project Area, have the greatest density of trees. Generally, the wooded areas within the Project Area are isolated groves or windrows established by the landowner/farmer to prevent soil erosion and provide shelter from the wind. The trees in these windbreaks are mostly cottonwoods and willows interspersed among other native vegetation. Additional information on Woodland resources can be found in Section 7.10.

### **7.15.2 Impacts**

Temporary disturbance due to construction staging areas and the installation of underground cables represents approximately 10 acres of impacts to vegetation. Approximately 120 acres of land within the Project Area will be used for turbines, associated facilities, and access roads. The vegetation that will be disturbed will mainly be agricultural, and vegetation in such areas is frequently disturbed by farming practices. Turbines and access roads will avoid wetlands to the extent practicable, and special efforts will be made to avoid wetlands within USFWS wetland easement lands, wooded areas, potential prairies, or those under the CRP, WPA, WRA programs. These areas will be avoided to the maximum extent practicable.

### **7.15.3 Mitigative Measures**

Sequoia will conduct a pre-construction inventory of existing wetlands, native prairie, and woodlands. The pre-construction inventories will have varying levels of detail

with the most specific detail in the vicinity of construction. These pre-construction inventory reports will be filed with the PSC and applicable agencies prior to construction. Sequoia will avoid impacts to WPAs, WRAs, and work with the USFWS to avoid or minimize impacts to wetlands within USFWS easements. Sequoia will work to avoid and to minimize impacts to existing trees and shrubs. Effects on CRP acreages will be minimized, and Sequoia will work with landowners and local and state agricultural agency staff to amend CRP contracts for those areas that removed from conservation reserve to allow for construction of turbines and access roads.

If impacts to wetlands are proposed within USFWS wetland easements, then the USFWS will perform a compatibility analysis and, if acceptable, issue a Special Use (temporary impact) or ROW Permit (permanent impact). Sequoia will follow permit conditions for site restoration and replacement.

Sequoia will use BMPs during construction and operation of the Project to protect topsoil and adjacent resources and to minimize soil erosion. Practices may include protecting exposed soil, revegetating rangelands with native species and other measures as listed in Section 7.11.

## **7.16 Wildlife**

### **7.16.1 Description of Resources**

Information on the existing wildlife in the wind farm site was obtained from a variety of sources including observations during a site visit, communication with local residents and information from the North Dakota Natural Heritage Inventory Database (NHID), NDGFD, NDPRD, and the USFWS.

Wildlife in the Project site consists of birds, mammals, fish, reptiles, amphibians, and insects, both resident and migratory, which utilize the Project site habitat for forage, migratory stopover, breeding and/or shelter. Species present in the Project vicinity are associated with agricultural fields, pasture grasslands, and wetland areas. Common mammals in the project vicinity include raccoon, mink, skunk, weasel, white-tailed deer, coyote, red fox, badger, porcupine, and rabbit. During a June 2008 field visit of the site, white-tailed deer (*Odocoileus virginianus*), beaver (*Castor canadensis*), prairie dog (*Cynomys ludovicianus*), and badger (*Taxidea taxus*). Avian species observed during field visits include red-tailed hawk (*Buteo jamaicensis*), killdeer (*Charadrius vociferous*), and several species of waterfowl, shorebirds, and songbirds.

The Project Area occurs within portions of two major migration highways. The central and Mississippi flyways are used by millions of birds as they migrate from northern Canada south through the Great Plains to the Gulf of Mexico. Based on

historical field research and observations, it is known that waterfowl, shorebirds, and songbirds migrate through the North Dakota region of these flyways each spring and fall.

### **7.16.2 Impacts**

Wildlife that is present within the Project area is already accustomed to activities associated with agriculture. Construction and operation of the Project will only minimally alter the existing land use. Wildlife that resides within construction zones of the Project will be temporarily displaced to adjacent habitats during the construction process. Although most effects on wildlife will be minimal and short-term, development of the turbines, the O&M facility and the Project Substation represents a small reduction in the available habitat used for forage and cover. Because these facilities total only 0.2 percent of the Project Area, there is expected to be minimal long-term effect on habitat.

Turbines will be located to avoid low areas and wooded areas, which will reduce impacts to wildlife. The wind turbines, meteorological towers, and transmission lines may affect raptors, waterfowl, and other bird and bat species. Birds and bats have the potential to collide with all elevated structures, including wind turbines, meteorological towers and power lines. Avian collisions with turbines, meteorological towers and transmission lines can occur in proximity to agricultural fields that serve as feeding areas, wetlands, and water features, and along riparian corridors that may be used during migration.

During Westwood's site visit no stick nests were observed within the Project Area. The Project Area has similar general habitat and species composition compared to other wind farms, particularly in the upper Midwest, and it is anticipated that bird fatality rates documented at other locations will be similar to the proposed Project. Recent studies demonstrate that modern wind turbines have relatively little impact on birds and the environment, ranging from less than one bird per turbine per year to 7.5 birds per turbine per year (ABC 2007). There are potential indirect impacts to breeding birds that might be displaced during breeding or nesting seasons within the immediate vicinity of the turbines.

Potential bat roosting habitat at the site includes trees and old farm buildings. Bats may forage over the entire Project area, although the extent of use is not known. Bat fatalities have been reported for most wind farms where post-construction monitoring data is available and have been estimated to range from less than two to nearly 50 bats per turbine per year. Bat fatality rates in the Upper Midwest are estimated at 1.7 bats/turbine/year or 2.7 bats/MW/year (NWCC 2004). Most bat casualties at wind farms have been migratory species that conduct long migrations between summer roosts and winter hibernacula. The proposed site does not contain topographic features that may funnel bats during migration.

The impact of the proposed Project on wildlife is expected to be minimal. There is potential for avian and bat collisions with Project turbines and meteorological towers. Additional impacts may include a small reduction in the available habitat that some of the wildlife uses for forage or cover. Operation of the wind farm will not change the existing land use.

### **7.16.3 Mitigative Measures**

Sequoia anticipates that most wildlife displacement and habitat impacts will be temporary. Only 0.2 percent of the entire project area will be utilized for permanent structures including wind turbines, meteorological towers, Project Substation, and O&M facility. However, this does not represent a significant amount of acreage that will be reduced for wildlife use.

Although Sequoia has not yet formally committed to a full suite of wildlife mitigation measures, Sequoia has committed to some of the following measures, and the others are currently being considered to help avoid and minimize potential impacts to wildlife during construction and subsequent operation of the Project:

- Implement 0.25-mile buffers around USFWS WPAs and avoid wetlands within wetland easement lands to the greatest extent practicable.
- Conduct pre-construction avian monitoring at the site. Pre-construction avian monitoring protocols are contained in Appendix D.
- Conduct pre-construction inventories of wetlands in the vicinity of proposed turbines, access roads, and associated facilities to minimize impacts at the site. Initial site inventories have been conducted and more detailed inventories will occur once turbine siting is completed to assess the construction zone. If required, these inventory reports would be filed with the PSC and applicable agencies prior to Project construction.
- Construct wind turbines using tubular monopole towers and turbines will be minimally lit according to FAA requirements.
- Place the electrical collection system from the turbines to the Project Substation underground to the greatest extent practicable.
- Avoid or minimize disturbance of individual wetlands or drainage systems during construction and operation of the Project.
- Protect existing trees and shrubs where practicable. If impacts are unavoidable, replace existing trees and shrubs at a 2:1 ratio and will keep the vegetation alive for five years.
- Maintain sound water and soil conservation practices during construction and operation of the Project to protect topsoil and adjacent resources and to

minimize soil erosion. To minimize erosion during and after construction, BMPs, as described in Section 7.11, for erosion and sediment control will be utilized.

- Revegetate non-cropland and pasture areas with seeding mix as recommended by USFWS and NRCS.
- Inspect and control noxious weeds in the vicinity of the turbines, access roads, and associated facilities immediately after construction and periodically for the life of the Project.

Sequoia is committed to minimizing wildlife impacts within the Project site. Sequoia will design their facility to minimize avian impacts by avoiding high use wildlife habitat, using tubular towers to minimize perching, placing electrical collection lines underground and minimizing infrastructure.

## **7.17 Rare and Unique Natural Resources**

### **7.17.1 Description of Resources**

The USFWS, NDGFD and NDPRD departments were contacted to review the Project site for threatened and endangered species and unique habitats.

In response to a request for a project review, the USFWS identified the following federally-listed endangered and candidate species found in Rolette and Towner counties:

- Whooping Crane (*Grus americana*) - Endangered
- Dakota skipper (*Hesperia dacotae*) - Candidate

The whooping crane is a prominent federally endangered bird species known to occur in Rolette and Towner counties. Whooping cranes nest and spend summers in Canada's Wood Buffalo National Park. Their wintering range centers on the Aransas National Wildlife Refuge on the Gulf Coast of Texas. North Dakota has critical stopover habitat for whooping cranes during their 2,400-mile twice annual migration. There is a 200-mile wide whooping crane migration corridor within the central and western portion of the state. The Border Winds project lies at the eastern edge of this 200-mile-wide migration corridor. More specifically, the Border Winds project lies about 12 miles outside the 180-mile-wide migration corridor that includes 95% of validated whooping crane observations, and approximately 100 miles outside the central portion of the migration corridor, which includes 50% of the validated whooping crane sightings since 1943.

Whooping cranes migrate during the day and use thermals to rise to high altitudes. Whooping cranes stop overnight to roost and feed in shallow open water marshes and croplands. October and April are the two most likely months for whooping cranes to stop in the Project Area during migration. At a height of five feet, whooping cranes are the tallest birds in North America. They are least agile and most vulnerable when flying near ground after takeoff and prior to landing. This vulnerability leads to collisions with power lines. Collisions with power lines and other structures pose the greatest mortality risk during migration.

The Dakota skipper is a rare butterfly that is a candidate for the federal endangered species list and is known to occur in Rolette County. The only known population of Dakota skippers in Rolette County is associated with the Holywater Spring site, which is located approximately 13 miles southeast of the Border Winds project area. Because the Dakota skipper requires high quality native prairie, it is unlikely to be present in the Project Area. The predominant cover type in the Project Area is cultivated grains, including oats and wheat, and only a few areas of native prairie (Exhibit 6). There are areas of native prairie associated with unplowed areas and pastures in a few locations.

The NDPRD reviewed the NHID to determine if plant or animal species of concern or other significant ecological communities are known to occur within an approximate one-mile radius of the Project area. The NDNH database identified the following species of concern:

- Few-Flowered Spikerush (*Eleocharis pauciflora*)
- Indianpipe (*Monotropa uniflora*)
- Sheathed Pondweed (*Potamogeton vaginatus*)
- Chestnut-Sided Warbler (*Dendroica pensylvanica*)

The NDNH database also identified the following Significant Ecological Communities:

- Aspen Woodland (*Populus tremuloides/Prunus virginiana* Woodland)
- Calcareous Fen (*Carex* spp.-*Triglochin maritime-Eleocharis pauciflora* Fen)
- Central Mesic Tallgrass Prairie (*Andropogon gerardii-Schizachyrium scoparium* Transition Tallgrass Prairie)

The review revealed records of several known rare plant or animal species or rare natural communities for a small portion of the project area. However, because this information is not based on a comprehensive inventory, there may be species of concern or significant ecological communities in the area that are not represented in

the database. Consequently, the lack of rare species data cannot be construed to mean that no significant features are present. In this case, the absence of data indicates that the project area has not been surveyed and not that the area lacks natural heritage resources (Duttenhefner 2008). Therefore, while Central Mesic Tallgrass Prairie, Aspen Woodland, Calcareous Fen, and the few-flowered spikerush are shown to occur within a small portion of the Project boundary (Exhibit 5), it is not known if these sensitive resources or others have been located within turbine, O&M, Project substation, and other permanent Project facilities.

**7.17.2 Impacts**

The Project proposes to bury most or all communication and electric power lines, thereby reducing potential for impacts to migrating whooping cranes. Sequoia will conduct a pre-construction inventory of wetlands and other biological resources within the Project Area (Appendix D). This will allow Sequoia to avoid the identified resources to the extent practicable during siting of permanent Project features and construction activities. Impacts to other rare and unique resources, including the Dakota skipper, are unlikely.

**7.17.3 Mitigative Measures**

Project design and construction will avoid encroachment and effects on rare and unique resources to the extent practicable. If such resources are identified and have the potential to be impacted, Sequoia will coordinate with USFWS, NDGFD, and NDPRD and consider modifying either the construction footprint or construction practices to minimize or avoid impacts. Sediment and erosion control practices will minimize the area affected during construction. Erosion control measures will also minimize potential impacts to surface water quality.

**7.18 Summary of Impacts**

Table 7-9 summarizes the resources that have the potential to be impacted as a result of the Project and the appropriate mitigation.

<b>Table 7-9: Summary of Potential Impacts and Mitigation</b>		
<b>Resource</b>	<b>Impact</b>	<b>Mitigation</b>
Demographics	Primarily positive due to increased expenditures during construction and the long term benefits of lease payments and an increased tax base of the county due to property taxes.	No adverse impacts are anticipated and no mitigation is proposed.

<b>Table 7-9: Summary of Potential Impacts and Mitigation</b>		
<b>Resource</b>	<b>Impact</b>	<b>Mitigation</b>
Land Use	Assuming turbines are between 2.3-2.4 MW, approximately 84 acres of land will be impacted for aggregate-surfaced access roads and approximately 5 to 10 acres of land will be impacted for associated facilities including the O&M facility and substation. Approximately 10 acres of land will be temporarily impacted for contractor staging and lay down areas.	Sequoia will work with landowners and regulatory agencies to minimize land use disruptions or impacts to environmentally sensitive areas.
Public Services	Only minimal effects are expected to occur on the existing infrastructure.	Sequoia will abide by MISO's recommendations to prevent impacts to the local transmission system. Sequoia will also coordinate with agencies and land owners regarding roadway and traffic concerns.
Human Health and Safety	No impacts are anticipated.	Turbines will be lighted to comply with FAA requirements. Sequoia will follow "prudent avoidance" methods to minimize EMF exposure. A variety of security measures will be implemented to reduce the chance of physical and property damage.
Noise	No impacts are anticipated to noise-sensitive resources.	Sequoia will locate turbines so the maximum level of 50 dBA is not exceeded at occupied residences.
Visual	Visual impacts will occur. The impacts are based on a subjective human response.	Sequoia will work with landowners and agencies to site turbines. They will not be located in environmentally sensitive areas. Existing infrastructure will be used where possible. Cut and fill areas will be minimized and mitigated as appropriate.

<b>Resource</b>	<b>Impact</b>	<b>Mitigation</b>
Cultural and Archaeological	No impacts to previously identified cultural resources are anticipated.	Sequoia has completed a Class I Cultural Resources Inventory for the Project. Sequoia will conduct a Class III inventory of a 200-foot wide corridor along the proposed collection lines and between the proposed turbine locations and other linear portions of the Project prior to construction.
Recreational Resources	Visual effects may occur.	Visual effects to recreational resources are likely and are limited to individuals using the resources. No other impacts are expected to recreational resources within the Project Area.
Land Based Economies	Assuming turbines are between 2.3-2.4 MW, a total of 84 acres of land will be impacted. Associated facilities will impact approximately 5 to 10 acres of land. Approximately 10 acres of land will be temporarily impacted for contractor staging areas. Approximately 81 percent of the site is cropland.	Sequoia will work with landowners to minimize impact to their land.
Soils	Assuming turbines are between 2.3-2.4 MW, approximately 84 acres of land will be impacted for the turbines and access roads. Approximately 5 to 10 acres of land will be impacted by the associated facilities. Approximately 10 acres of land will be temporarily impacted for contractor staging and lay down areas. Impacts will be limited to land needed for the turbine foundations, access roads, and associated facilities.	BMPs for erosion and sediment control will be utilized to minimize wind and water erosion at the site. Only land needed for the facility will be impacted. Temporarily disturbed areas will be restored.
Geologic and Groundwater Resources	No impacts to groundwater resources are anticipated.	No mitigation is proposed.
Surface Water and Floodplain Resources	Access roads and turbines will be located and constructed in such a manner that no impacts are anticipated.	Impacts to surface waters will be avoided. Sequoia will implement BMPs to minimize erosion and sedimentation at the site.

**Table 7-9: Summary of Potential Impacts and Mitigation**

Resource	Impact	Mitigation
Wetlands	Minor impacts are anticipated.	Attempts will be made to keep impacts to a minimum. Wetlands, including those in USFWS easements, and WRAs will be avoided to the extent practicable. Sequoia will observe a setback of 0.25 miles from WPAs. If impacts cannot be avoided once micro-siting is complete, Sequoia will work with the USACE and USFWS for permitting.
Vegetation	Final project plans have not yet been made. Assuming turbines are between 2.3-2.4 MW, approximately 84 acres of land will be impacted for the turbines and access roads. Approximately 5 to 10 acres of vegetation will be impacted by the O&M facility and substation. Approximately 10 acres of land will be temporarily impacted for contractor staging areas.	Sequoia will avoid impacts to WPAs, WRAs, and avoid minimize impacts on wetlands to the extent practicable, especially those in USFWS wetland easements. Sequoia will avoid existing trees and shrubs as practicable. Sequoia will use BMPs during construction and operation to minimize impacts..
Wildlife	Impacts to wildlife populations are expected to be minimal. Potential avian and bat collisions may occur, but are anticipated to be relatively small.	A variety of mitigative measures will be implemented. These include designing the facility to specifically minimize avian impacts. Pre-construction monitoring is being considered for avian species.
Rare and Unique Natural Resources	Impacts to rare and unique natural resources are not anticipated.	A pre-construction inventory of biological resources will be conducted. Sequoia will work with appropriate agencies to minimize or avoid impacts. BMPs will also be employed during construction to minimize impacts.

**8.0 PUBLIC COORDINATION**

Keeping the public informed on the status of the Project is key component to its success. Principal stakeholders in the Project are landowners that have entered into agreements with Sequoia to provide wind rights for the Project. Sequoia will continue to meet with County

officials as the Project moves forward and Sequoia apply for Conditional Use Permits from both Rolette and Towner Counties.

Sequoia and their representatives have been working with key state and federal agencies including the Department of Commerce, the USFWS and the North Dakota Game and Fish Department to inform them of the Project and to address areas of interest particular to each department.

Sequoia is committed to keeping key stakeholders engaged in the Project as it moves forward.

### 9.0 IDENTIFICATION OF POTENTIAL PERMITS/APPROVALS

The federal and state permits or approvals that have been identified as potentially being required for the construction and operation of the Project are shown in Table 9-1. Permits dependent on the final site layout will be applied for after receiving PSC approval, but prior to construction.

<b>Table 9-1: Potential Permits and Approvals Required for Construction and Operation of the Proposed Facility</b>			
<b>Agency</b>		<b>Type of Approval</b>	<b>Need</b>
Federal	USFWS	Compatibility Analysis of Disturbed Easements	If constructing in wetlands within wetland easements or in WPAs, then compatibility analysis by USFWS is required.
		Right of Way Permit	If use is compatible, then a Right of Way Permit is required for work on USFWS easement lands and fee title lands.
		Special Use Permit	If use is compatible, then a Special Use Permit is required for work on USFWS easement lands and fee title lands.
	USACE	Jurisdictional Determination	The Project may be eligible for a Letter of No Jurisdiction if wetlands are avoided or impacts are limited to isolated wetlands.

<b>Table 9-1: Potential Permits and Approvals Required for Construction and Operation of the Proposed Facility</b>		
<b>Agency</b>	<b>Type of Approval</b>	<b>Need</b>
	Section 404 Permit	Project may require USACE Nationwide Permit or an Individual Permit depending on the amount and type of wetland impact proposed.
EPA	Spill Prevention Control and Countermeasure (SPCC) Plan	Needed for non-transportation related facilities (e.g. O&M) with a total above ground oil storage capacity greater than 1,320 gallons in containers that individually hold at least 55 gallons.
FAA	Form 7460-1, Notice of Proposed Construction or Alteration	Determination of No Hazard to Air Navigation needed for each structure over 200 feet tall.
	Form 7460-2, Notice of Actual Construction or Alteration	Notify FAA of construction.
USDA FSA	Environmental Assessment for Class I Action	Compliance with NEPA and Environmental Assessment required if leased lands include property encumbered by federal FSA mortgage.
	CRP Contract Amendment	CRP contract needs amendment if enrolled CRP lands are affected.
USDA NRCS	Wetland Determination/ Delineation Certification	May be needed if participating landowners are enrolled in federal farm programs.
	Form AD-1026, Highly Erodible Land Conservation and Wetland Conservation	Needed for certification of compliance with USDA programs if the Project converts land enrolled in federal farm programs to non-agricultural use.

<b>Table 9-1: Potential Permits and Approvals Required for Construction and Operation of the Proposed Facility</b>			
<b>Agency</b>	<b>Type of Approval</b>	<b>Need</b>	
	Form AD-1006	Required if federal dollars or assistance is used for Project that will convert farmland to nonagricultural use.	
State of North Dakota	Public Service Commission	Certificate of Site Compatibility for a Wind Energy Project	Required under NDCC 49-22 for an Energy Conversion Facility that generates 100 MW or more of electricity.
		Route Permit/Certificate of Corridor Compatibility for a Transmissions Line	Required under NDCC 49-22 for a Transmission Facility with a design a capacity over 115 kV of electricity.
	North Dakota Department of Health	National Pollutant Elimination System (NPDES) General Permit	Required for projects that disturbance more than one acre of land.
		Septic Tank and Drainfield Permit	Required for installation of septic system at O&M facility.
		Section 401 Water Quality Certification	Section 401 Water Quality Certification or Waiver is required under the Federal Clean Water Act for projects that obtain a wetland permit from the U.S. Army Corps of Engineers to ensure that authorized activities do not violate state water quality standards
	State Historical Society of North Dakota, Historic Preservation Division	Request for Comment	North Dakota PSC Permit mandates SHPO notification
	North Dakota Highway Patrol	Overheight/Overweight Permit for State Highways	Permit required for hauling construction equipment and materials that exceed height and weight limits on State Highways.

<b>Table 9-1: Potential Permits and Approvals Required for Construction and Operation of the Proposed Facility</b>			
<b>Agency</b>		<b>Type of Approval</b>	<b>Need</b>
	North Dakota Department of Transportation	Driveway Permit	Permit required for construction of an access onto a State Highway.
		Utility Occupancy Permit	Permit required to place utilities along or across North Dakota DOT ROW.
Local	Rolette County	Conditional Use Permit	The Rolette County Zoning Resolution requires a Conditional Use Permit for all towers exceeding 50 ft in height
		Pre- and Post- Haul Road Inspection	Required to show that haul roads have been returned to pre-construction conditions
		Permit for Facilities in Road Right-of-Ways	Required for facilities in road ROW
		Building Permits	Rolette County requirement
	Towner County	Conditional Use Permit	Conditional Use Permit for utilities and for wind power facilities if they are not consistent with Article II, Section 12 of Towner County Zoning Regulations (i.e. if >5 MW)
		Building Permits	Towner County requirement
		Certificate of Compliance	Towner County requirement

### 10.0 FACTORS CONSIDERED

The North Dakota Energy Conversion and Transmission Facility Siting Act lists 11 factors to guide the Commission in the evaluation and designation of the site of the facility.

## **10.1 Public Health and Welfare, Natural Resources, and the Environment**

The preceding sections discuss the research and investigations relating the effects of the proposed facility on public health and welfare, natural resources, and the environment. These effects and the proposed mitigation to minimize these effects are summarized in Section 7.18.

## **10.2 Technologies to Minimize Adverse Environmental Effects**

Sequoia will utilize the most recent technologies that minimize impacts to the environment. Current wind turbine technologies, including the equipment and siting tools, optimize the wind and land resources.

## **10.3 Potential for Beneficial Uses of Waste Energy**

This factor is not applicable to this Project. No waste energy is created using wind energy.

## **10.4 Unavoidable Adverse Environmental Effects**

Unavoidable adverse environmental effects may include the visual impacts associated with the Project as well as those impacts related to the placement and use of the land within the site. The visual character of the site will be changed due to the construction of the Project. In order to construct the facility, access roads and turbine pads are necessary for the operation and maintenance of the facility. The preliminary turbine and access road layout is expected to impact approximately 84 acres of land assuming turbines are between 2.3-2.4 MW. Approximately 5 to 10 acres of land will be acquired for the O&M facility and Project Substation, of which 3 to 8 acres will be occupied by the footprint of these facilities.

## **10.5 Alternatives to the Proposed Site**

No alternatives were considered for the Project. Sequoia believes that the proposed site is the most viable alternative. Sequoia is committed to being flexible on the preliminary site layout and will work closely with landowners and regulatory agencies to examine reasonable alternatives to the preliminary site layout.

## **10.6 Irreversible and Irretrievable Commitment of Natural Resources**

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable time frame. Irretrievable resource commitments

involve the loss in value of an affected resource that cannot be restored as a result of the action. There are few commitments of resources associated with this Project that are irreversible and irretrievable, but include those resources primarily related to construction.

Construction resources that will be used include aggregate resources, concrete, steel, and hydrocarbon fuel. Each steel turbine requires the construction of a concrete base 40 to 60 feet across and extend seven to 10 feet below grade. Access roads will require aggregate resources for their construction and maintenance. During construction vehicles will be traveling to and from the site, utilizing hydrocarbon fuels.

### **10.7 Direct and Indirect Economic Impacts**

Direct economic impacts include the short-term impacts associated with up to 84 acres of agricultural land being removed from production due to conversion to turbine sites, associated access roads, and associated facilities. In general, agricultural areas surrounding each turbine can still be farmed, and landowners will be compensated for the land occupied by the wind turbines and associated facilities.

The remaining direct and indirect economic impacts are primarily positive. To the extent that local contractors are used for portions of the construction, total wages and salaries paid to contractors and workers in Rolette and Towner counties will contribute to the total personal income of the region. Additional personal income will be generated for residents in the county and the state by circulation and recirculation of dollars paid out by Sequoia as business expenditures and state and local taxes. Expenditures made for equipment, energy, fuel, operating supplies, and other products and services benefit businesses at the county and state level.

Long-term beneficial impacts to the county's tax base as a result of the construction and operation of the wind farm will contribute to improving the local economy in this area of North Dakota. The development of wind energy in this region will be important in diversifying and strengthening the economic base of north eastern North Dakota. Additional revenues are expected from property and income taxes.

Continuing to establish the north-eastern region of North Dakota as an important producer of alternative energy sources, may spur the development of wind-related businesses in the area. This, in turn, will contribute to economic growth in the region.

### **10.8 Existing Development Plans of the State, Local, Government and Private Entities at or in the Vicinity of the Site**

No conflicts are anticipated with existing state and local government and private entities' development plans.

**10.9 Effect of Site on Cultural Resources**

A Class I Survey, including a search of the records maintained at the HPD and the North Dakota State Historical Society Library and Achieves, was conducted by Westwood Professional Services, Inc. for the Project Area (Appendix C). Based on the results of the Class I Survey, a total of nine recorded archaeological properties were identified within the project boundaries. Seven of the identified archaeological properties are recorded as archaeological site leads. A total of 29 recorded historic properties were identified within the project boundaries. A pre-construction Class III archaeological investigation of the defined Project Area will be conducted. Currently, no impacts are anticipated to known cultural resources in the site. Sequoia is committed to minimizing impacts to these resources and will avoid these resources and potential additional resources identified throughout the life of the Project. If avoidance is not possible, Sequoia will work with the North Dakota SHPO to mitigate potential impacts.

**10.10 Effect of Site on Biological Resources**

Sequoia will implement measures to avoid and minimize effects to biological resources at the proposed site. Measures proposed are summarized in Section 7.18 and include preconstruction monitoring to identify sensitive resources within the project area, use of BMPs during construction and operation, avoiding sensitive biological resources or working with appropriate agencies to mitigate impacts if avoidance is not possible.

**10.11 Agency Comments**

Federal, state, and local agencies were contacted for comment on the Project. Letters distributed to each agency and agency responses received are provided in Appendix E. Table 10-1 summarizes the communication received from each agency. Those agencies that provided comments are further discussed below.

<b>Table 10-1: Policy Criteria</b>			
<b>Agency</b>		<b>Responses and/or Comments</b>	
		<b>Received</b>	<b>Not Received</b>
Federal	Federal Aviation Administration		X
	Natural Resources Conservation Service	X	
	U.S. Army Corps of Engineers	X	
	U.S. Customs and Border Protection		X
	U.S. Fish and Wildlife Service (USFWS)	X	
	U.S. Geological Survey		X
State of North Dakota	Job Service of North Dakota	X	
	North Dakota Aeronautics Commission		X
	North Dakota Department of Agriculture	X	
	North Dakota Department of Career and Technical Education		X

<b>Agency</b>		<b>Responses and/or Comments</b>	
		<b>Received</b>	<b>Not Received</b>
	North Dakota Department of Commerce		X
	North Dakota Department of Health	X	
	North Dakota Department of Human Services		X
	North Dakota Department of Labor		X
	North Dakota Department of Transportation	X	
	North Dakota Game and Fish Department	X	X
	North Dakota Geological Survey		X
	North Dakota Governor		X
	North Dakota Indian Affairs Commission	X	
	North Dakota Office of Management and Budget		X
	North Dakota Office of Attorney General	X	
	North Dakota Parks and Recreation Department	X	
	North Dakota State Land Department		X
	North Dakota State Soil Conservation Committee		X
	North Dakota State Water Commission		X
	North Dakota SHPO		X
North Dakota Township Officers Association		X	
Local Entities	City of Rolla		X
	Mount View Township		X
	Picton Township		X
	Rolla Municipal Airport		X
	Rolette County	X	
	Rolette County Soil Conservation District		X
	Towner County	X	
	Towner County Soil Conservation District		X

## **Federal Agencies**

### **Natural Resources Conservation Service**

The NRCS is interested in potential impacts to wetlands, prime farmlands, and conservation easement acreage as a result of the Project. However, in order to comment more specifically regarding impacts to these resources, the NRCS will need information on locations of turbines and other areas proposed for disturbance. Sequoia will continue to communicate with the NRCS in order to address their concerns

### **U.S. Army Corps of Engineers**

The USACE responded with a letter specifying their jurisdiction over navigable waters and waters of the United States. If preconstruction investigations determine that USACE

jurisdictional resources are present within the Project Area, then formal delineation of these resources will be required by the USACE. Permitting under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act will proceed if work on the Project occurs in the USACE jurisdictional resources. Sequoia will continue communication with the USACE throughout the initial phases of the Project including design and construction.

### **U.S. Fish and Wildlife Service**

The USFWS holds certain resources in trust and manages these resources for the benefit of the public. USFWS trust resources include migratory birds, interjurisdictional fish, federally-listed threatened and endangered species of plants and animals and their habitats, and units of the National Wildlife Refuge System. In regards to migratory birds, the USFWS asked that overhead power lines be constructed in accordance with the current guidelines for preventing raptor electrocutions and asked Sequoia to conduct collision monitoring studies to determine the effect of several factors related to wind turbine facilities on avian species. To avoid or reduce potential impacts to whooping cranes, the USFWS would like all new electrical transmission lines to be either buried or have overhead lines be marked with visual marking devices. USFWS property interests, including WPAs and wetland easements, occur within the Project Area. If these lands are proposed to be impacted, the USFWS will be required to conduct an analysis of impacts and examine alternatives, pursuant to NEPA. Finally, there are high value habitat areas within the Project boundaries including native mixed-grass prairies, potentially USACE jurisdictional wetlands, woodlands, and riparian areas. The USFWS requests that Project facilities be located outside of these areas.

No collisions or electrocutions with overhead power lines are anticipated because Project power collector lines will be placed underground. Sequoia is conducting pre-construction studies on wetlands and avian species according to protocols specified in Appendix E. In addition, Sequoia is coordinating with USFWS on site layout to minimize impacts to USFWS managed resources.

### **State of North Dakota Agencies**

#### **Job Service of North Dakota**

Job Service North Dakota administers the employment service and unemployment insurance programs. This agency had no applicable permits and had no additional comments regarding the proposed Project.

#### **North Dakota Department of Agriculture**

The North Dakota Department of Agriculture is primarily concerned about the control of noxious weeds within the construction zone. Sequoia will coordinate with the Weed Control Officials for Rolette and Towner counties, including an annual inspection and preparation of a management plan, to ensure that land disturbed as a result of the Project does not create future noxious weed control concerns.

#### North Dakota Department of Health

The North Dakota Department of Health (NDDOH) believes that environmental impacts from the proposed construction will be minor and can be controlled by proper construction methods. The NDDOH requested that measures be taken to minimize fugitive dust emissions, adverse effects on waters of the state, and noise levels during construction on the Project. Permitting through the NDDOH will be required to discharge storm water. The NDDOH also provided Construction and Environmental Disturbance Requirements that when implemented, will ensure minimal environmental degradation occurs as a result of construction.

#### North Dakota Department of Transportation

The North Dakota Department of Transportation (NDDOT) requires a Driveway Application and Permit be submitted for construction of new driveways and improvements to existing driveways on state highways. As part of this permit application process, the driveway sites will need to have wetland and cultural resources surveys conducted. Sequoia will continue to be in contact with NDDOT in order to address these concerns.

#### North Dakota Game and Fish Department

The North Dakota Game and Fish Department (NDGFD) indicated that many of 100 species of conservation priority listed in the North Dakota Wildlife Action Plan can be found in the proposed project area. The plan is habitat based and the key to species survival is habitat preservation. The NDGFD asked that work within native prairie be avoided to the extent possible, that wetlands and woody vegetation be avoided, and that they be kept informed of the progress of the Border Winds Project. Sequoia Energy will continue coordination with the NDGFD. Prairies and other habitats are discussed in this document. The species of conservation priority are discussed under the Desktop Avian Study in Appendix C.

#### North Dakota Indian Affairs Commission

The North Dakota Indian Affairs Commission forwarded Project information to the Tribal Historic Preservation Officer and the Tribal Planner for the Turtle Mountain Band of Chippewa for their review of potential impacts.

#### North Dakota Office of Attorney General

The Attorney General and members of his staff are prohibited by statute from giving legal advice, opinions, or assistance to private businesses. They may only serve as legal advisors to state officials, state's attorneys, and certain city officials. Accordingly, the Office of Attorney General cannot review Project information or provide assistance.

#### North Dakota Parks and Recreation

The NDPRD stated that the Project will not affect state park lands but does have the possibility to include three Land and Water Conservation Fund (LWCF) sites that are

within or adjacent to the Project Area. LWCF sites are protected under section 6(f) of the LWCF Act and property taken from within the sites is to be replaced with property of equal market value. Sequoia will continue to coordinate with NDPRD and will consult with staff prior to any action taken on LWCF sites. The Natural Heritage Inventory listed four species of concern (few-flowered spikerush, Indianpipe, sheathed pondweed, and chestnut-sided warbler) and three significant ecological communities (aspen woodland, calcareous fen, and central mesic tallgrass prairie) occurring within or adjacent to the Project boundary. An inventory will be conducted during the preconstruction phase of the Project to avoid impacts to these resources to the extent practicable.

**Local Government Entities**

**Rolette County**

The Rolette County Zoning Resolution requires a Conditional Use Permit for all towers exceeding 50 feet in height. Sequoia will continue to coordinate with Rolette County during the application process of this permit.

**Towner County**

Westwood Professional Services, Inc. on behalf of Sequoia assessed sound levels that will be emitted by Project turbines. The results of this assessment are presented in Appendix C. Mr. Kent Haugen of the Towner County Auditor’s Office concurred with the findings in this assessment that the sound of turbines associated with the Project will be acceptable to Towner County if turbines are setback at least 800 feet from the nearest occupied residence and the nearest non-participating landowner property boundary.

**11.0 QUALIFICATIONS OF CONTRIBUTORS TO SITING STUDY**

<b>Table 11-1: Qualifications of Contributors to the Siting Study</b>	
<b>Name and Title</b>	<b>Education and Professional Experience</b>
Ian Witherspoon Manager, Project Development Sequoia Energy	B.Sc. Geography, minor in Zoology, Brandon University, Brandon, Manitoba, Canada 20 years of professional experience 17 with Ducks Unlimited Canada 3.5 with Sequoia Energy Inc.
Rob Bouta, MS, CSE, WDC Senior Environmental Scientist Westwood Professional Services	M.S. Environmental and Forest Biology, State Univ. of New York, Syracuse B.S. Wildlife Management, Univ. of Wisconsin, Stevens Point A.A.S. Natural Resources, Univ. of Minnesota, Crookston 23 years of professional natural experience.
Amy Linnerooth, MS Environmental Scientist Westwood Professional Services	M.S. Plant Ecology, University of Nevada, Reno B.A. Biology, Gustavus Adolphus College, St. Peter, MN 9 years of professional experience
Dean Sather, MA, RPA Senior Cultural Resource Specialist Westwood Professional Services	M.A. Anthropology/Archaeology, Univ. of Kansas, Lawrence B.A. Anthropology, Moorhead State University, Minnesota 18 years of professional experience

<b>Table 11-1: Qualifications of Contributors to the Siting Study</b>	
<b>Name and Title</b>	<b>Education and Professional Experience</b>
Brie Anderson, BS GIS Specialist/Environmental Scientist Westwood Professional Services	B.S. Ecology and Field Biology, minor in GIS, St. Cloud State University, Minnesota 2 years of professional experience
Kari Block, BS GIS Specialist/Environmental Scientist Westwood Professional Services	B.S. Environmental Studies, minors in GIS and Biology, St. Cloud State University, Minnesota 4 years of professional experience

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### 13.0 DEFINITIONS

ABC	American Bird Conservancy
ADT	Average Daily Traffic
Aggregate Surface	Road cover used for proposed access roads
ANSI	American National Standards Institute
Asynchronous Generator	A cage-wound generator, also called an induction generator, used to generate alternating current
BMPs	Best Management Practices; prevents soil erosion and sedimentation
Capacity	The capability of a system, circuit, or device for storing electronic charge
Certificate	Certificate of Site Compatibility
City	City of Rolla, North Dakota
Class I	Cultural Resources Inventory Existing data inventory – a large-scale review and compilation of known cultural resource data
Class III	Cultural Intensive Resources Inventory field inventory – complete surface inventory of a specific area.
Commission or PSC	North Dakota Public Service Commission
CRP	Conservation Reserve Program
dBA	A-weighted decibel
Distribution	Relatively low-voltage lines that deliver electricity to the retail customer’s home or business
DOE	US Department of Energy
Electromechanical	Of, relating to, or being a mechanical process or device actuated or controlled electrically; especially being a transducer for converting electrical energy to mechanical energy
EMF	Electric and Magnetic Field
EPC	Engineering, procurement, and construction
ESA	Environmental Site Assessment
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps

FSA	Flood Service Agency
ft	Foot/Feet
Gearbox	An assembly of parts including the speed-changing gears and the propeller shaft by which the power is transmitted from an automobile engine to a live axle; the speed-changing gears in such an assembly
Generator	A machine by which mechanical energy is changed into electrical energy
Geotechnical	A science that deals with the application of geology to engineering
HPD	Historic Preservation Division
Hub	The central part of a circular object (as a wheel or propeller)
HWY	Highway
Interconnection	To be or become mutually connected
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour
LWCF	Land and Water Conservation Fund
MW	megawatt
m	meter
m/s	meter per second
MAPP	Mid-Continent Area Power Pool
Micrositing	The process in which the wind resources, potential environmentally sensitive areas, soil conditions, and other site factors, as identified by local, state and federal agencies, are evaluated to locate wind turbines and associated facilities.
MISO	Midwest Independent System Operator
mph	miles per hour
Nacelle	A streamlined enclosure (as for an engine), which houses the gearbox, generator, brake, cooling system and other electrical and mechanical systems
NDDOT	North Dakota Department of Transportation
NDPDES	North Dakota Pollutant Discharge Elimination System
NESC	National Electric Safety Code
NDAC	North Dakota Administrative Code
NDCC	North Dakota Century Code
NDGFD	North Dakota Game and Fish Department
NDIRC	North Dakota Intertribal Reinternment Committee
NDDOH	North Dakota Department of Health
NDNH	North Dakota Natural Heritage
NDPRD	North Dakota Parks and Recreation Department
NHID	Natural Heritage Inventory Database
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory

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O&M	Operations and maintenance facility
PABF	Palustrine Aquatic Bed Sempermanently Flooded
PEMA	Palustrine Emergent Temporarily Flooded
PEMAd	Palustrine Emergent Temporarily Flooded Partially Drained/Ditched
PEMC	Palustrine Emergent Seasonally Flooded
PEMCd	Palustrine Emergent Seasonally Flooded Drained/Ditched
PEMF	Palustrine Emergent Semipermanently Flooded
PEMFd	Palustrine Emergent Semipermanently Flooded Drained/Ditched
Pitch	The action or a manner of pitching; especially an up-and-down movement
Project	Border Winds Wind Energy Project
PSC or Commission	North Dakota Public Service Commission
PSSA	Palustrine Scrub-Shrub Temporarily Flooded
PTC	Production Tax Credit
RECs	Recognized Environmental Conditions
Resistance	The opposition offered by a body or substance to the passage through it of a steady electric current
Rotor	The rotor consists of three blades mounted to a rotor hub
RD	Rotor Diameter: Diameter of the rotor from the tip of a single blade to the tip of the opposite blade
ROW	Right-of-Way
rpm	Revolutions per minute
SCADA	Supervisory Control and Data Acquisitions (communications technology)
Sequoia	Sequoia Energy U.S. Inc.
SHPO	North Dakota State Historic Preservation Office
SHSND	State Historical Society of North Dakota
Step-up Transformer	A transformer that increases voltage
Substation	A subsidiary station in which electric current is transformed
SWPPP	Storm Water Pollution Prevention Plan
TCPO	Tribal Cultural Preservation Officers
THPO	Tribal Historic Preservation Officers
Torque	A force that produces or tends to produce rotation or torsion; also a measure of the effectiveness of such a force that consists of the product of the force and the perpendicular distance from the line of action of the force to the axis of rotation : a turning or twisting force
Transformer	An electrical device by which alternating current of one voltage is changed to another voltage
Transmission	An assembly of parts including the speed-changing gears and the propeller shaft by which the power is transmitted from an automobile engine to a live axle; the speed-changing gears in such an assembly
USACE	US Army Corps of Engineers
USDA	US Department of Agriculture
USFWS	US Fish and Wildlife Service

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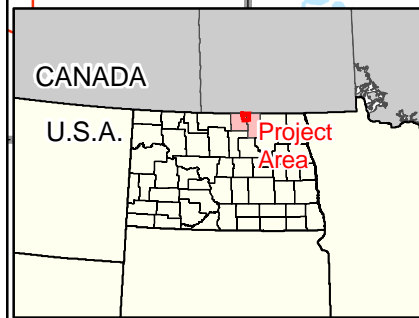
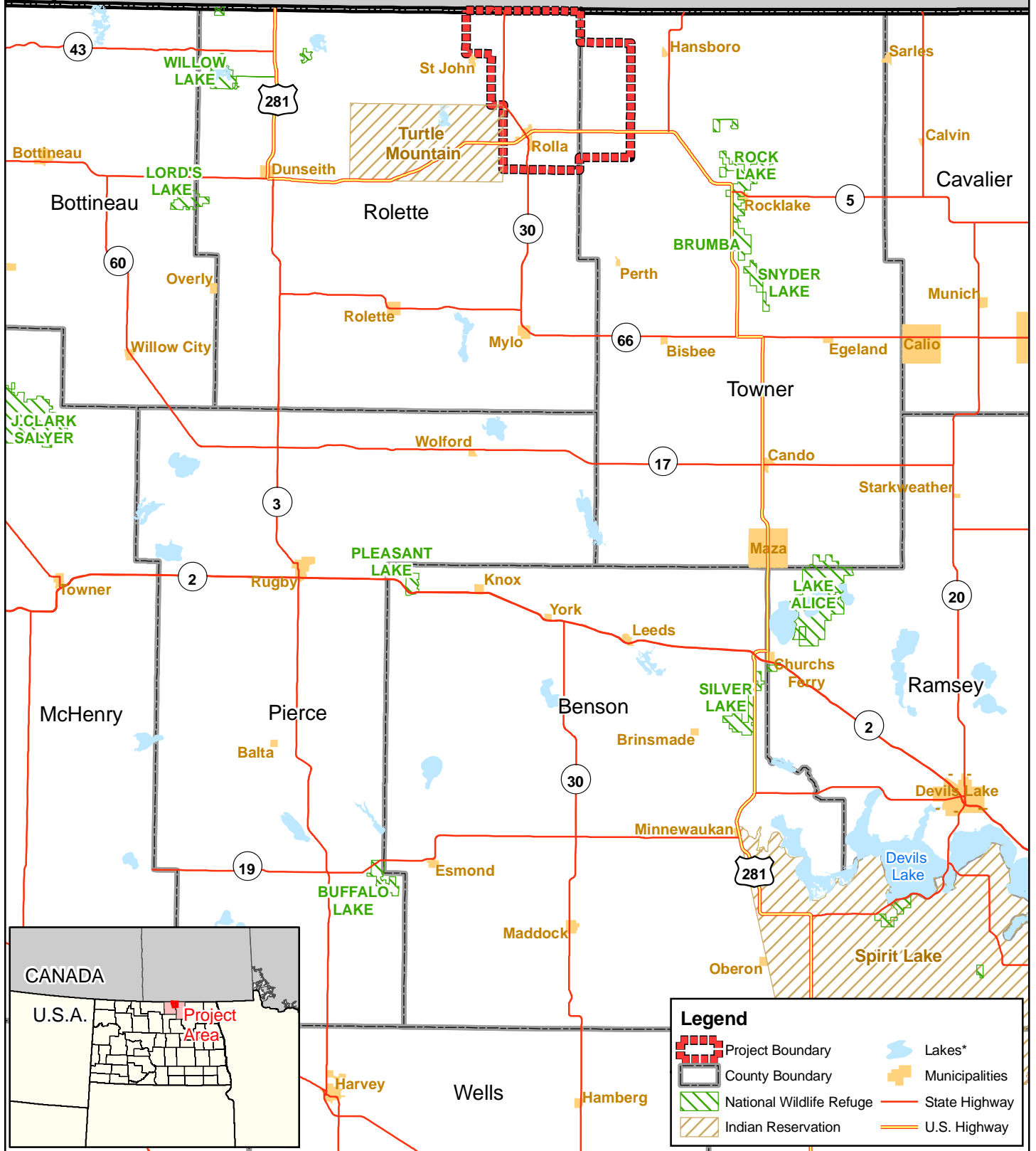
USGS US Geological Survey  
WMD Wetland Management District  
WPAs Waterfowl Protection Area  
WRAs Waterfowl Rest Areas  
Yaw To deviate erratically from a course (as when struck by a heavy sea); especially to move from side to side: to turn by angular motion about the vertical axis



**Exhibits**



# MANITOBA, CANADA



**Legend**

- Project Boundary
- County Boundary
- National Wildlife Refuge
- Indian Reservation
- Lakes\*
- Municipalities
- State Highway
- U.S. Highway

Data Source: USGS 100K DRG (unknown date), ESRI Data (2005), North Dakota Geologic Survey US PLS System (1994), Westwood (2007).

\*Note: Lakes shown have an area greater than 2.5 sq. km.

# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

## Project Vicinity

EXHIBIT 1



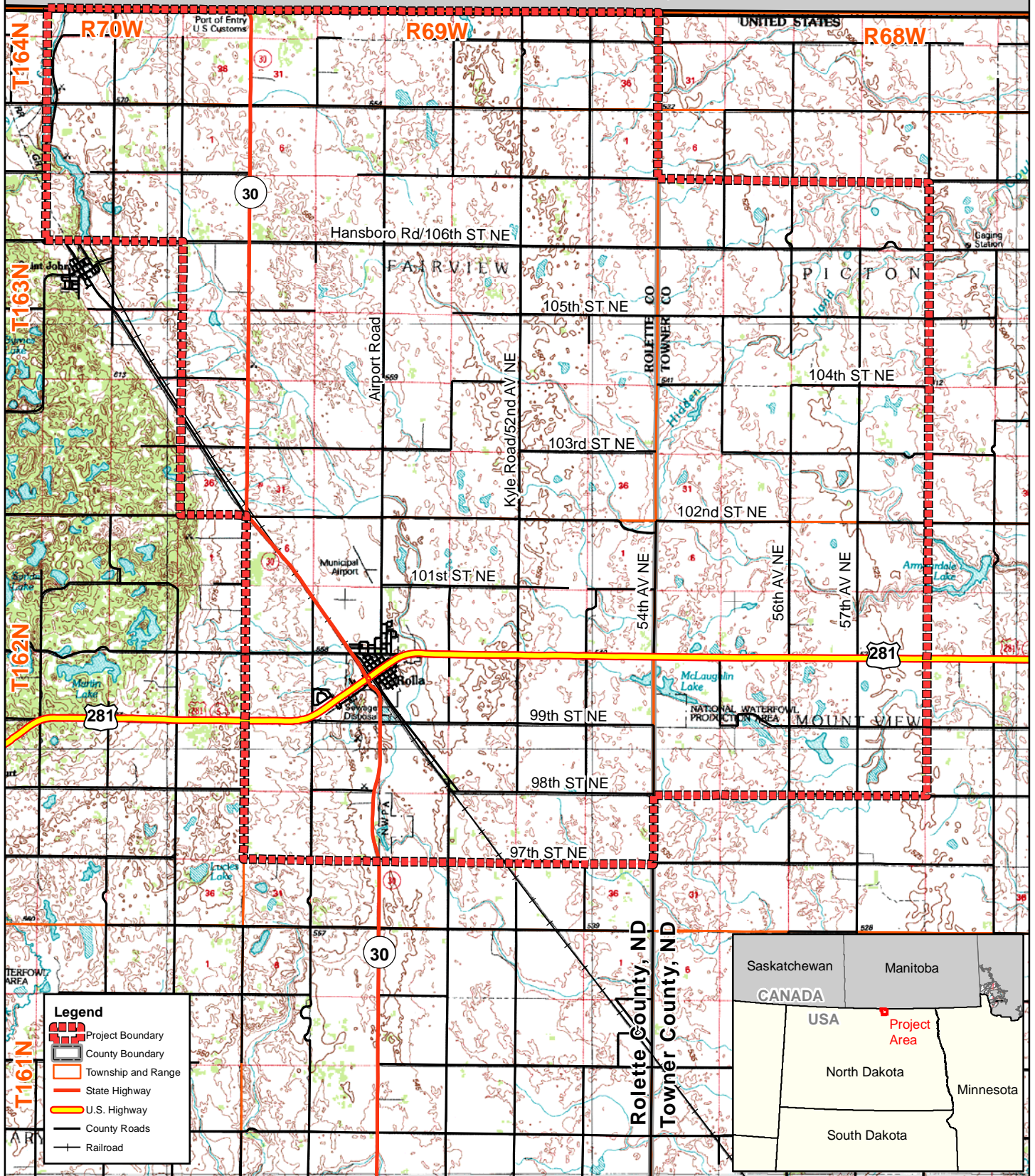
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# MANITOBA, CANADA



Data Source(s): USGS 100K DRG (unknown date), ESRI Data (2005), North Dakota Geologic Survey US PLS System (1994), Westwood (2007).

## Border Winds Energy Project

Rolette and Towner Counties, North Dakota

### Project Location

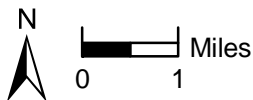
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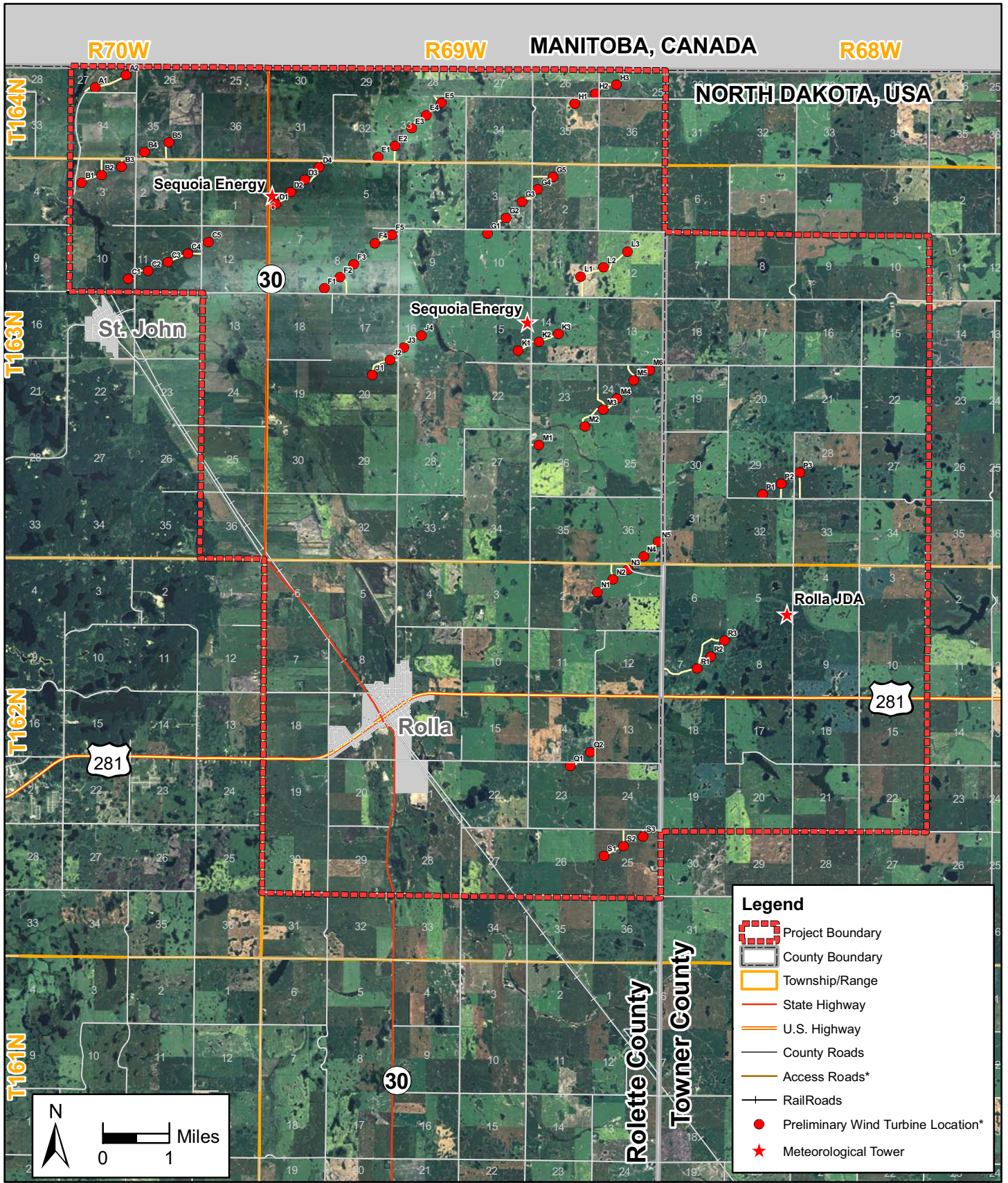


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Data Source(s): NAIP Aerial Photography (2005), ESRI (2005), Westwood (2008), Sequoia Energy (2008).

\*NOTE: Turbine locations and access roads are preliminary and subject to change.



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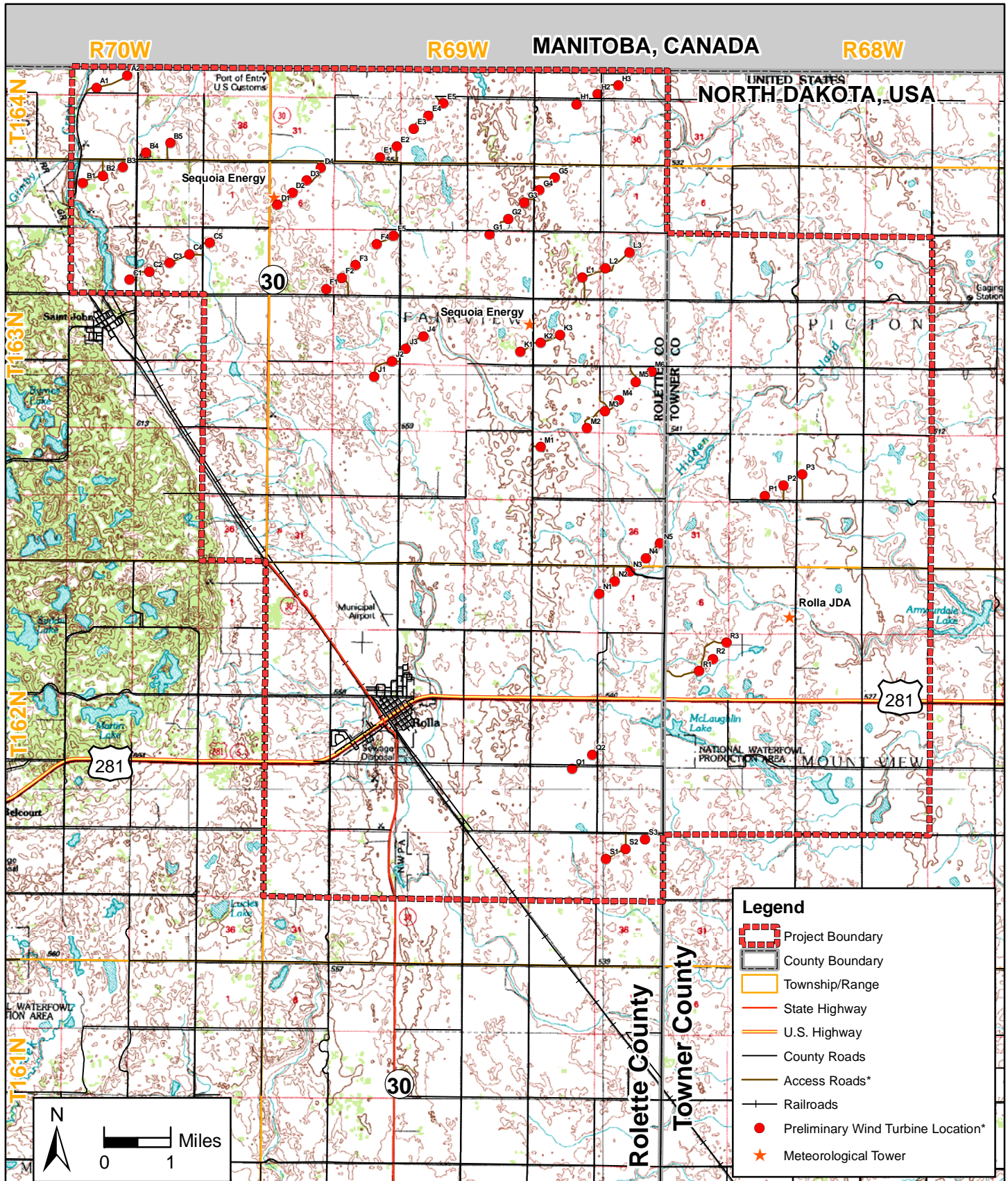
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# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

## Project Location and Preliminary Site Layout (Aerial)

EXHIBIT 3



Data Source(s): NAIP Aerial Photography (2005), ESRI (2005), Westwood (2008), Sequoia Energy (2008).

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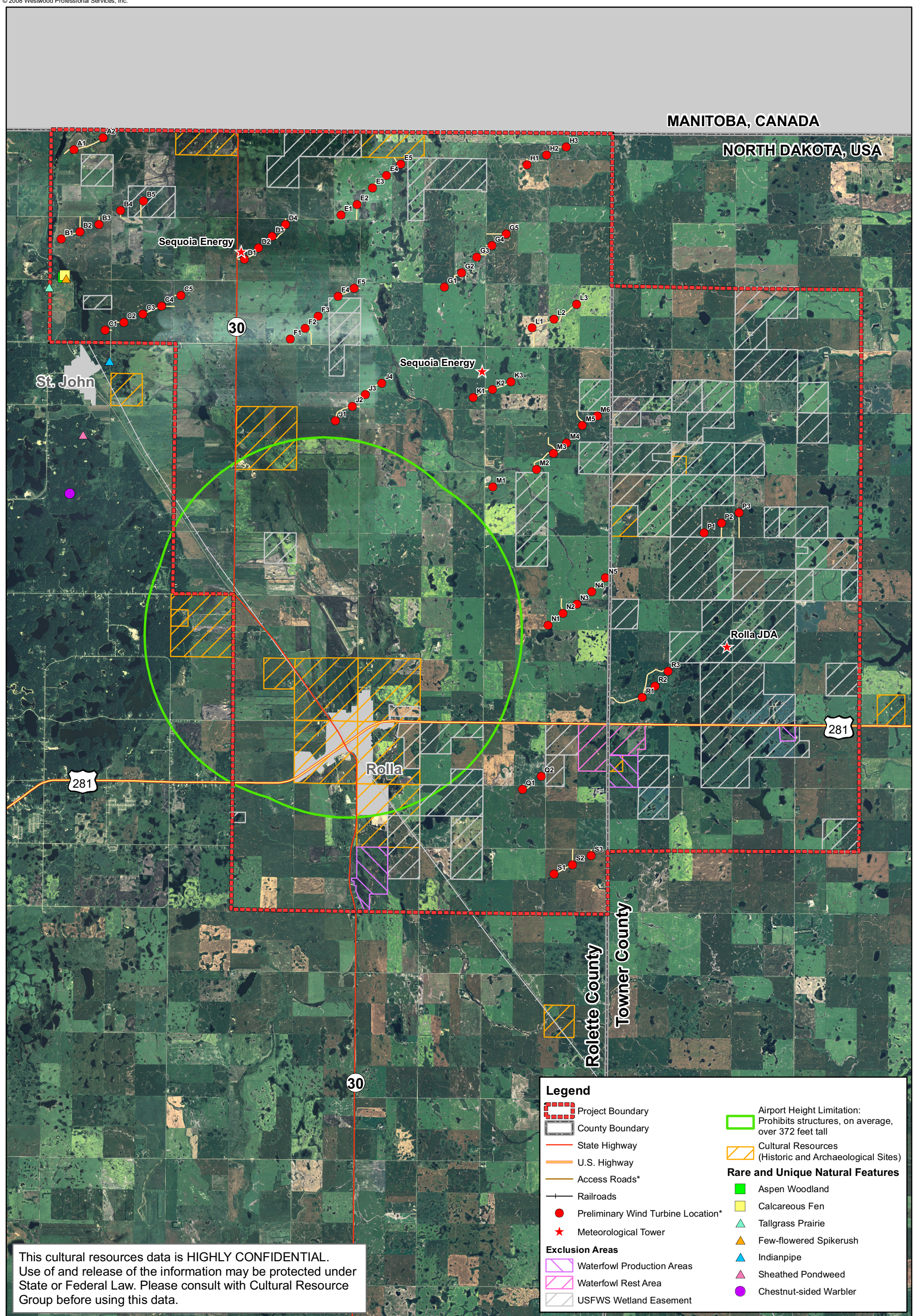
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# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

## Project Location and Preliminary Site Layout (Topographical)

EXHIBIT 4



This cultural resources data is HIGHLY CONFIDENTIAL.  
 Use of and release of the information may be protected under  
 State or Federal Law. Please consult with Cultural Resource  
 Group before using this data.

Data Source(s): NAIP Aerial Photography (2005); USFWS (2007); Westwood (2008); ESRI (2005); NDPRD (2008).



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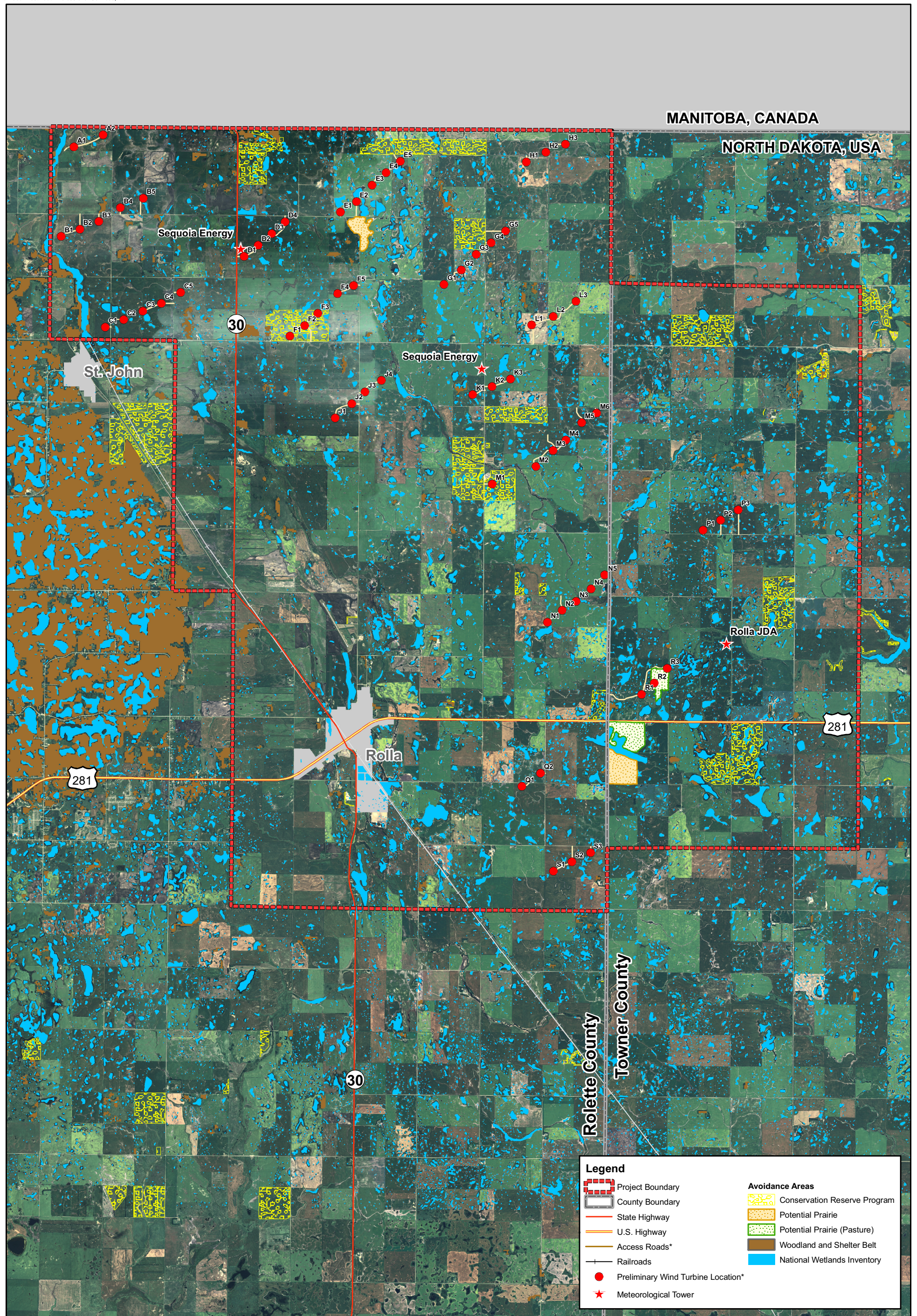
0 1.5 Miles

\*NOTE: Turbine locations and access roads are preliminary and subject to change.

# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

Exclusion Areas  
 EXHIBIT 5



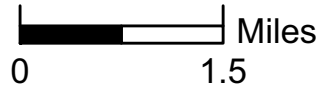
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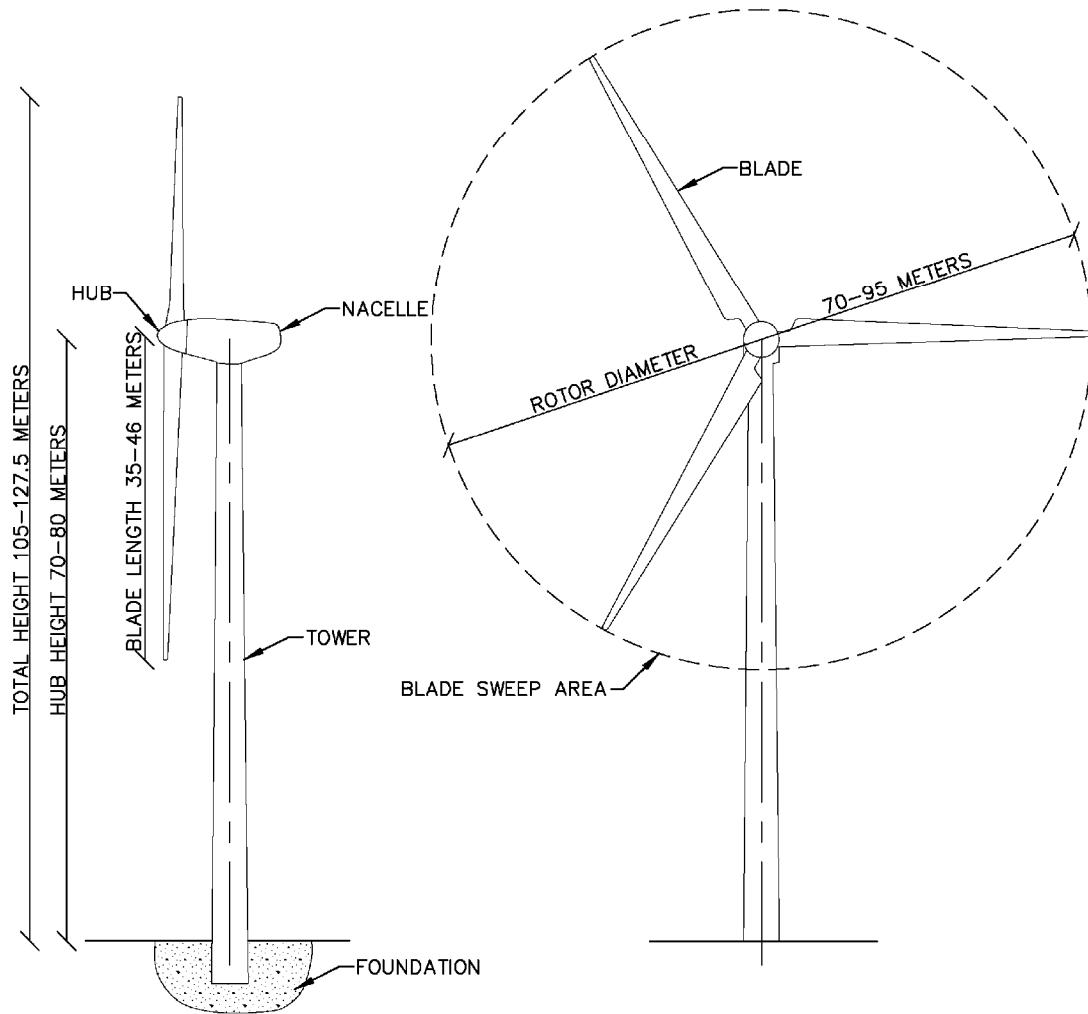
\*NOTE: Turbine locations and access roads are preliminary and subject to change.

# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

Avoidance Areas

EXHIBIT 6



Data Source(s): Westwood (2008).

# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

## Wind Turbine Design Features

EXHIBIT 7

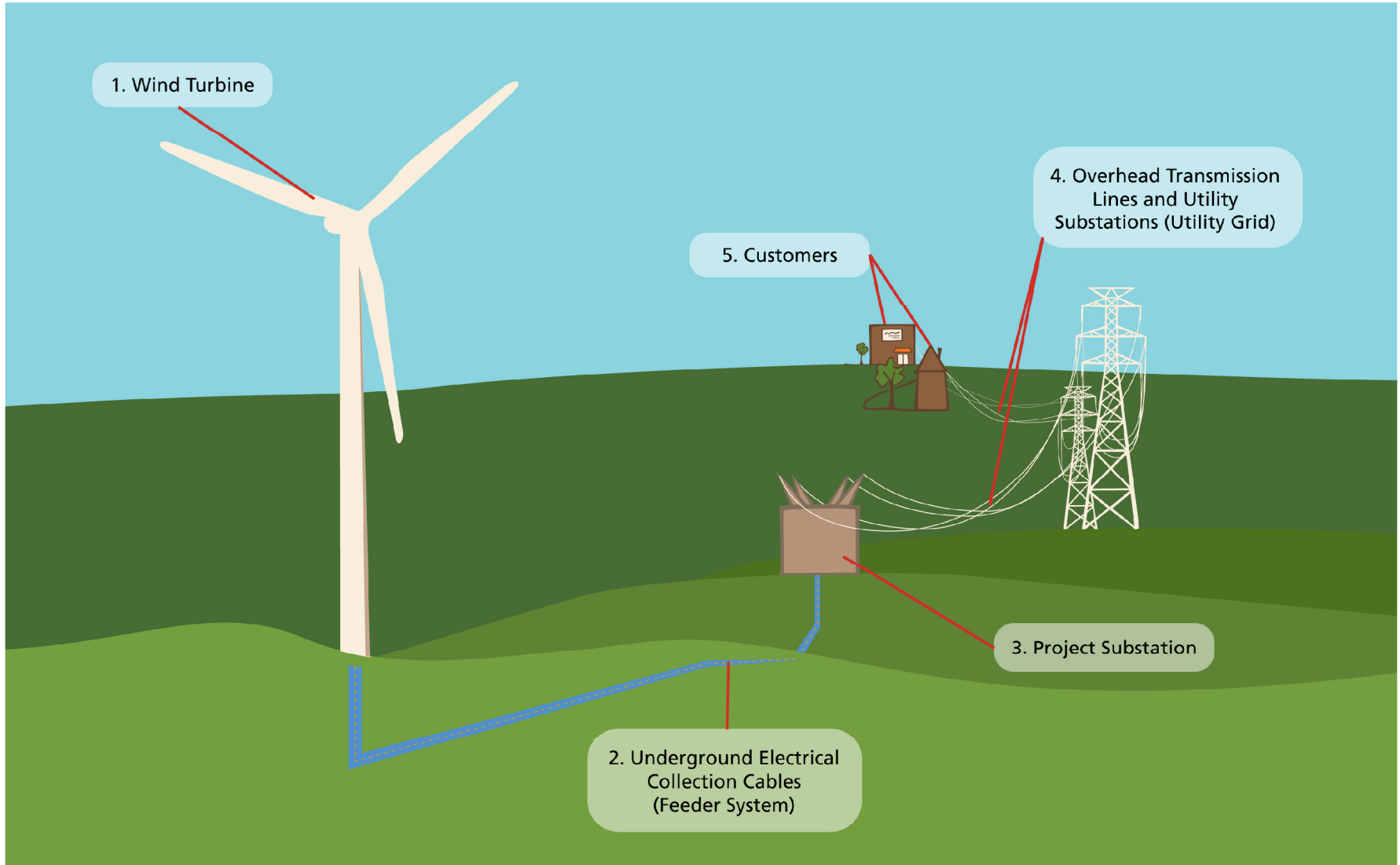


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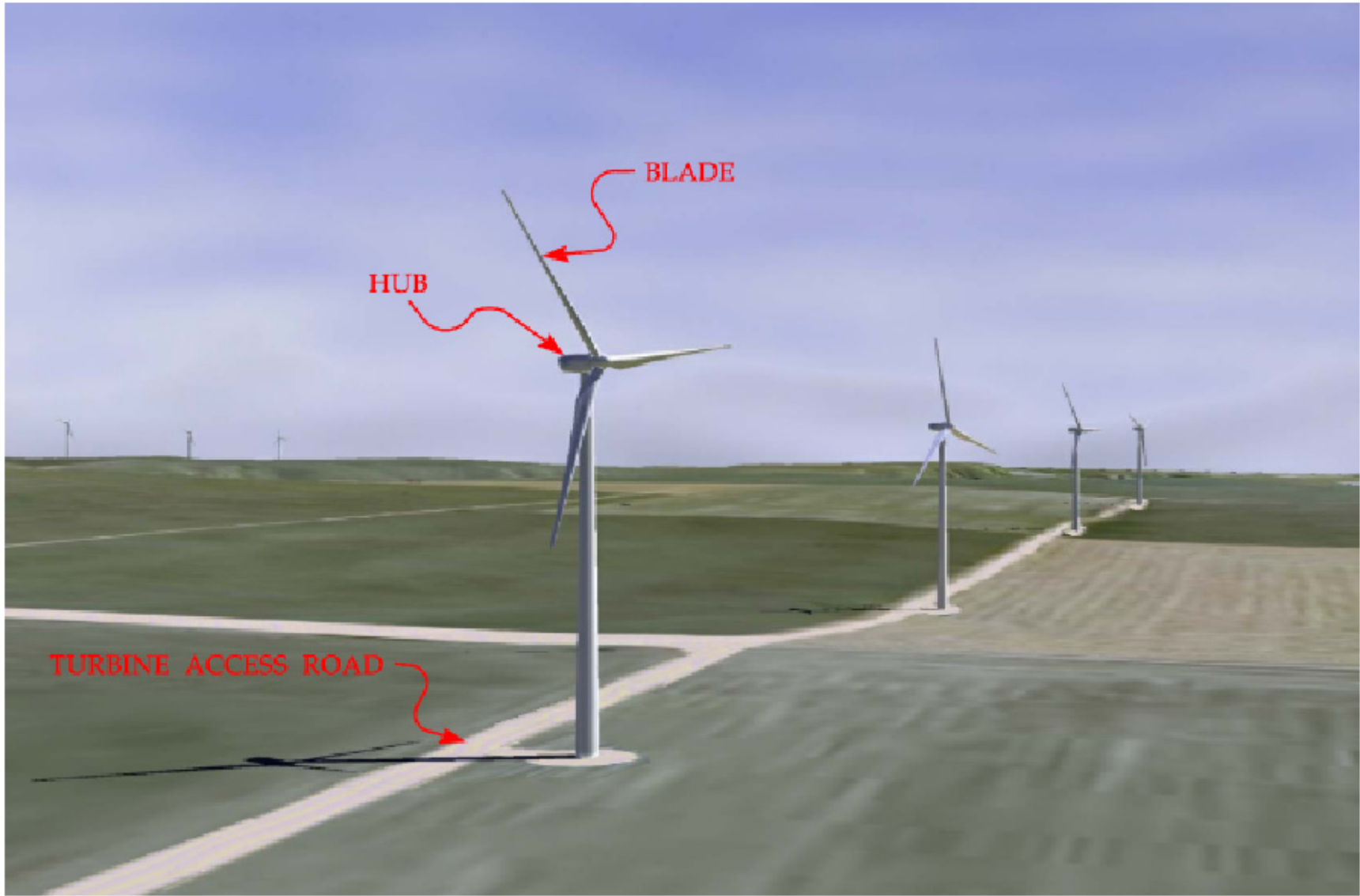
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# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

## Path of Energy Diagram

EXHIBIT 8



Data Source(s): Westwood (2008).



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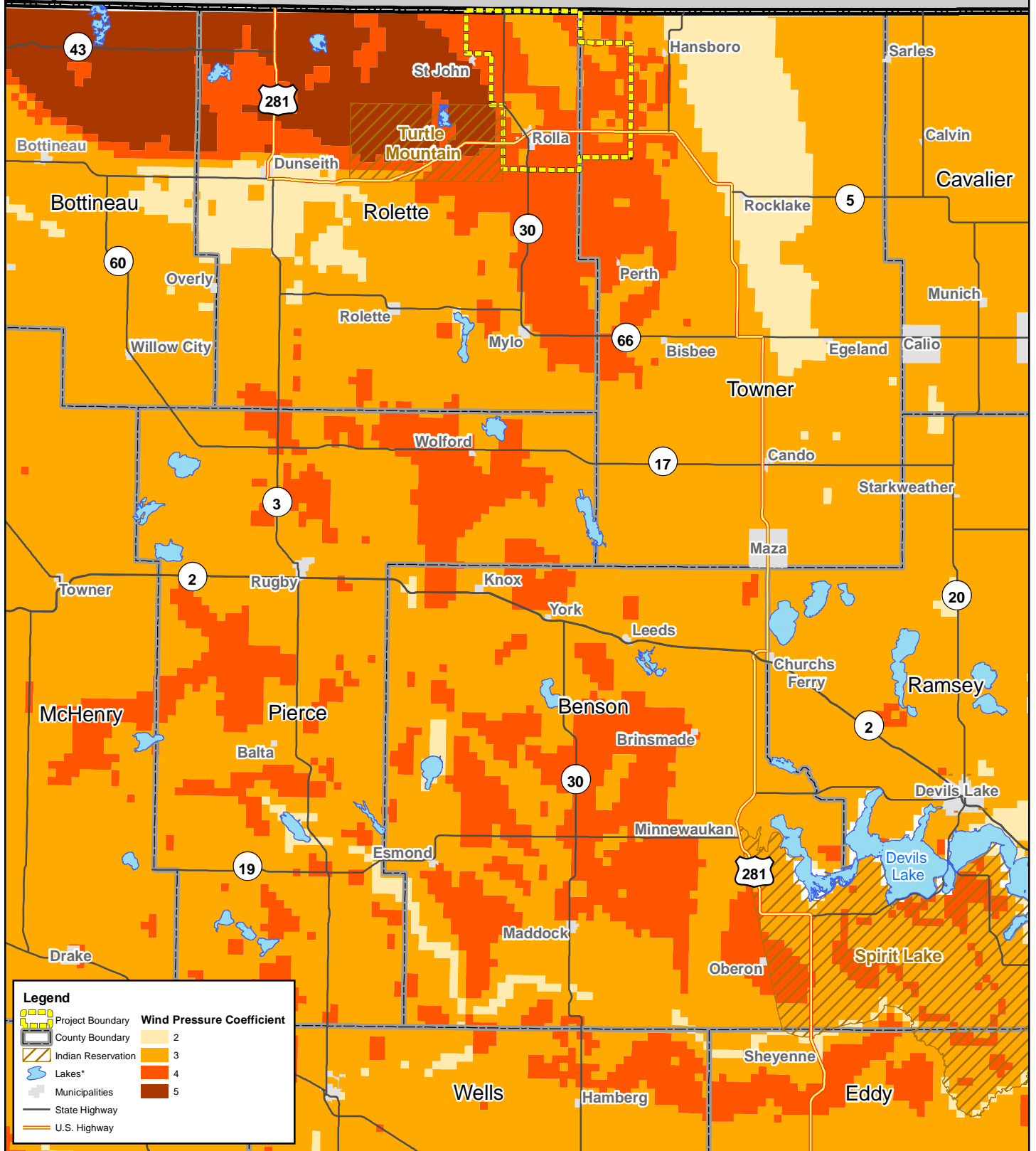
## Border Winds Energy Project

Rolette and Towner Counties, North Dakota

Typical Wind Energy Project Layout

EXHIBIT 9

# MANITOBA, CANADA



**Legend**

	<b>Wind Pressure Coefficient</b>
	2
	3
	4
	5

Data Source: USGS 100K DRG (unknown date), ESRI Data (2005), North Dakota Geologic Survey US PLS System (1994), U.S. Department of Energy (unknown), Westwood (2007).

\*Note: Lakes shown have an area greater than 2.5 sq. km.

## Border Winds Energy Project

Rolette and Towner Counties, North Dakota

### Wind Resource Assessment

EXHIBIT 10



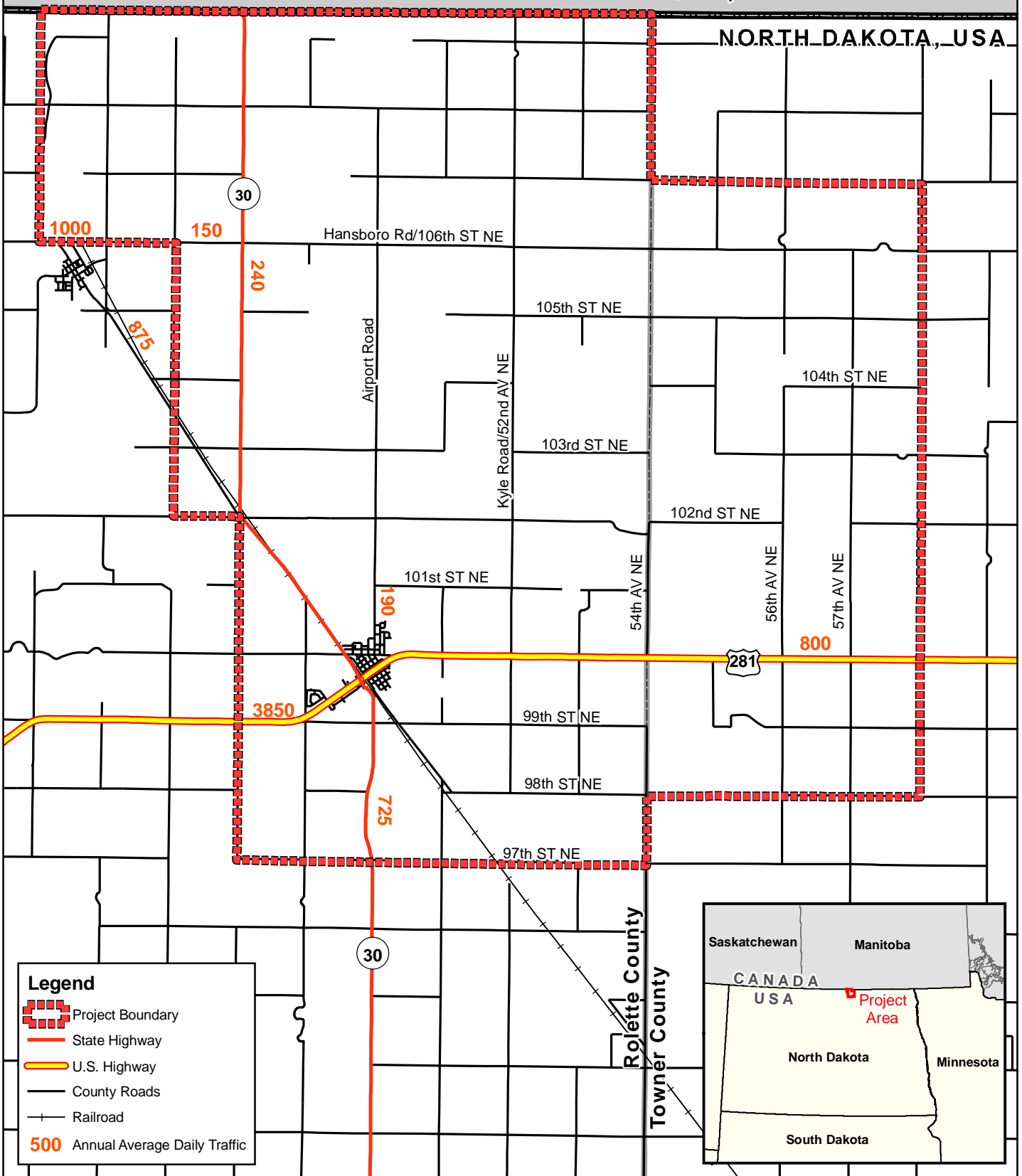
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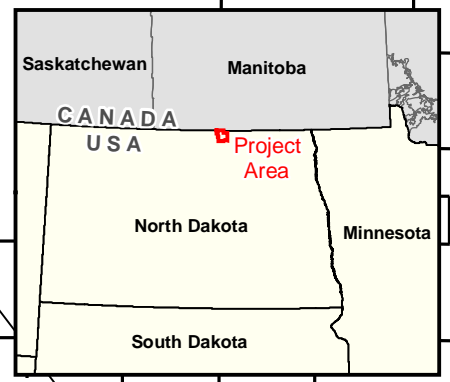
MANITOBA, CANADA

NORTH DAKOTA, USA



**Legend**

- Project Boundary
- State Highway
- U.S. Highway
- County Roads
- Railroad
- 500** Annual Average Daily Traffic



Data Source: ESRI Data (2005), North Dakota Geologic Survey US PLS System (1994), Westwood (2007), ND DOT (2006-2008).

# Border Winds Energy Project

Rolette and Towner Counties, North Dakota



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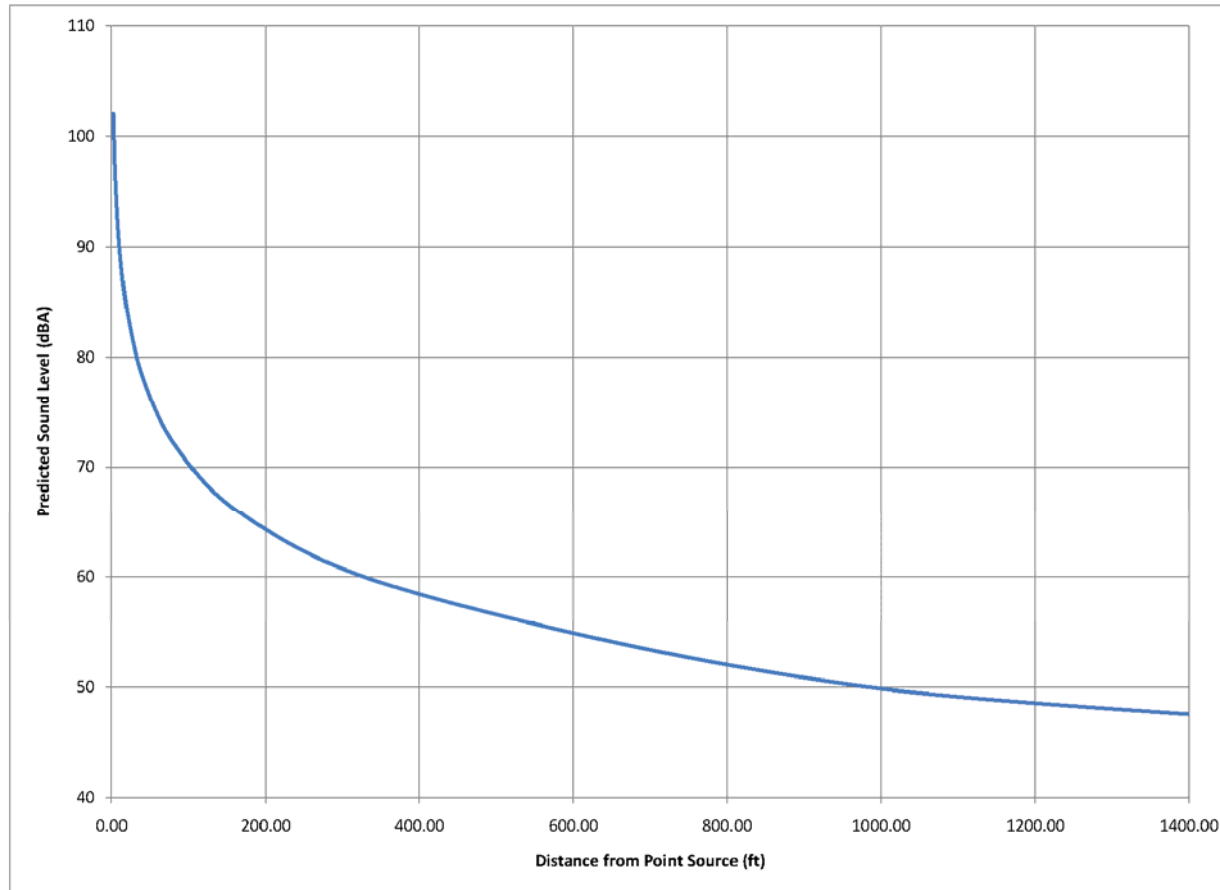
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## Average Daily Traffic

EXHIBIT 11



Data Source(s): Westwood (2008).



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# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

## Sound Attenuation

EXHIBIT 12



Data Source(s): Westwood (2008).



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## Border Winds Energy Project

Rolette and Towner Counties, North Dakota

Photo of Typical Area

EXHIBIT 13



Data Source(s): Westwood (2008).



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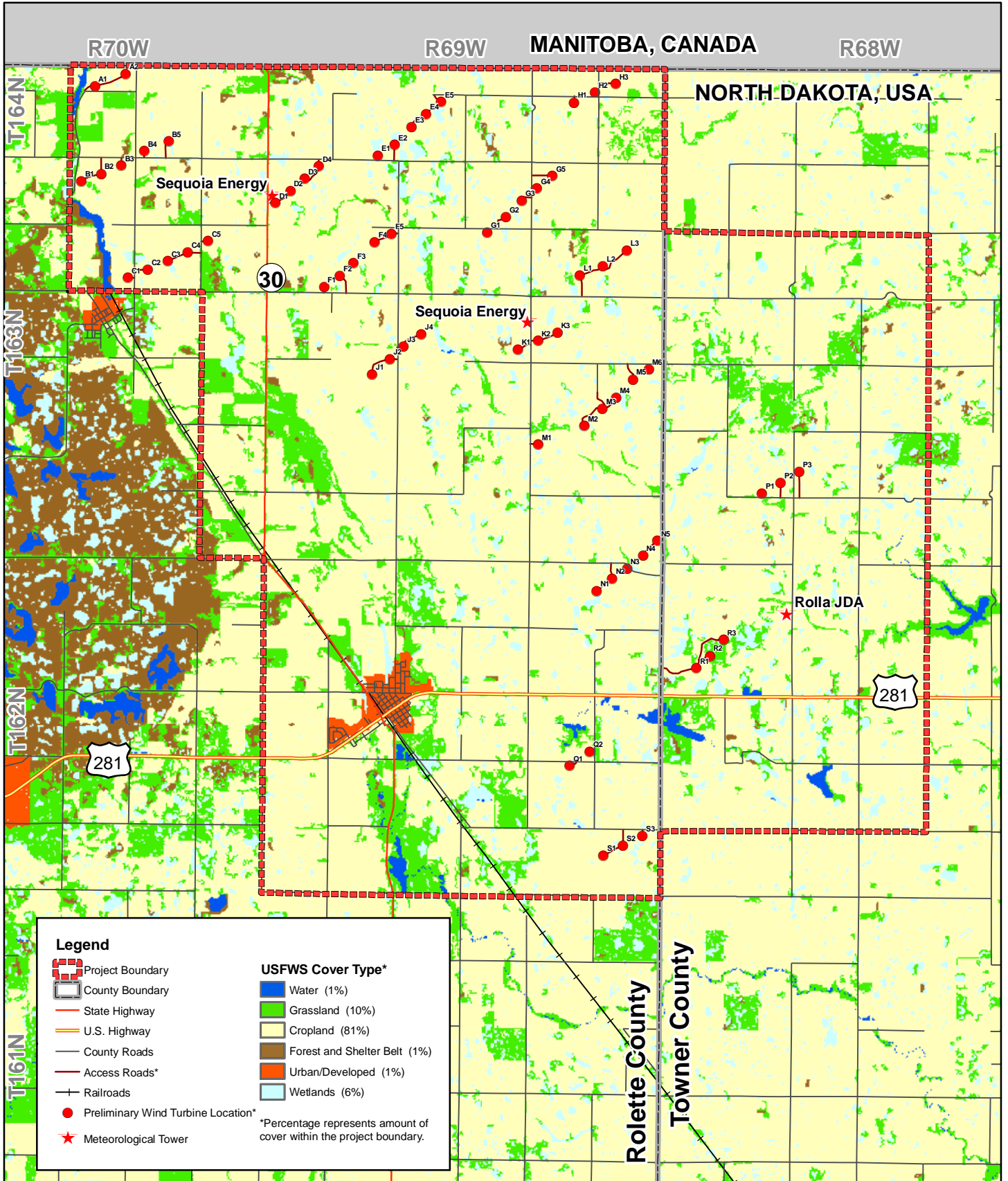
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# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

Photo Simulation

EXHIBIT 14



Data Source(s): USFWS (2007), ESRI (2005), Westwood (2008), Sequoia Energy (2008).

\*NOTE: Turbine locations and access roads are preliminary and subject to change.

# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

USFWS Land Use

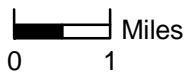
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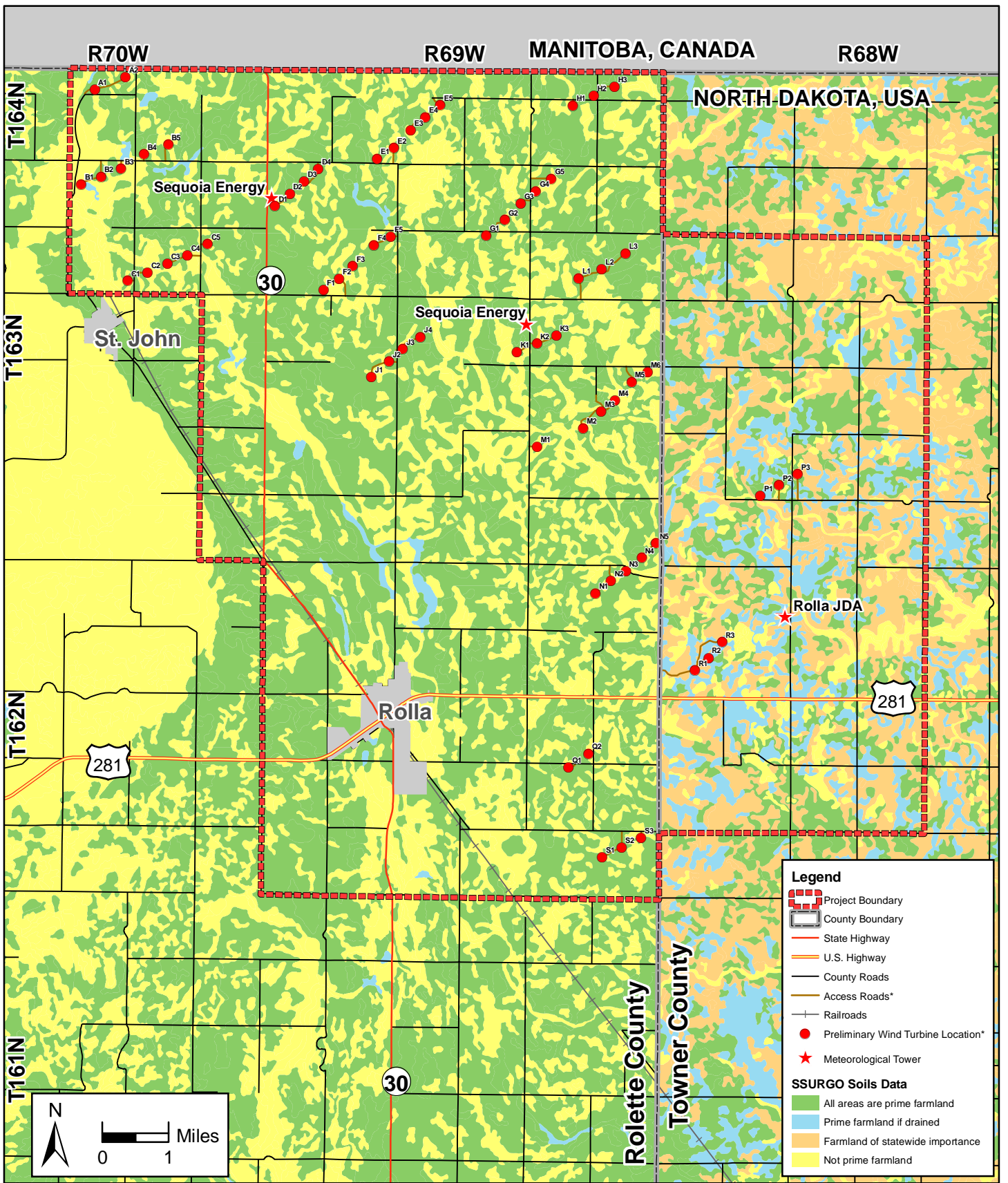


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Data Source(s): U.S. Department of Agriculture, Natural Resource Conservation Science (1998), ESRI (2005), Westwood (2008), SSURGO, Sequoia Energy (2008).

\*NOTE: Turbine locations and access roads are preliminary and subject to change.

# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

## Prime Farmland Soil Distribution

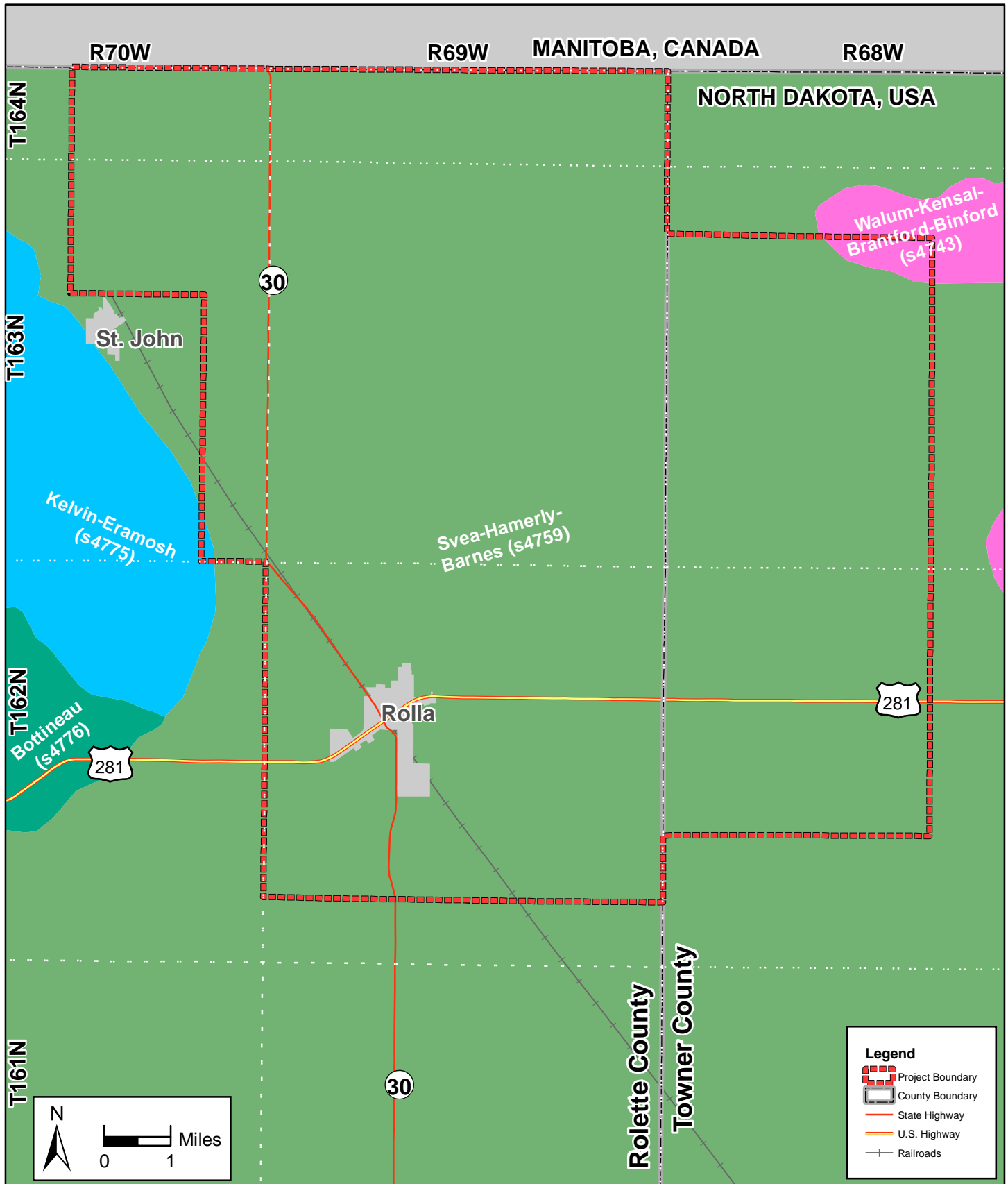
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Data Source(s): STATSGO, NRCS (2002), ESRI (2005), Westwood (2008), Sequoia Energy (2008).

# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

State Soils Association

EXHIBIT 17



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MANITOBA, CANADA

NORTH DAKOTA, USA



Data Source(s): USFWS (2007), Westwood (2008), Sequoia Energy (2008), USGS (2006).

\*NOTE: Turbine locations and access roads are preliminary and subject to change.



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**Legend**

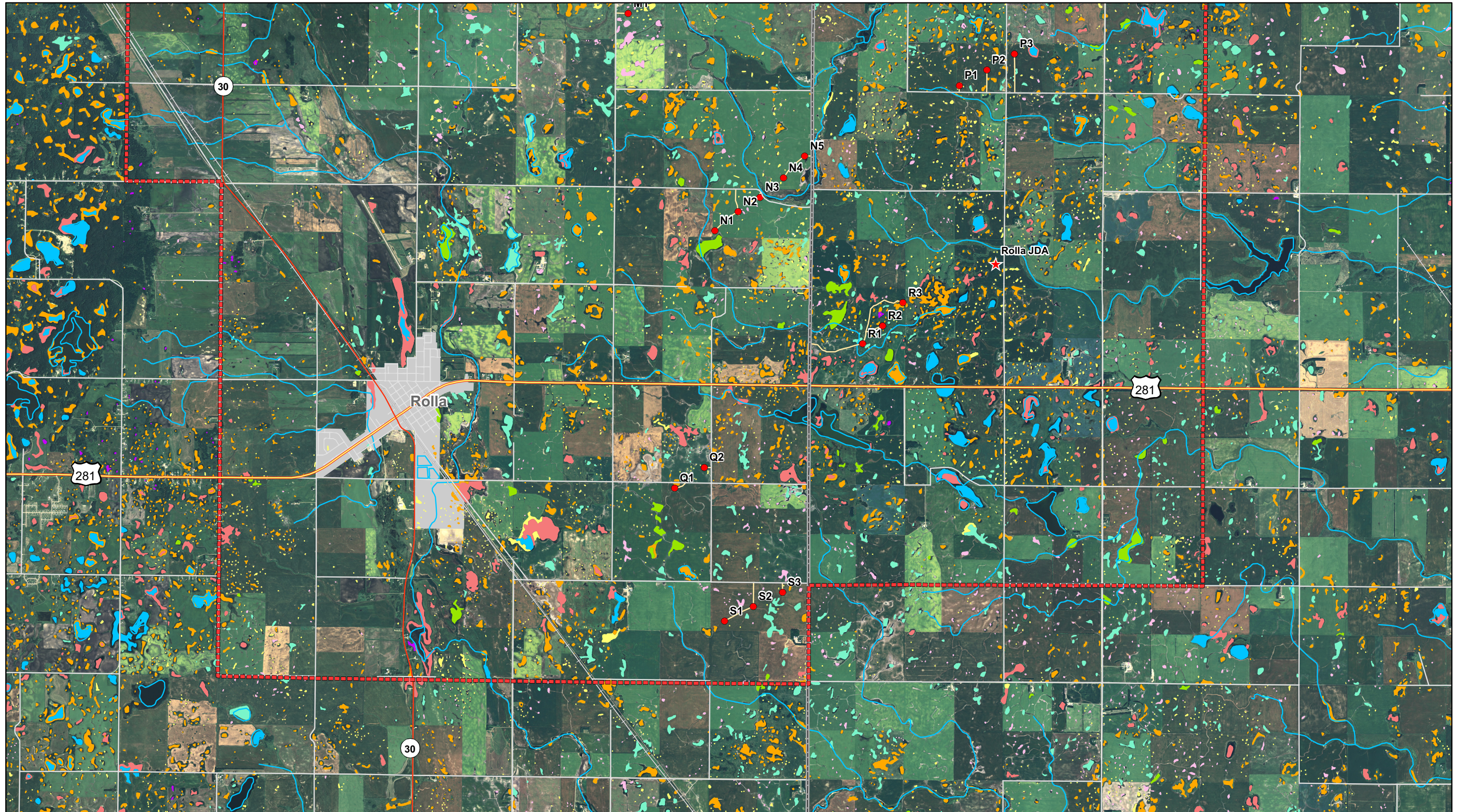
- |                  |                                    |       |       |
|------------------|------------------------------------|-------|-------|
| Project Boundary | Access Roads*                      | PEMAd | PEMF  |
| County Boundary  | Railroads                          | PABF  | PEMC  |
| State Highway    | Preliminary Wind Turbine Location* | PEMA  | PEMFd |
| U.S. Highway     | Meteorological Tower               | PEMCd | PSSA  |
| County Roads     | Intermittent Streams (USGS)        |       |       |

# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

## National Wetlands Inventory and Surface Waters

Map Document: P:\20071163\gis\pse\20071163\mxd\B\_fig18.mxd 10/22/2008 5:38:37 PM



Data Source(s): USFWS (2007), Westwood (2008), Sequoia Energy (2008), USGS (2006).

\*NOTE: Turbine locations and access roads are preliminary and subject to change.













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**Legend**

-  Project Boundary
-  County Boundary
-  State Highway
-  U.S. Highway
-  County Roads
-  Access Roads\*
-  Railroads
-  Preliminary Wind Turbine Location\*
-  Meteorological Tower
-  Intermittent Sreams (USGS)

- NWI Wetlands**
-  PABF
  -  PEMA
  -  PEMAd
  -  PEMC
  -  PEMCd
  -  PEMF
  -  PEMFd
  -  PSSA

# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

National Wetlands Inventory and Surface Waters



**Appendices**





**Appendix A**  
**Sequoia Energy U.S. Inc. Environmental**  
**Policy**





## **ENVIRONMENTAL POLICIES**

### **Management Directives and Board of Directors Orientation**

Sequoia Energy Inc. ("SEI") is a private company which is solely focused on the development and management of renewable energy projects. As such the company has the pursuit of sound environmental policy and positive environmental outcomes at the core of its business.

This document summarizes the management level directives and Board level policies which assure continuing diligence to environmental practice as part of this core business orientation.

### **Board of Directors**

The SEI Board of Directors consists of majority representation of Good Energies Inc. ("GEI"), a significant SEI shareholder. In part this is meant to provide a structural and direct basis to assure that the policy orientation of GEI applies to the direction of SEI. Elements of this GEI orientation are summarized below.

#### **GOOD ENERGIES – POWER FOR A BETTER WORLD**

Good Energies is a leading global investor in renewable energy and energy efficiency industries. The firm invests in solar, turbine-based renewables, green building technologies and other emerging areas within clean energy. Guided by the "3-P" principle of People-Planet-Profit, Good Energies looks for meaningful, long-term investments in companies with outstanding growth potential. The firm's mission is to accelerate the global transition to a low-carbon economy.

#### **PEOPLE – PLANET – PROFIT**

Guided by the 3-P principle of People-Planet-Profit, Good Energies aims to bring financial success together with sustainable returns for the environment and for society. We seek to help drive the transition to a low-carbon economy, as well as to bring affordable renewable energy to the developing world.

The transition to more renewable sources of energy offers unique challenges and opportunities in each dimension of the “3-P” sustainability principles which guide our investments:

<b>People</b>	<b>Planet</b>	<b>Profit</b>
Poverty alleviation through increased access to affordable renewable energy	Accelerated transition to clean energy resources	Outstanding business opportunities with superior returns

We focus investments in five main areas:

<b>Solar</b>	Up- and downstream solar photovoltaic companies as well as project investments in development, construction and operation of renewable energy assets in solar.
<b>Turbine-Based Renewables</b>	Companies using new technologies or materials for wind energy generation as well as project investments in development, construction and operation of renewable energy assets turbine based renewables such as wind and run of river hydro.
<b>Green Building and Energy Efficiency</b>	Energy efficiency technologies, low carbon building materials and building integrated renewables.
<b>Investments in the Developing World</b>	To assist developing countries by investing in renewable energy and energy efficiency companies which return profits and high social benefits.
<b>Research and Development / Game Changers</b>	Potential breakthrough technologies in renewable energy generation, as well as energy storage and efficiency.

# About Sequoia

## Mission & Values

Establish environmentally appropriate renewable wind [energy](#) developments in the heartland of North America.

Maximize asset growth and shareholder returns with a set of renewable wind energy developments that are [managed responsibly](#).

Advance industry best practices with models of responsibility in environmental impact, stakeholder collaboration, and respect for [community](#).

## Business Excellence in Community: Based Renewable Energy

Sequoia's core business is to develop and manage renewable energy. We are driven by a value to be responsible in everything we do.

The global need for secure and lasting energy is increasing. As these demands increase, the introduction of new sources of environmentally appropriate renewable energy is critical. Sequoia Energy is committed to filling this need - responsibly.

We believe that business excellence must be built on financial strength to secure the future of communities that steward the environment. We also believe the company must continually pursue social responsibility. We value tangible corporate social responsibility outcomes - both in our own work and in our choice of partners.

At Sequoia we develop 'Responsible Renewables' through our commitment to business excellence, community development through environmental leadership and social responsibility.

## Business Excellence

- Consistent financial performance and asset growth
- Shareholder returns
- Do What You Say – 'Walk the Talk'
- Stakeholder responsibility – communities, utilities, customers
- World Class partners and suppliers

## Community Development through Environmental Leadership

- "Community First Approach"
- Support of Community Culture
- Predictable & Achievable Community Income Enhancement
- Soft Impact Practices – farmlands, roadways, re-vegetation
- Best Practice Environmental Planning and Permitting

## Social Responsibility

- Joining community capital to community benefit
- Respect for Host Communities
- Renewable energy education
- Assisting public policy and power grid transitions
- A preferred employer

The SEI commitment to best environmental practices has been reflected in its approach to environmental impact assessment and environmental permitting and licencing.

## Sequoia Energy – The Company

Sequoia Energy Inc. is a renewable energy company that operates in the United States and Canada. Sequoia is focused on large-scale wind energy projects. As a pioneer in developing a “community first approach”, Sequoia has been instrumental in demonstrating that wind energy is a safe, reliable, economically sound and a socially responsible source of energy for North America.

Sequoia prides itself in acting responsibly and collaboratively with key stakeholders. Our goal is to facilitate a smooth introduction of renewable energy into established energy production and transmission networks. We bring new income and economic opportunity to rural areas.

## Community First Approach

### The Right People in the Right Places

Tomorrow’s approach to energy requires finding the right conditions and relationships at a local and regional level which, brought together, create global solutions.

This holistic approach is the key to Sequoia's success and turns on the interplay of five key resources: **land and energy resources; landowners and their community; transmission access; government partners; utilities and consumers.**

### Land and Energy Resources

Generations of North Americans have worked with the gifts and constraints of the land. And the prairie lands of Western Canada and the Midwest United States have done an especially good job of creating some of the strongest winds in the world. We extensively test wind in every proposed wind farm site, erecting meteorological towers that rise 200 feet into the air or use our mobile Sodar system that measures wind up to 900 feet above the land.

## **Landowners and Their Community**

It takes a community to advance renewable energy, which is why we pioneered our "community first approach." We want to ensure that projects fit with how a landowner and a community want their land developed. We carry that philosophy through from early decisions about wind test locations to land lease agreements, co-designed between the community and Sequoia. Every community is unique and every Sequoia wind farm is designed with that in mind since a wind farm will be part of the community for years to come.

## **Transmission Access**

Tomorrow's wind turbines will be taller and more efficient at capturing the wind and turning it into electrons, but moving those electrons from the field to the light bulb above the kitchen table will take careful planning.

We're working diligently to smoothly and carefully introduce renewable energy into established power grids. Over the years, we've cooperated closely with the engineers responsible for creating the very transmission lines we will use. We have spent millions of dollars and will spend millions more to complete interconnection studies and designs, determining where and how new renewable energy can be safely added to the power grid.

## **Government Partners**

Governments have a lot of expectations and Sequoia will meet their requirements, knowing these regulations and policies have been put in place to protect land, wildlife, people and power systems. The first step is a thorough, independent environmental assessment to determine how renewable projects could affect the local flora, fauna and human inhabitants.

Since a wind farm is a new venture for many municipal leaders, we work with them on zoning - pointing them to examples of the best practices we've seen work well for other communities.

We conduct public consultations and work with provincial, state and federal authorities to comply with transportation planning, air safety regulations, land use planning and heritage sites, often with up to dozens of government stakeholders to consider.

## **Utilities and Consumers**

Everyone from consumers to utilities is asking for more green energy – derived from renewable sources like the wind and the sun.

They know, as we do, we must change the way we work and live. Homeowners and businesses are learning to conserve energy. Contractors are creating new energy efficient green buildings. Utilities are leading the way with energy saving incentives, in some cases paying a premium for energy created in an environmentally friendly way.

*"We have farmers and mayors of small towns tell us all the time that they need stable diversified sources of revenues to sustain their roads, schools and arenas."*

Bob Spensley, Managing Director, Community Partnerships, Sequoia Energy Inc.

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**Appendix B**  
**Design Data Report**





## Border Winds Wind Energy Project Rolette and Towner Counties, North Dakota

### DESIGN DATA REPORT

#### Project Overview

- Up to 150 MW Wind Energy Project
- Up to 68 Turbines
- Wind turbine generator model selection will be completed with further project development.
- The project is generically based on the use of typical 2.3 MW or 2.4 MW turbines.
- The North Dakota PSC will receive a more advanced project layout prior to the public hearing and completion of the permitting process.

#### Wind Turbine Generator Specifications

Turbine Manufacturer	To be determined as project advances
Nameplate Capacity	2.3 MW to 2.4 MW
Model Types	To be determined as project advances
Rotor Diameter	70 to 95 meters
Swept Area	5,280 m <sup>2</sup> to 7,090 m <sup>2</sup>
Rotor Speed	6 to 18 rpm
Pitch System	Individual pitch control or Full span pitching
Cut-In Wind Speed	3 to 5 m/s
Cut-Out Wind Speed	25 m/s
Optimum Wind Speed	12 to 14 m/s
Maximum Wind Speed	25 m/s
Tower System	Cylindrical tapered tubular steel
Obstruction Marking and Lighting	Turbine and tower finish color will be light grey. Aviation lighting will be consistent FAA determinations.
Foundations	To be determined following turbine selection
Generator Type	Asynchronous
Rated Power	2,300 to 2,400 kW
Generator Rated Voltage	690 V

#### Associated Facility Specifications

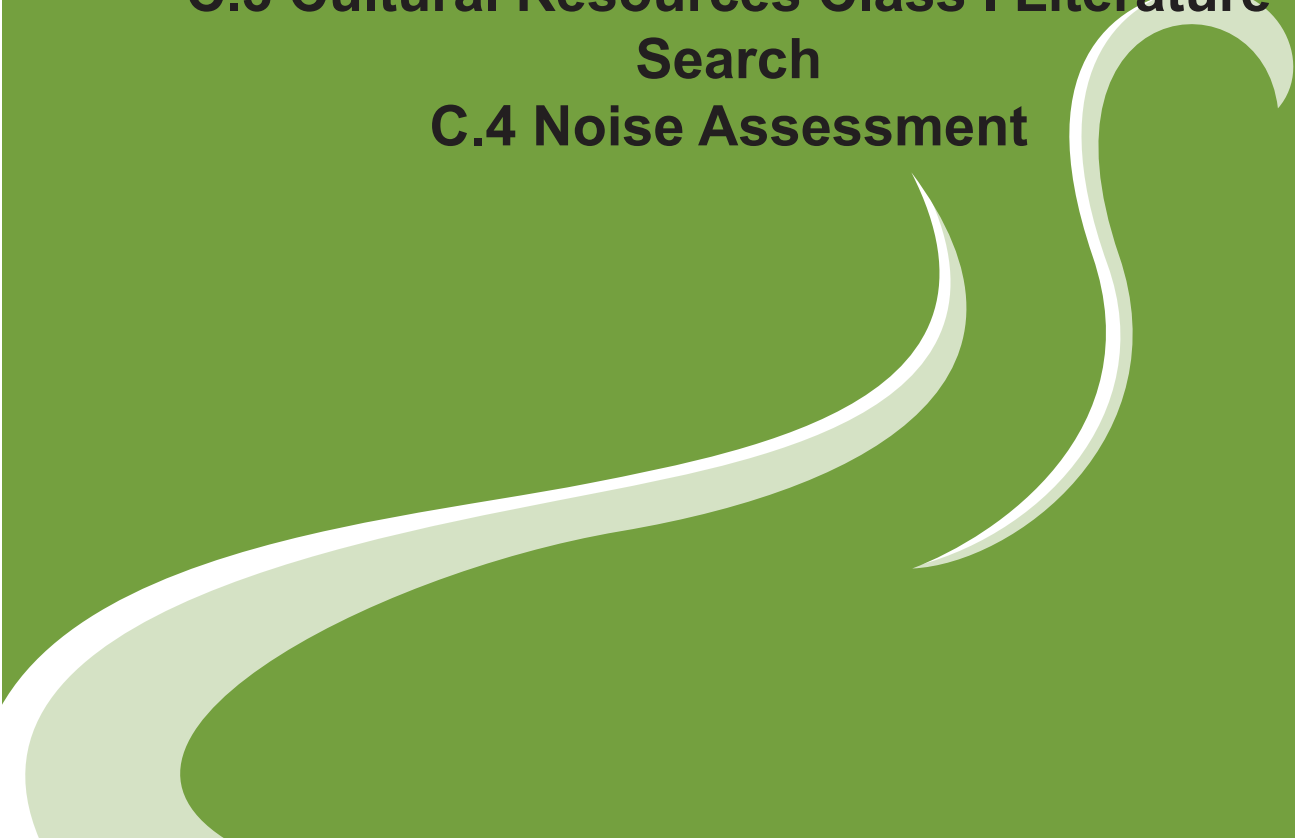
<b>Electrical Collector System</b>	
Construction Type	Multiple circuits of primarily underground cable
Collector System Voltage	34.5 kV
Transformer at Tower Base	34.5 kV/690 V
Construction Method	Trenching
Design Standards	National Electric Safety Cod (NESC)
<b>Substation</b>	
Approximate Land Area	3 to 5 acres
Voltage	230/34.5 kV
Equipment	One 203/34.5 kV transformer, switchgear and control house, circuit breakers, surge arrestors, ring bus
Design Standards	National Electric Safety Code (NESC)
Interconnecting Utility	Xcel Energy
<b>Operations and Maintenance</b>	
Approximate Land Area	5 to 10 acres
Approximate Building Footprint	5,000 ft <sup>2</sup>
Typical Building Layout	SCADA system, office space, restroom, shop, parts room, fenced compound/yard area



## **Appendix C**

### **Project Studies and Assessments**

- C.1 Microwave Interference Study**
- C.2 Avian Study**
- C.3 Cultural Resources Class I Literature Search**
- C.4 Noise Assessment**





**Appendix C.1**  
**Microwave Interference Study**





## Executive Summary – Wind Power GeoPlanner™

### Licensed Microwave Search

Comsearch performed an analysis to evaluate the potential effect of the planned Border Winds project in Rolette County and Towner County, North Dakota on existing non-Federal Government microwave telecom systems.

Comsearch's Wind Power GeoPlanner™ provides a graphical representation of affected microwave paths and provides supporting technical parameters. The microwave path data is overlaid on USGS topographic basemaps.

**Microwave Search Results.** Comsearch identified no microwave paths that intersect the project area (see Figure 1).

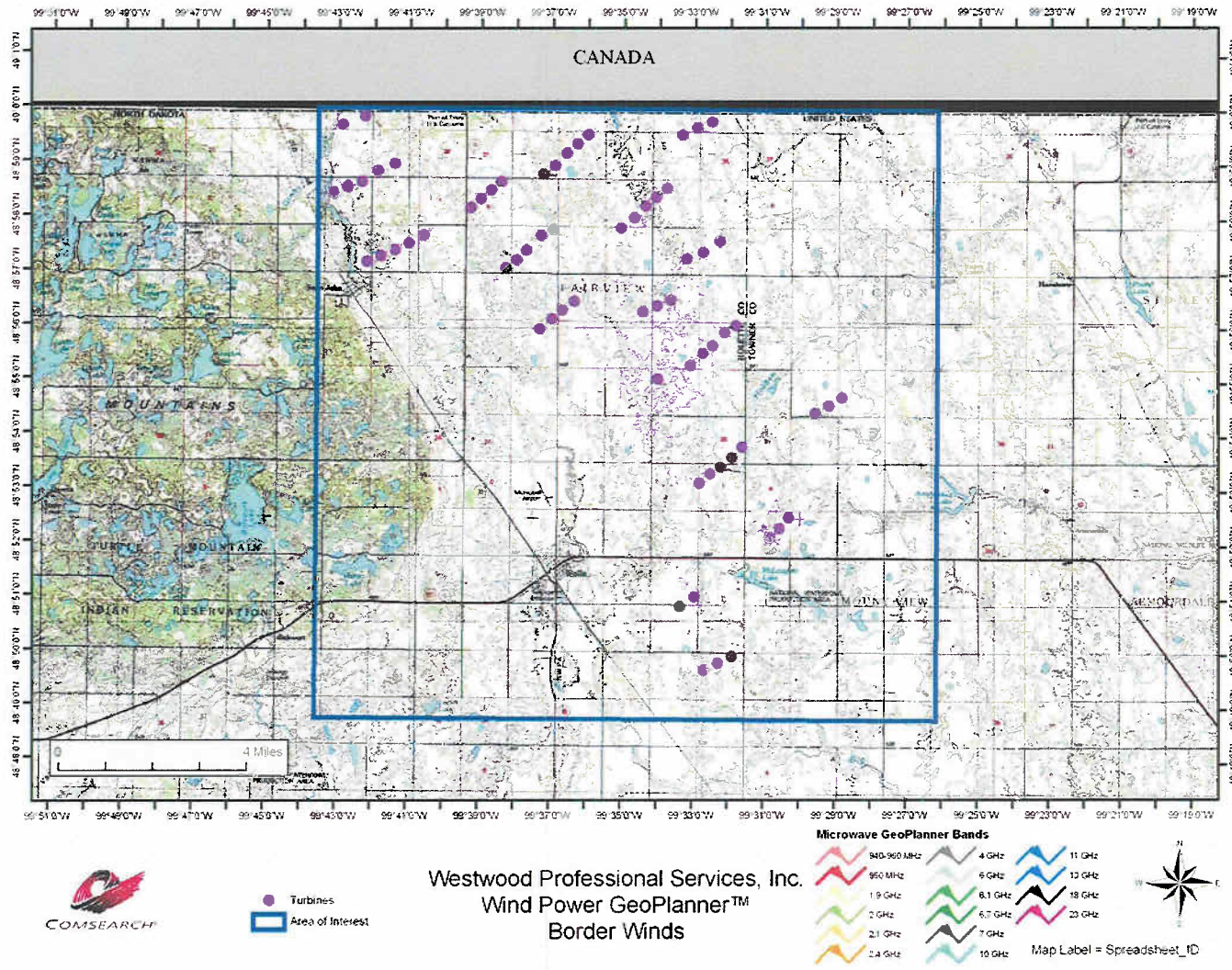
Therefore, none of the proposed turbines will conflict with licensed microwave systems in the frequency bands listed in Figure 1's legend.

**Turbines:** 66 turbines were considered in the analysis, each with a blade diameter of 95 meters. The coordinates provided were in NAD83, which is consistent with the datum of our GeoPlanner™ application.

**Map Projection:** The ESRI® Shapefiles contained in the enclosed GeoPlanner CD are in NAD 83 UTM Zone 14 projected coordinate system.

**Comsearch Contact:**

Denise Finney, Account Manager  
Phone: (703) 726-5650 Fax: (703) 726-5599  
Email: [dfinney@comsearch.com](mailto:dfinney@comsearch.com)



Westwood Professional Services, Inc.  
Wind Power GeoPlanner™  
Border Winds

Figure 1 – Wind Power GeoPlanner™



**Appendix C.2**  
**Avian Study**



# PRE-CONSTRUCTION DESKTOP AVIAN RISK ASSESSMENT BORDER WINDS WIND ENERGY PROJECT

October 23, 2008

## Westwood Professional Services

Robin P. Bouta, CSE, WDC

Sarah M. Stai, PhD, CE

Brie Anderson

Species list compiled by Ron Martin of the North Dakota Birding Society

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## INTRODUCTION

Wind energy provides a renewable alternative to traditional fossil fuels. Wind energy is the fastest growing energy source in the U.S., although it comprised less than 1% of overall energy output in the country just four years ago. Many states are requiring utilities to obtain a portion of their electrical supply from renewable sources, and the wind industry is poised to supply 6% of the American electrical energy market within the next 10 to 15 years (Schwartz 2004). In contrast to wind energy, fossil fuels are a non-renewable source of energy and have adverse environmental effects. Habitat loss, for example, results from surface mining of coal. The burning of fossil fuels results in emission of various harmful substances, including toxic heavy metals, components of acid rain, and greenhouse gases that contribute to global climate change.

While wildlife are among the beneficiaries of reduced mining activity, decreased air and water pollution, and stabilized climate change, animals may also be negatively impacted by wind energy production. Concern about impacts on birds and bats, in particular, has grown as large-scale wind farms have become more common. Local impacts are generally divided into two categories: (1) direct mortality resulting from the collision of birds and bats with rotors, towers, power lines, and related structures; and (2) indirect effects resulting from habitat disruption associated with turbines and access roads (Schwartz 2004, NWCC 2004).

Relatively high bird fatality rates at the Altamont Pass Wind Resource Area in California, dating back to the early 1980s, drew considerable attention to the risk of collision mortality from wind energy facilities. A variety of factors, such as lattice towers, rapid blade movement, and the close proximity of turbines, apparently contributed to the bird mortality levels at Altamont Pass, as did habitat and geographic factors that result in high concentrations of raptors at certain times of year (Schwartz 2004). Several of the turbine designs and layouts used at Altamont Pass are now obsolete, and ongoing studies have been identifying causes of mortality and mitigation measures that aim to reduce mortality at this facility (Smallwood and Thelander 2004).

Post-construction monitoring of “new generation” wind energy facilities has shown a lower impact on avian mortality than observed at Altamont Pass. The NWCC (2004) reported bird fatality estimates of 2.3 birds per turbine per year, or 3.1 per megawatt (MW) per year of capacity, in the U.S. outside of California. These nationwide averages, based on several studies, compare favorably to a recent estimate from Altamont Pass of 8.1 fatalities per MW per year. With data accumulating to show relatively low direct mortality of birds outside of Altamont

Pass, the focus of wind farm assessments has evolved to include review of potential habitat impacts (Schwartz 2004).

## **PURPOSE**

This report assesses the risk of bird mortality and bird habitat impacts related to the Border Winds Wind Energy Project. This report is based on a desktop study supported by a brief windshield survey of the project area. No field surveys or point counts of avian species or diversity were used in this report. This report includes bird species lists, conservation status information, and a summary of relevant literature concerning wind power and birds. Results of coordination with U.S. Fish and Wildlife Service (USFWS) staff and North Dakota Parks and Recreation Department (NDPRD) are provided to address the concerns of wildlife officials relative to birds and key habitats in the project area. This information is used to assess the risk to birds from the proposed Border Winds Energy Project, identify measures that may reduce and mitigate this risk, and address the potential for further desktop analysis and/or an avian field surveys in the project area.

## **METHODS**

### **Study Site and Habitat**

The Border Winds Energy Project encompasses approximately 122 square miles (78,080 acres) and is located immediately south of the Canadian border in Rolette and Towner Counties, North Dakota (Exhibit 1). Land cover mapping for the project area was obtained from the USFWS (USFWS 2001). The predominant land cover in the project area is durum wheat, oats, and other small grains (Exhibit 2). Grasslands and pastures exist in certain areas. Woodlands are limited primarily to farmsteads that are scattered throughout the area, and to the Turtle Mountains, which are located west of the project area.

The majority of wetlands on the Project are palustrine and emergent. Within the project area, there are a total of 11,075 palustrine-type wetlands with a combined area of 6,882 acres. Some of these wetlands are associated with creeks and unnamed intermittent streams and some of the wetlands are isolated basins.

The project area contains lands designated for avian use by the USFWS. These include wetland easement lands and Waterfowl Protection Areas (WPAs). USFWS wetland easements provide habitat for migratory birds by protecting wetlands through easement agreements on privately owned land. The easements prevent conversion of wetlands to uplands through drainage or filling. Within the project area, approximately 13,200 acres of land are enrolled in this program. Waterfowl Production Areas are public lands managed by the USFWS that preserve wetlands and grasslands critical to waterfowl and other wildlife. Approximately 480 acres of land within the project boundary are in this category.

## Species Composition and Conservation Status

Rolette and Towner County Bird Lists were compiled from Ron Martin, President of the North Dakota Birding Society Records Committee. Conservation status of bird species known to occur in these counties were assessed in two ways. First, endangered and threatened species lists were consulted at the federal level (North Dakota does not have a state level threatened and endangered species list). Secondly, the Comprehensive Wildlife Conservation Strategy (CWCS) for North Dakota, known as the Wildlife Action Plan (NDGFD 2008), was reviewed. In exchange for federal funding from the State Wildlife Grants program, states are required to prepare a CWCS plan that identifies Species in Greatest Conservation Need (SGCN) and prioritizes conservation activities.

## RESULTS

### Species Composition

A comprehensive bird list of occurrence for both Rolette and Towner Counties, North Dakota includes 277 species with representation of 47 families in 18 orders (Table 1). Species on the list occur as migrants, breeders, questionable breeders, or extirpated. Species that are known to breed in the Turtle Mountains also exist as migrants on the plains. The most species-rich orders on the list are songbirds (Passeriformes, with 139 species), shorebirds (Charadriiformes, with 39 species), and waterfowl (Anseriformes, with 30 species). Various groups and guilds are represented, including waterbirds (e.g., waterfowl, pelicans, wading birds, and shorebirds), birds of prey (e.g., eagles, hawks, and owls), and an array of forest- and grassland-inhabiting songbirds (e.g., flycatchers, vireos, swallows, wrens, thrushes, warblers, sparrows, blackbirds, and finches).

### Conservation Status

Of the 277 species on the comprehensive bird list for Rolette and Towner Counties, only one species, the Whooping Crane (*Grus americana*), is federally listed. The endangered Whooping Crane may occur in the project area as a migrant, likely utilizing wetlands for roosting and agricultural fields for forage. The bald eagle (*Haliaeetus leucocephalus*) was formerly listed as threatened at the federal level, but it was removed from the endangered species list by the U.S. Department of Interior in 2007. Both the bald eagle and golden eagle (*Aquila chrysaetos*) are currently protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

The bird list for Rolette and Towner Counties includes 38 species having some level of conservation priority according to the North Dakota CWCS (NDGF 2008). Species listed with conservation status on the CWCS include 13 species of waterbirds, 12 species of songbirds, nine raptor species, two species of gamebirds, and one species each of cuckoo and woodpecker. Although species classified as SGCN are not officially listed as threatened or endangered, the

state CWCS has indicated that these species merit conservation efforts. The species are categorized into three levels according to the need to conserve them:

Level I – Species in greatest need of conservation.

Level II – Species in need of conservation, but have had support from other wildlife programs.

Level III – Species in moderate need of conservation, but are believed to be on the edge of their range in North Dakota.

Of the 38 species identified by the North Dakota CWCS and known to occur in Rolette and Towner Counties, 17 are a Level I species of concern, 18 are Level II species of concern, and three are Level III species of concern. Of these 38 species, 31 are known breeders in Rolette and Towner Counties, five are migrants, one is extirpated, and one is a questionable breeder. Nearly all species listed with conservation status according to the North Dakota CWCS are strongly associated with grasslands, wetlands, or woodlands.

Most species known to occur in Rolette and Towner Counties, except for game birds (Galliformes), European starlings, rock pigeons, and house sparrows, are protected by the Migratory Bird Treaty Act (MBTA). According to the USFWS (2003), the MBTA is a “strict liability statute,” meaning that proof of intent to harm or kill a migratory bird is not required for an action to be considered a violation of the MBTA. The USFWS recognizes, however, that some birds may be harmed or killed even if all reasonable measures to avoid these outcomes are implemented. The USFWS, as cited in Schwartz (2004), prefers to take a pro-active partnership approach to the protection of migratory birds, though it will utilize regulations and enforcement when disregard for the law is demonstrated (USFWS 2003). As such, consideration of potential bird impacts from proposed wind energy projects is advised, and involvement of federal and/or state agency wildlife professionals from the pre-development phase onward is recommended (USFWS 2003).

## **AGENCY COMMENTS**

Westwood contacted the USFWS in North Dakota and the NDPRD to obtain comments regarding migratory birds; federally threatened and endangered species; fish and wildlife service property interests; high value habitat avoidance; and research, monitoring, and assessment methods within the project boundary (the State of North Dakota has no endangered species list or endangered species program). The USFWS comment letter identified the Whooping Crane (*Grus americana*) as the only federally listed endangered species likely to occur within the project area. They also identified the invertebrate Dakota Skipper (*Hesperia dacotae*) as a federally listed candidate species.

The North Dakota Parks and Recreation Department (Hanson 2008) reviewed the North Dakota Natural Heritage biological conservation database to determine if any plant or animal species of concern or other significant ecological communities are known to occur within an approximate one-mile radius of the project area. The review yielded several historical occurrences including: *Populus tremuloides/prunus virginiana* woodland (aspen woodland), *Carex spp.* – *Triglochin maritime* – *Eleocharis pauciflora* fen (calcareous fen), *Eleocharis pauciflora* (few-flowered

spikerush), *Andropogon gerardii* – *Schizachyrium scoparium* transition tallgrass prairie (Central mesic tallgrass prairie), *Momotropa uniflora* (Indianpipe), *Potamogeton vaginatus* (sheathed pondweed), and *Dendroica pensylvanica* (chestnut-sided warbler). Because the information obtained from NDPRD is not based on a comprehensive inventory, there may be species of concern or otherwise significant ecological communities in the area that are not represented in the database. The lack of data cannot be construed to mean that no significant features are present, but rather that the project area has not been surveyed.

The USFWS also encouraged project proponents to conduct collision monitoring studies designed to determine the effect of several factors on bird deaths. Factors of interest included site selection, turbine designs, the layout of wind plants, wind plant operations, habitat alteration, and changes in available perching and nesting sites. Recommended guidelines for monitoring methodologies were referenced to the National Wind Coordinating Committee (NWCC). Correspondence from the USFWS and NDPRD is included at the end of this report.

## **DISCUSSION**

### **Risk of Bird Mortality**

In general, wind farm-related bird mortality rates have been considered relatively low when compared to other forms of collision mortality. Bird mortality rates at wind farms in the Upper Midwest have averaged 2.7 birds per turbine per year and 4.2 birds per MW per year (NWCC 2004). Other sources of bird collisions may kill substantially greater numbers of birds than wind farms. The annual number of avian fatalities has been reported as 4-5 million for collisions with communications towers, up to 174 million for power lines, 60-80 million for vehicles, and 98-980 million for buildings and window glass (Erickson et al. 2001).

The rate of bird mortality due to turbine collisions at Border Winds is expected to be similar to bird mortality rates at the Buffalo Ridge wind resource area in southwestern Minnesota. At Buffalo Ridge, where much of the research on turbine-bird interactions has been done in the Upper Midwest, mortality rates have averaged 2.86 birds per turbine per year and 4.21 birds per MW per year (Erickson et al. 2005). Differences in landscape mosaic exist between the two sites, with Buffalo Ridge located amongst mostly corn and soybeans with fewer wetlands. Conversely, Border Winds is located in an area consisting largely of small grains, and including a variety of wetlands. Although the composition of the landscape at Buffalo Ridge and Border Winds differ, the studies from Buffalo Ridge provide the most readily available bird mortality rates due to turbine collisions in a landscape reasonably comparable to Border Winds.

Whooping crane migration stopover habitat represents the most critical habitat resource for whooping cranes in North Dakota. The Border Winds project lies at the eastern edge of a 200-mile-wide whooping crane migration corridor that was mapped in 2005. When evaluated more precisely based on more recent data, the Border Winds project lies about 12 miles outside the 180-mile-wide migration corridor that includes 95% of validated whooping crane observations, and approximately 100 miles outside the central portion of the migrations corridor, which includes 50% of the validated whooping crane sightings since 1943. October and April are the two most likely months for whooping cranes to stop in the project area during migration.

## **Risk of Habitat Disruption**

Some studies have shown that densities of songbirds and other species decrease with increasing proximity to turbines and auxiliary structures (Howe and Atwater 1999, NWCC 2004). At the Top of Iowa Wind Farm, Jain (2005) found that birds in flight tended to avoid turbines during fall, but there was no difference in the use of airspace near and away from turbines by birds in flight during summer. Similarly, the use of fields by Canada geese (*Branta canadensis*) did not vary between fields with and without turbines. The potential for habitat avoidance by birds is highly variable, depending on the species under consideration, seasonal and annual variation in weather and migration routes, and local and individual behavior patterns. Ongoing research is addressing a multitude of factors that will contribute to our understanding of wind power-avian interactions, including the impacts of facility lighting on nocturnal migration, the role of weather events, and turbine size, design, and layout (NWCC 2004).

## **Habitat Suitability and Geographic Considerations**

The predominance of agricultural land use in the project area suggests that limited areas have substantial habitat value for avian species of concern. The avian species richness in agricultural fields is characteristically low relative to native habitats such as grasslands, woodlands, and wetlands. Avoidance of native habitats is recommended when siting turbines to minimize impacts on resident and breeding birds.

A site's proximity to migration pathways is a consideration when evaluating the potential impacts of wind energy development on bird populations. The Border Winds Energy Project is located near the eastern edge of the Central Flyway, one of four migratory flyways spanning the continent. Flyways are broad geographic belts in which numerous migration routes for different species overlap. Given the largely conceptual nature of flyways, and the complexity of bird migration patterns, impacts to the migration of particular species are difficult to predict (Lincoln et al. 1998) and are probably best approached at a continental scale (Schwartz 2004).

On a more local scale, the Border Winds project area is located immediately east of the Turtle Mountains. This area is characterized by woodlands and intermittent areas of grassland and wetland. The transition zone between the woodlands of the Turtle Mountains and predominant cropland of the project area has the potential for the highest species diversity. With 11,075 wetlands of seven types defined by the USFWS National Wetlands Inventory in the project area, the USFWS has recognized the importance of these lands to both breeding and migratory birds and taken measures to protect wetland habitats through the wetland easement program and WPAs. The USFWS has jurisdiction of nearly one-fifth of the lands within the project boundary. Specific conclusions regarding the potential for local impacts of wind energy development on migratory birds at the Border Winds Energy Project would require additional analysis.

## Potential Future Field Surveys

Wildlife agency recommendations for future field surveys are being considered, but such surveys would be voluntary and a commitment to complete such surveys on Border Winds has not yet been made. Only the NDPRD specifically recommended pre-construction field surveys of avian and bat abundance or diversity.

Both the NDPRD and the USFWS recommended post-construction monitoring of project-related avian mortality. Post-construction monitoring of birds and bats would be voluntary. Even though the project will not likely require permits with conditions that may dictate post-construction monitoring, concerns regarding birds, bats, and wind power are not likely to subside. Wildlife agencies and non-governmental organizations will continue to express concerns regarding avian mortality and impacts on habitats and populations.

## USFWS Guidelines for Wind Energy Development

USFWS (2003) provided an interim set of guidelines for wind energy site development. These guidelines are provided below in condensed form, and tailored to the known features of the Border Winds Energy Project where appropriate.

1. Avoid placement of turbines in documented locations of endangered species, if the project boundaries at the site are altered in the future to include such locations.
2. Avoid placement of turbines in known local bird migration pathways, in daily movement flyways, areas with a high incidence of fog, mist, low cloud ceilings, and low visibility, or areas of high concentration, such as:
3. Although this report focused on birds, it should be noted that placement of turbines near bat colonies, migration corridors, or flight paths should be avoided.
4. Avoidance of turbine placement in areas known to attract raptors, such as cliff/rim edges, may not apply, given the topography at the site.
5. Configure turbine arrays to avoid potential avian mortality where feasible, e.g.:
  - group turbines instead of spreading them widely;
  - orient rows of turbines parallel to known bird movements; and
  - implement storm water management practices that do not attract birds.
6. Place turbines on lands already altered or cultivated, as is most of the land at the site.
7. Maintain contiguous habitat for area-sensitive species such as prairie grouse and/or their leks, if any are found to occur in future surveys or upon subsequent consultation with federal and/or state agency wildlife professionals.
8. Minimize roads, fences, and other infrastructure, and design infrastructure to withstand periodic burning of vegetation.
9. Develop a habitat restoration plan for the proposed site that avoids or minimizes negative impacts on vulnerable wildlife while maintaining or enhancing habitat values for other species. Avoid attracting high densities of prey animals, such as rodents and rabbits, used by raptors, beyond that which occurs in existing cropland.
10. Reduce availability of carrion by practicing responsible animal husbandry (e.g., removing carcasses, fencing out cattle, etc.) to avoid attracting raptors and other scavenger species.

Specific turbine design and operation recommendations are also contained in USFWS (2003). These recommendations are not reproduced here, since they generally apply as written to modern wind farms. The USFWS guidelines are voluntary, but their voluntary nature does not limit the USFWS from taking regulatory or enforcement action if necessary and appropriate. Furthermore, the guidelines are not all-inclusive. The USFWS sometimes provides additional recommendations that are specific to the geographic area of site development. The potential for specific recommendations highlights the need for involvement of federal and state agency staff during the early stages of wind energy planning. Agency recommendations that are specific to the Border Winds Energy Project are discussed in the sections of this report titled Agency Comments and Potential Future Field Surveys. Copies of NDPRD and USFWS correspondence are attached to the end of this report.

## **Conclusions**

Based on a review of bird species lists, species conservation status, land cover mapping, agency correspondence, and relevant literature, Westwood concludes that:

1. The predominant land cover in the Border Winds Energy Project area is durum wheat, oats, and other small grains. Native habitats that fulfill specific requirements for rare avian species are relatively uncommon in the project area, and are mostly limited to wetlands.
2. It is likely that many of the grassland breeding bird species identified on the CWCS with occurrence in Rolette and Towner Counties have a low probability of nesting within the project area. Durum wheat, oats, and other small grains are not favorable nesting habitat for these species.
3. There are nearly 12,000 mapped wetlands within the project boundary that water birds could use. Impacts to this habitat will be avoided to the extent practical. No turbines or access roads will affect USFWS WPAs.
4. The risk of direct mortality to birds at the Border Winds Energy Project due to collisions with wind turbines is estimated to be relatively low, comparable to that found during post-construction bird mortality studies at other wind farms in southwestern Minnesota. On the basis of relevant literature, bird mortality due to collisions is expected to be within the range of 2.8 to 4.2 birds per MW per year.
5. Although some habitat displacement may occur for birds as a result of wind farm construction and operation, the degree of displacement varies according to multiple factors. Assuming that most turbines will be sited in crop fields where durum wheat, oats, and other small grains are traditionally grown, the risk of substantial impacts to avian habitat use is expected to be relatively low.

## **Recommendations**

Based on the information reviewed and presented in the development of this report, Westwood provides the following recommendations for consideration:

1. Turbines should be sited to avoid grasslands and wetlands to the extent practicable. Positioning turbines in cropland, away from grasslands and wetlands, is expected to help mitigate the potential for bird mortality.

2. Electrical collection cables in the project area should be underground wherever practicable. Above ground transmission lines and substations should be designed and insulated to prevent electrocutions in a manner consistent with the design and specification guidelines provided by the Avian Power Line Interaction Committee (APLIC 2006) and the guidelines for developing an Avian Protection Plan (APLIC and USFWS 2005).
3. Use of guy wires should be avoided on permanent meteorological towers wherever possible to minimize the potential for bird mortality.

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**Table 1**  
**Bird List for Rolette and Towner Counties**

<b>ORDER</b>	<b>FAMILY</b>	<i>Genus</i>	<i>Species</i>	<b>Common Name</b>	<b>Occurence</b>	<b>Conservation Status</b>
<b>ANSERIFORMES</b>						
	ANATIDAE	<i>Aix</i>	<i>sponsa</i>	Wood Duck	B	
		<i>Anas</i>	<i>acuta</i>	Northern Pintail	B	II
		<i>Anas</i>	<i>americana</i>	American Wigeon	B	
		<i>Anas</i>	<i>clypeata</i>	Northern Shoveler	B	
		<i>Anas</i>	<i>crecca</i>	Green-winged Teal	B	
		<i>Anas</i>	<i>cyanoptera</i>	Cinnamon Teal	M	
		<i>Anas</i>	<i>discors</i>	Blue-winged Teal	B	
		<i>Anas</i>	<i>platyrhynchos</i>	Mallard	B	
		<i>Anas</i>	<i>strepera</i>	Gadwall	B	
		<i>Anser</i>	<i>albifrons</i>	Greater White-fronted Goose	M	
		<i>Aythya</i>	<i>affinis</i>	Lesser Scaup	B	
		<i>Aythya</i>	<i>americana</i>	Redhead	B	II
		<i>Aythya</i>	<i>collaris</i>	Ring-necked Duck	B	
		<i>Aythya</i>	<i>marila</i>	Greater Scaup	M	
		<i>Aythya</i>	<i>valisineria</i>	Canvasback	B	
		<i>Branta</i>	<i>bernicla</i>	Brant	M	
		<i>Branta</i>	<i>canadensis</i>	Canada Goose	B	
		<i>Branta</i>	<i>hutchinsii</i>	Cackling Goose	M	
		<i>Bucephala</i>	<i>albeola</i>	Bufflehead	B-TM	
		<i>Bucephala</i>	<i>clangula</i>	Common Goldeneye	B-TM	
		<i>Chen</i>	<i>caerulescens</i>	Snow Goose	M	
		<i>Chen</i>	<i>rossii</i>	Ross's Goose	M	
		<i>Cygnus</i>	<i>buccinator</i>	Trumpeter Swan	M	
		<i>Cygnus</i>	<i>columbianus</i>	Tundra Swan	M	
		<i>Lophodytes</i>	<i>cucullatus</i>	Hooded Merganser	B	
		<i>Melanitta</i>	<i>fusca</i>	White-winged Scoter	M	
		<i>Melanitta</i>	<i>perspicillata</i>	Surf Scoter	M	
		<i>Mergus</i>	<i>merganser</i>	Common Merganser	M	
		<i>Mergus</i>	<i>serrator</i>	Red-breasted Merganser	M	
		<i>Oxyura</i>	<i>jamaicensis</i>	Ruddy Duck	B	
<b>APODIFORMES</b>						
	APODIDAE	<i>Chaetura</i>	<i>pelagica</i>	Chimney Swift	B	
<b>APODIFORMES</b>						
	TROCHILIDAE	<i>Archilochus</i>	<i>colubris</i>	Ruby-throated Hummingbird	B	
<b>CAPRIMULGIFORMES</b>						
	CAPRIMULGIDAE	<i>Chordeiles</i>	<i>minor</i>	Common Nighthawk	B	
<b>CHARADRIIFORMES</b>						

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	CHARADRIIDAE	<i>Charadrius</i>	<i>melodus</i>	Piping Plover	B?	II
		<i>Charadrius</i>	<i>semipalmatus</i>	Semipalmated Plover	M	
		<i>Charadrius</i>	<i>vociferus</i>	Killdeer	M	
		<i>Pluvialis</i>	<i>dominica</i>	American Golden-Plover	M	
		<i>Pluvialis</i>	<i>squatarola</i>	Black-bellied Plover	M	
	LARIDAE	<i>Chlidonias</i>	<i>niger</i>	Black Tern	B	I
		<i>Larus</i>	<i>argentatus</i>	Herring Gull	M	
		<i>Larus</i>	<i>californicus</i>	California Gull	B	
		<i>Larus</i>	<i>delawarensis</i>	Ring-billed Gull	B	
		<i>Larus</i>	<i>philadelphia</i>	Bonaparte's Gull	M	
		<i>Larus</i>	<i>pipixcan</i>	Franklin's Gull	B	I
		<i>Sterna</i>	<i>caspia</i>	Caspian Tern	M	
		<i>Sterna</i>	<i>forsteri</i>	Forster's Tern	B	
		<i>Sterna</i>	<i>hirundo</i>	Common Tern	B	
	RECURVIROSTRIDAE	<i>Himantopus</i>	<i>mexicanus</i>	Black-necked Stilt	M	
		<i>Recurvirostra</i>	<i>americana</i>	American Avocet	B	II
	SCOLOPACIDAE	<i>Arenaria</i>	<i>interpres</i>	Ruddy Turnstone	M	
		<i>Calidris</i>	<i>alba</i>	Sanderling	M	
		<i>Calidris</i>	<i>alpina</i>	Dunlin	M	
		<i>Calidris</i>	<i>bairdii</i>	Baird's Sandpiper	M	
		<i>Calidris</i>	<i>fuscicollis</i>	White-rumped Sandpiper	M	
		<i>Calidris</i>	<i>himantopus</i>	Stilt Sandpiper	M	
		<i>Calidris</i>	<i>mauri</i>	Western Sandpiper	M	
		<i>Calidris</i>	<i>melanotos</i>	Pectoral Sandpiper	M	
		<i>Calidris</i>	<i>minutilla</i>	Least Sandpiper	M	
		<i>Calidris</i>	<i>pusilla</i>	Semipalmated Sandpiper	M	
		<i>Gallinago</i>	<i>delicata</i>	Wilson's Snipe	B	
		<i>Limosa</i>	<i>fedoa</i>	Marbled Godwit	B	I
		<i>Limosa</i>	<i>haemastica</i>	Hudsonian Godwit	M	
		<i>Limnodramus</i>	<i>griseus</i>	Short-billed Dowitcher	M	
		<i>Limnodromus</i>	<i>scolopaceus</i>	Long-billed Dowitcher	M	
		<i>Phalaropus</i>	<i>fulicarius</i>	Red Phalarope	M	
		<i>Phalaropus</i>	<i>lobatus</i>	Red-necked Phalarope	M	
		<i>Phalaropus</i>	<i>tricolor</i>	Wilson's Phalarope	B	I
		<i>Scolopax</i>	<i>minor</i>	American Woodcock	B?	
		<i>Tringa</i>	<i>flavipes</i>	Lesser Yellowlegs	M	
		<i>Tringa</i>	<i>melanoleuca</i>	Greater Yellowlegs	M	

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		<i>Tringa</i>	<i>solitaria</i>	Solitary Sandpiper	M	
		<i>Tryngites</i>	<i>subruficollis</i>	Buff-breasted Sandpiper	M	
CICONIIFORMES						
	ARDEIDAE	<i>Ardea</i>	<i>alba</i>	Great Egret	B	
		<i>Ardea</i>	<i>herodias</i>	Great Blue Heron	B	
		<i>Botaurus</i>	<i>lentiginosus</i>	American Bittern	B	I
		<i>Bubulcus</i>	<i>ibis</i>	Cattle Egret	B	
		<i>Egretta</i>	<i>thula</i>	Snowy Egret	B	
		<i>Egretta</i>	<i>tricolor</i>	Tricolored Heron	M	
		<i>Nycticorax</i>	<i>nycticorax</i>	Black-crowned Night-Heron	B	
	CATHARTIDAE	<i>Cathartes</i>	<i>aura</i>	Turkey Vulture	B	
	THRESKIORNITHIDAE	<i>Plegadis</i>	<i>chihi</i>	White-faced Ibis	B	
COLUMBIFORMES						
	COLUMBIDAE	<i>Columba</i>	<i>livia</i>	Rock Pigeon	B	
		<i>Streptopelia</i>	<i>decaocto</i>	Eurasian Collared-Dove	B	
		<i>Zenaida</i>	<i>macroura</i>	Mourning Dove	B	
CORACIIFORMES						
	ALCEDINIDAE	<i>Ceryle</i>	<i>alcyon</i>	Belted Kingfisher	B	
CUCULIFORMES						
	CUCULIDAE	<i>Coccyzus</i>	<i>erythrophthalmus</i>	Black-billed Cuckoo	B	I
FALCONIFORMES						
	ACCIPITRIDAE	<i>Accipiter</i>	<i>cooperii</i>	Cooper's Hawk	B	
		<i>Accipiter</i>	<i>gentilis</i>	Northern Goshawk	M	
		<i>Accipiter</i>	<i>striatus</i>	Sharp-shinned Hawk	B-TM	
		<i>Aquila</i>	<i>chrysaetos</i>	Golden Eagle	M	II
		<i>Buteo</i>	<i>jamaicensis</i>	Red-tailed Hawk	B	
		<i>Buteo</i>	<i>lagopus</i>	Rough-legged Hawk	M	
		<i>Buteo</i>	<i>platypterus</i>	Broad-winged Hawk	B-TM	
		<i>Buteo</i>	<i>regalis</i>	Ferruginous Hawk	B	I
		<i>Buteo</i>	<i>swainsoni</i>	Sawinson's Hawk	B	I
		<i>Circus</i>	<i>cyaneus</i>	Northern Harrier	B	II
		<i>Haliaeetus</i>	<i>leucocephalus</i>	Bald Eagle	B	II
		<i>Pandion</i>	<i>Haliaeetus</i>	Osprey	M	
	FALCONIDAE	<i>Falco</i>	<i>columbarius</i>	Merlin	B	
		<i>Falco</i>	<i>mexicanus</i>	Prairie Falcon	M	II
		<i>Falco</i>	<i>peregrinus</i>	Peregrine Falcon	M	III
		<i>Falco</i>	<i>rusticolus</i>	Gyr Falcon	M	
		<i>Falco</i>	<i>sparverius</i>	American Kestrel	B	

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GALIFORMES						
	PHASIANIDAE	<i>Bonasa</i>	<i>umbellus</i>	Ruffed Grouse	B-TM	
		<i>Meleagris</i>	<i>gallopavo</i>	Wild Turkey	B	
		<i>Perdix</i>	<i>perdix</i>	Gray Partridge	B	
		<i>Phasianus</i>	<i>colchicus</i>	Ring-necked Pheasant	B	
		<i>Tympanuchus</i>	<i>cupido</i>	Greater Prairie-Chicken	EX	II
		<i>Tympanuchus</i>	<i>phasianellus</i>	Sharp-tailed Grouse	B	II
GAVIIFORMES						
	GAVIIDAE	<i>Gavia</i>	<i>immer</i>	Common Loon	B-TM	
GRUIFORMES						
	GRUIDAE	<i>Grus</i>	<i>americana</i>	Whooping Crane	M	III; *
		<i>Grus</i>	<i>canadensis</i>	Sandhill Crane	M	
	RALLIDAE	<i>Coturnicops</i>	<i>noveboracensis</i>	Yellow Rail	B	I
		<i>Fulica</i>	<i>americana</i>	American Coot	B	
		<i>Porzana</i>	<i>carolina</i>	Sora	B	
		<i>Rallus</i>	<i>limicola</i>	Virginia Rail	B	
PASSERIFORMES						
	ALAUDIDAE	<i>Eremophila</i>	<i>alpestris</i>	Horned Lark	B	
	BOMBYCILLIDAE	<i>Bombycilla</i>	<i>cedrorum</i>	Cedar Waxwing	B	
		<i>Bombycilla</i>	<i>garrulus</i>	Bohemian Waxwing	M	
	CARDINALIDAE	<i>Cardinalis</i>	<i>cardinalis</i>	Northern Cardinal	M	
		<i>Passerina</i>	<i>cyanea</i>	Indigo Bunting	B	
		<i>Pheucticus</i>	<i>ludovicianus</i>	Rose-breasted Grosbeak	B	
		<i>Spiza</i>	<i>americana</i>	Dickcissel	B	II
	CERTHIIDAE	<i>Verthia</i>	<i>americana</i>	Brown Creeper	M	
	CORVIDAE	<i>Corvus</i>	<i>brachyrhynchos</i>	American Crow	B	
		<i>Corvus</i>	<i>corax</i>	Common Raven	B	
		<i>Cyanocitta</i>	<i>cristata</i>	Blue Jay	B	
		<i>Perisoreus</i>	<i>canadensis</i>	Gray Jay	M	
		<i>Pica</i>	<i>hudsonia</i>	Black-billed Magpie	B	
	EMBERIZIDAE	<i>Ammodramus</i>	<i>bairdii</i>	Baird's Sparrow	B	I
		<i>Ammodramus</i>	<i>leconteii</i>	Le Conte's Sparrow	B	II
		<i>Ammodramus</i>	<i>nelsoni</i>	Nelson's Sharp-tailed Sparrow	B	I
		<i>Ammodramus</i>	<i>savannarum</i>	Grasshopper Sparrow	B	I
		<i>Calcarius</i>	<i>lapponicus</i>	Lapland Longspur	M	
		<i>Calcarius</i>	<i>mccownii</i>	McCown's Longspur	M	III
		<i>Calcarius</i>	<i>ornatus</i>	Chestnut-collared Longspur	B	I
		<i>Calcarius</i>	<i>pictus</i>	Smith's Longspur	M	

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		<i>Calmospiza</i>	<i>melanocorys</i>	Lark Bunting	B	I
		<i>Chondestes</i>	<i>grammacus</i>	Lark Sparrow	B	
		<i>Junco</i>	<i>hyemalis</i>	Dark-eyed Junco	M	
		<i>Melospiza</i>	<i>georgiana</i>	Swamp Sparrow	B	
		<i>Melospiza</i>	<i>lincolnii</i>	Lincoln's Sparrow	M	
		<i>Melospiza</i>	<i>melodia</i>	Song Sparrow	B	
		<i>Passerculus</i>	<i>sandwichensis</i>	Savannah Sparrow	B	
		<i>Passerella</i>	<i>iliaca</i>	Fox Sparrow	M	
		<i>Pipilo</i>	<i>erythrophthalmus</i>	Eastern Towhee	B	
		<i>Pipilo</i>	<i>maculatus</i>	Spotted Towhee	B	
		<i>Plectrophenax</i>	<i>nivalis</i>	Snow Bunting	M	
		<i>Poocetes</i>	<i>gramineus</i>	Vesper Sparrow	B	
		<i>Spizella</i>	<i>arborea</i>	American Tree Sparrow	M	
		<i>Spizella</i>	<i>pallida</i>	Clay-colored Sparrow	B	
		<i>Spizella</i>	<i>passerina</i>	Chipping Sparrow	B	
		<i>Spizella</i>	<i>pusilla</i>	Field Sparrow	M	
		<i>Zonotrichia</i>	<i>albicollis</i>	White-throated Sparrow	B-TM	
		<i>Zonotrichia</i>	<i>leucophrys</i>	White-crowned Sparrow	M	
		<i>Zonotrichia</i>	<i>querula</i>	Harris's Sparrow	M	
	FRINGILLIDAE	<i>Carduelis</i>	<i>flammea</i>	Common Redpoll	M	
		<i>Carduelis</i>	<i>hornemanni</i>	Hoary Redpoll	M	
		<i>Carduelis</i>	<i>pinus</i>	Pine Siskin	B	
		<i>Carduelis</i>	<i>tristis</i>	American Goldfinch	B	
		<i>Carpodacus</i>	<i>mexicanus</i>	House Finch	B	
		<i>Carpodacus</i>	<i>purpureus</i>	Purple Finch	B-TM	
		<i>Coccothraustes</i>	<i>vespertinus</i>	Evening Grosbeak	M	
		<i>Loxia</i>	<i>curvirostra</i>	Red Crossbill	B	
		<i>Loxia</i>	<i>leucoptera</i>	White-winged Crossbill	B	
		<i>Pinicola</i>	<i>enucleator</i>	Pine Grosbeak	M	
	HIRUNDINDAE	<i>Hirundo</i>	<i>rustica</i>	Barn Swallow	B	
		<i>Petrochelidon</i>	<i>pyrrhonota</i>	Cliff Swallow	B	
		<i>Progne</i>	<i>subis</i>	Purple Martin	B	
		<i>Riparia</i>	<i>riparia</i>	Bank Swallow	B	
		<i>Stelgidopteryx</i>	<i>serripennis</i>	Northern Rough-winged Swallow	B	
		<i>Tachycineta</i>	<i>bicolor</i>	Tree Swallow	B	
	ICTERIDAE	<i>Agelaius</i>	<i>phoeniceus</i>	Red-winged Blackbird	B	
		<i>Dolichonyx</i>	<i>oryzivorus</i>	Bobolink	B	II
		<i>Euphagus</i>	<i>carolinus</i>	Rusty Blackbird	M	

Occurrence - M = Migrant; B = Breeder; TM = Turtle Mountains; EX = Extirpated  
Conservation Status from North Dakota Comprehensive Wildlife Conservation Strategy

\* The Whooping Crane is federally endangered

**Table 1**  
**Bird List for Rolette and Towner Counties**

ORDER	FAMILY	Genus	Species	Common Name	Occurrence	Conservation Status
		<i>Euphagus</i>	<i>cyanocephalus</i>	Brewer's Blackbird	B	
		<i>Icterus</i>	<i>galbula</i>	Baltimore Oriole	B	
		<i>Icterus</i>	<i>spurius</i>	Orchard Oriole	B	
		<i>Molothrus</i>	<i>ater</i>	Brown-headed Cowbird	B	
		<i>Quiscalus</i>	<i>quiscula</i>	Common Grackle	B	
		<i>Sturnella</i>	<i>neglecta</i>	Western Meadowlark	B	
		<i>Xanthocephalus</i>	<i>xanthocephalus</i>	Yellow-headed Blackbird	B	
	LANIIDAE	<i>Lanius</i>	<i>excubitor</i>	Northern Shrike	M	
		<i>Lanius</i>	<i>ludovicianus</i>	Loggerhead Shrike	B	II
	MIMIDAE	<i>Dumetella</i>	<i>carolinensis</i>	Gray Catbird	B	
		<i>Mimus</i>	<i>polyglottos</i>	Northern Mockingbird	M	
		<i>Toxostoma</i>	<i>rufum</i>	Brown Thrasher	B	
	MOTACILLIDAE	<i>Anthus</i>	<i>rubescens</i>	American Pipit	M	
		<i>Anthus</i>	<i>spragueii</i>	Sprague's Pipit	B	I
	PARIDAE	<i>Poecile</i>	<i>atricapillus</i>	Black-capped Chickadee	B	
		<i>Poecile</i>	<i>hudsonica</i>	Boreal Chickadee	M	
	PARULIDAE	<i>Dendroica</i>	<i>castanea</i>	Bay-breasted Warbler	M	
		<i>Dendroica</i>	<i>coronata</i>	Yellow-rumped Warbler	B-TM	
		<i>Dendroica</i>	<i>fusca</i>	Blackburnian Warbler	M	
		<i>Dendroica</i>	<i>magnolia</i>	Magnolia Warbler	M	
		<i>Dendroica</i>	<i>palmarum</i>	Palm Warbler	M	
		<i>Dendroica</i>	<i>pensylvanica</i>	Chestnut-sided Warbler	B-TM	
		<i>Dendroica</i>	<i>petechia</i>	Yellow Warbler	B	
		<i>Dendroica</i>	<i>striata</i>	Blackpoll Warbler	M	
		<i>Dendroica</i>	<i>tigrina</i>	Cape May Warbler	M	
		<i>Dendroica</i>	<i>virens</i>	Black-throated Green Warbler	M	
		<i>Geothlypis</i>	<i>trichas</i>	Common Yellowthroat	B	
		<i>Mniotilta</i>	<i>varia</i>	Black-and-White Warbler	B-TM	
		<i>Oporornis</i>	<i>agilis</i>	Connecticut Warbler	M	
		<i>Oporornis</i>	<i>philadelphia</i>	Mourning Warbler	B-TM	
		<i>Parula</i>	<i>americana</i>	Northern Parula	M	
		<i>Seiurus</i>	<i>aurocapilla</i>	Ovenbird	B-TM	
		<i>Seiurus</i>	<i>noveboracensis</i>	Northern Waterthrush	B-TM	
		<i>Setophaga</i>	<i>ruticillia</i>	American Redstart	B-TM	
		<i>Vermivora</i>	<i>celata</i>	Orange-crowned Warbler	B	
		<i>Vermivora</i>	<i>peregrina</i>	Tennessee Warbler	M	
		<i>Vermivora</i>	<i>ruficapilla</i>	Nashville Warbler	M	

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**Table 1**  
**Bird List for Rolette and Towner Counties**

ORDER	FAMILY	Genus	Species	Common Name	Occurrence	Conservation Status
		<i>Wilsonia</i>	<i>canadensis</i>	Canada Warbler	M	
		<i>Wilsonia</i>	<i>pusilla</i>	Wilson's Warbler	M	
	PASSERIDAE	<i>Passer</i>	<i>domesticus</i>	House Sparrow	B	
	REGULIDAE	<i>Regulus</i>	<i>calendula</i>	Ruby-crowned Kinglet	M	
		<i>Regulus</i>	<i>satrapa</i>	Golden-crowned Kinglet	M	
	SITTIDAE	<i>Sitta</i>	<i>canadensis</i>	Red-breasted Nuthatch	B	
		<i>Sitta</i>	<i>carolinensis</i>	White-breasted Nuthatch	B	
	STURNIDAE	<i>Sturnus</i>	<i>vulgaris</i>	European Starling	B	
	THRAUPIDAE	<i>Piranga</i>	<i>olivacea</i>	Scarlet Tanager	M	
	TROGLODYTIDAE	<i>Cistothorus</i>	<i>palustris</i>	Marsh Wren	B	
		<i>Cistothorus</i>	<i>platensis</i>	Sedge Wren	B	II
		<i>Salpinctes</i>	<i>obsoletus</i>	Rock Wren	M	
		<i>Troglodytes</i>	<i>aedon</i>	House Wren	B	
		<i>Troglodytes</i>	<i>troglodytes</i>	Winter Wren	M	
	TURDIDAE	<i>Catharus</i>	<i>fuscescens</i>	Veery	B	
		<i>Catharus</i>	<i>guttatus</i>	Hermit Thrush	M	
		<i>Catharus</i>	<i>minimus</i>	Gray-cheeked Thrush	M	
		<i>Catharus</i>	<i>ustulatus</i>	Swainson's Thrush	M	
		<i>Ixoreus</i>	<i>naevius</i>	Varied Thrush	M	
		<i>Myadestes</i>	<i>townsendi</i>	Townsend's Solitaire	M	
		<i>Sialia</i>	<i>currucoides</i>	Mountain Bluebird	B	
		<i>Sialia</i>	<i>sialis</i>	Eastern Bluebird	B	
		<i>Turdus</i>	<i>migratorius</i>	American Robin	B	
	TYRANNIDAE	<i>Contopus</i>	<i>cooperi</i>	Olive-sided Flycatcher	M	
		<i>Contopus</i>	<i>virens</i>	Eastern Wood-Pewee	B	
		<i>Empidonax</i>	<i>alorum</i>	Alder Flycatcher	B	
		<i>Empidonax</i>	<i>flaviventris</i>	Yellow-bellied Flycatcher	M	
		<i>Empidonax</i>	<i>minimus</i>	Least Flycatcher	B	
		<i>Empidonax</i>	<i>traillii</i>	Willow Flycatcher	B	
		<i>Myiarchus</i>	<i>crinitus</i>	Great Crested Flycatcher	B	
		<i>Sayornis</i>	<i>phoebe</i>	Eastern Phoebe	B	
		<i>Sayornis</i>	<i>saya</i>	Say's Phoebe	B	
		<i>Tyrannus</i>	<i>tyrannus</i>	Eastern Kingbird	B	
		<i>Tyrannus</i>	<i>verticalis</i>	Western Kingbird	B	
	VIREONIDAE	<i>Vireo</i>	<i>flavifrons</i>	Yellow-throated Vireo	B	
		<i>Vireo</i>	<i>gilvus</i>	Warbling Vireo	B	
		<i>Vireo</i>	<i>olivaceus</i>	Red-eyed Vireo	B	
		<i>Vireo</i>	<i>philadelphicus</i>	Philadelphia Vireo	B	

Occurrence - M = Migrant; B = Breeder; TM = Turtle Mountains; EX = Extirpated  
Conservation Status from North Dakota Comprehensive Wildlife Conservation Strategy

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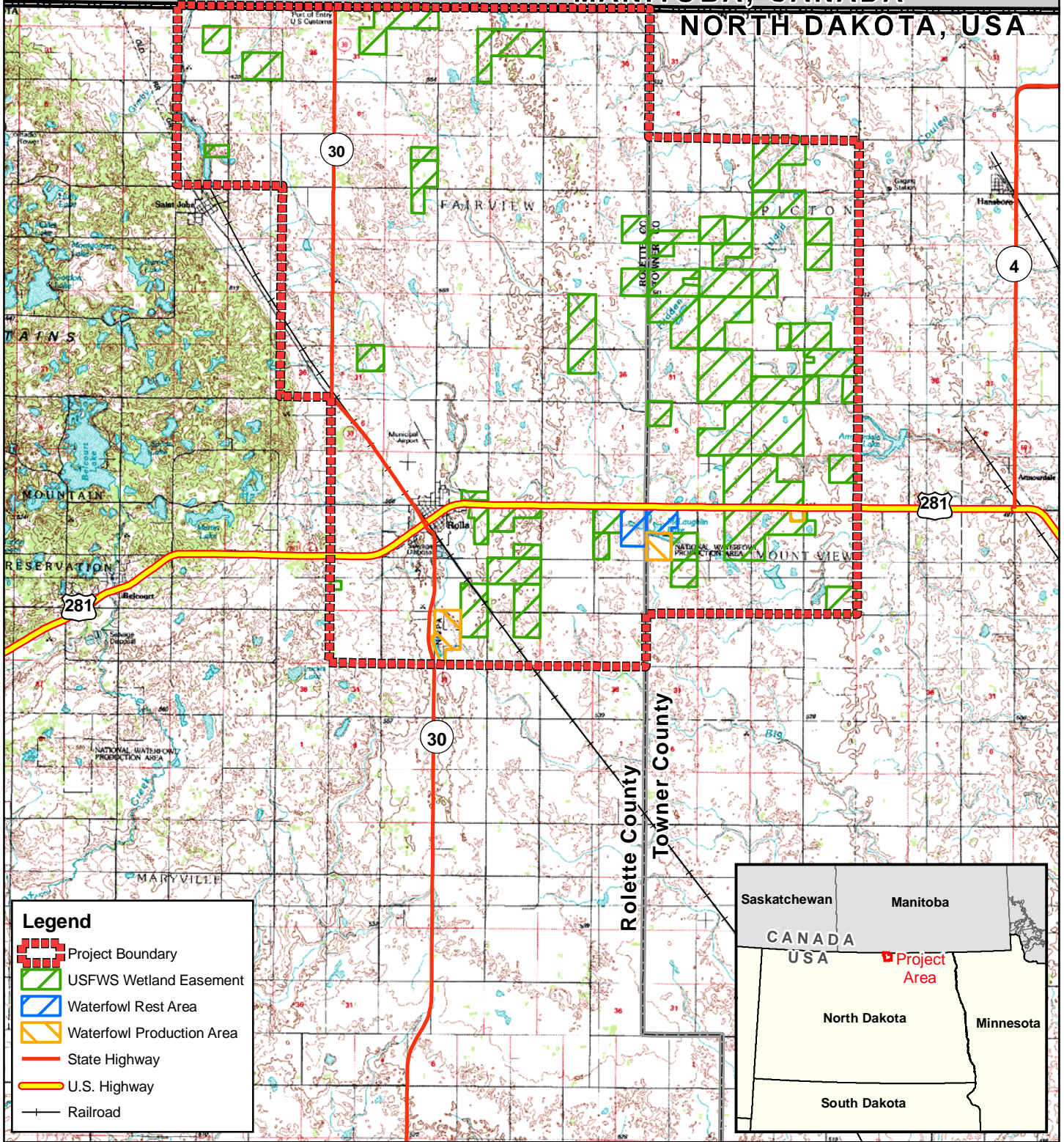
**Table 1**  
**Bird List for Rolette and Towner Counties**

<b>ORDER</b>	<b>FAMILY</b>	<i>Genus</i>	<i>Species</i>	<b>Common Name</b>	<b>Occurrence</b>	<b>Conservation Status</b>
		<i>Vireo</i>	<i>solitarius</i>	Blue-headed Vireo	M	
<b>PELECANIFORMES</b>						
	PELECANIDAE	<i>Pelecanus</i>	<i>erythrorhynchos</i>	American White Pelican	B	I
		<i>Phalacrocorax</i>	<i>auritus</i>	Double-crested Cormorant	B	
<b>PICIFORMES</b>						
	PICIDAE	<i>Colaptes</i>	<i>auratus</i>	Northern "Yellow-shafted" Flicker	B	
		<i>Dryocopus</i>	<i>pileatus</i>	Pileated Woodpecker	B	
		<i>Melanerpes</i>	<i>carolinus</i>	Red-bellied Woodpecker	M	
		<i>Melanerpes</i>	<i>erythrocephalus</i>	Red-headed Woodpecker	B	II
		<i>Picoides</i>	<i>arcticus</i>	Black-backed Woodpecker	M	
		<i>Picoides</i>	<i>pubescens</i>	Downy Woodpecker	B	
		<i>Picoides</i>	<i>villosus</i>	Hairy Woodpecker	B	
		<i>Sphyrapicus</i>	<i>varius</i>	Yellow-bellied Sapsucker	B	
<b>PODICIPEDIFORMES</b>						
	PODICIPEDIDAE	<i>Aechmophorus</i>	<i>clarkii</i>	Clark's Grebe	B	
		<i>Aechmophorus</i>	<i>occidentalis</i>	Western Grebe	B	
		<i>Podiceps</i>	<i>auritus</i>	Horned Grebe	B	I
		<i>Podiceps</i>	<i>griseogen</i>	Red-necked Grebe	B	
		<i>Podiceps</i>	<i>nigricollis</i>	Eared Grebe	B	
		<i>Podilymbus</i>	<i>podiceps</i>	Pied-billed Grebe	B	
<b>STRIGIFORMES</b>						
	STRIGIDAE	<i>Aegolius</i>	<i>acadicus</i>	Northern Saw-whet Owl	B-TM	
		<i>Aegolius</i>	<i>funereus</i>	Boreal Owl	M	
		<i>Asio</i>	<i>flammeus</i>	Short-eared Owl	B	II
		<i>Asio</i>	<i>otus</i>	Long-eared Owl	B	
		<i>Athene</i>	<i>cunicularia</i>	Burrowing Owl	B	II
		<i>Bubo</i>	<i>scandiacus</i>	Snowy Owl	M	
		<i>Bubo</i>	<i>virginianus</i>	Great Horned Owl	B	
		<i>Megascops</i>	<i>asio</i>	Eastern Screech-Owl	B	
		<i>Surnia</i>	<i>ulula</i>	Northern Hawk Owl	M	

Occurrence - M = Migrant; B = Breeder; TM = Turtle Mountains; EX = Extirpated  
Conservation Status from North Dakota Comprehensive Wildlife Conservation Strategy

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MANITOBA, CANADA  
NORTH DAKOTA, USA



**Legend**

- Project Boundary
- USFWS Wetland Easement
- Waterfowl Rest Area
- Waterfowl Production Area
- State Highway
- U.S. Highway
- Railroad

Data Source: USGS 100K DRG (unknown date), ESRI Data (2005), North Dakota Geologic Survey, Westwood (2007).

# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

Site Location

EXHIBIT 1



Westwood Professional Services, Inc.  
7699 Anagram Drive  
Eden Prairie, MN 55344

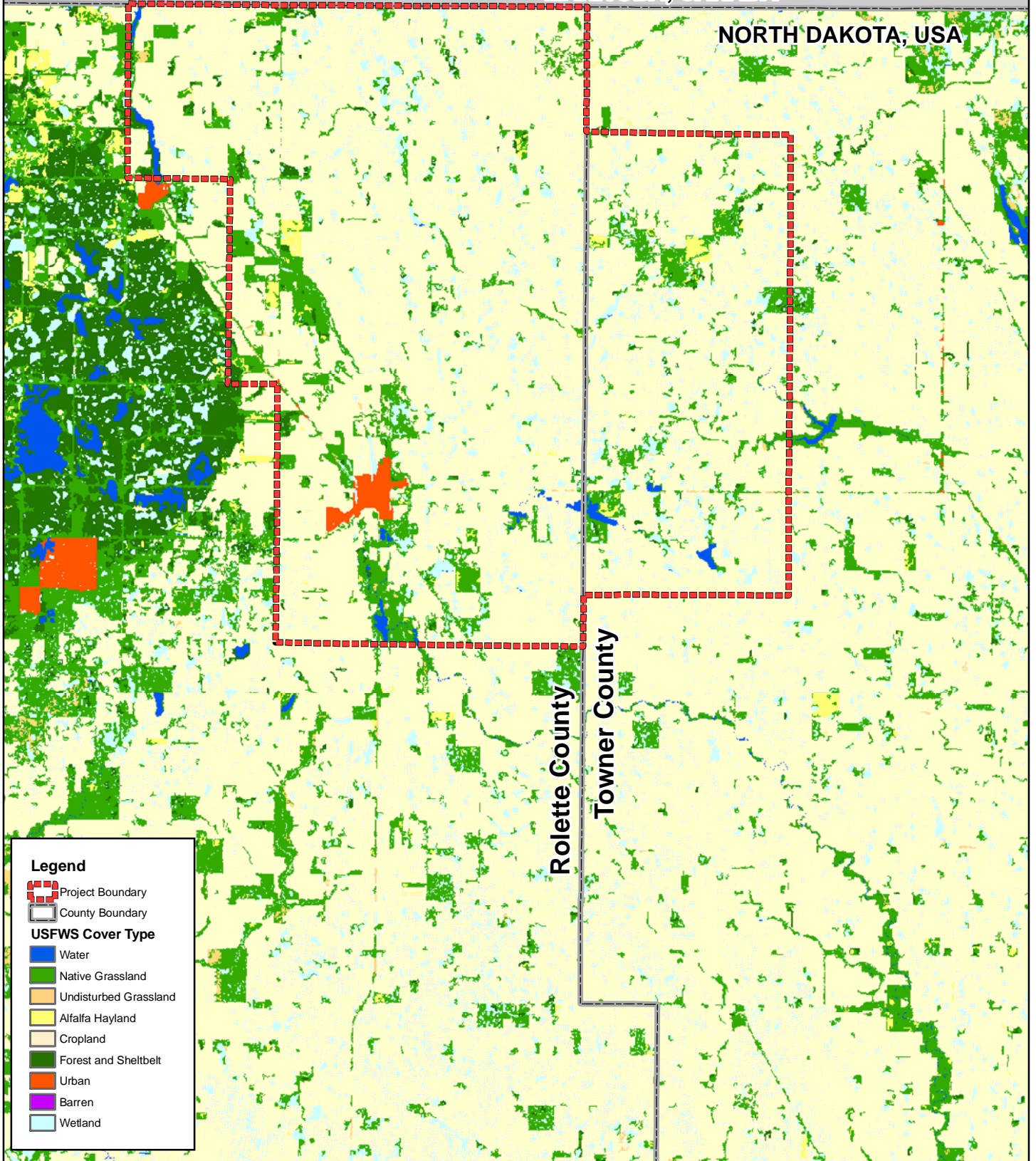
PHONE 952-937-5150  
FAX 952-937-5822  
TOLL FREE 1-888-937-5150

www.westwoodps.com



MANITOBA, CANADA

NORTH DAKOTA, USA



Rolette County  
Towner County

**Legend**

- Project Boundary
- County Boundary
- USFWS Cover Type**
- Water
- Native Grassland
- Undisturbed Grassland
- Alfalfa Hayland
- Cropland
- Forest and Sheltbelt
- Urban
- Barren
- Wetland

Data Source(s): USFWS (2007), ESRI (2005), Westwood (2008), Sequoia Energy (2008).

# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

## USFWS Land Use

EXHIBIT 2



Westwood Professional Services, Inc.  
 7699 Anagram Drive  
 Eden Prairie, MN 55344

PHONE 952-937-5150  
 FAX 952-937-5822  
 TOLL FREE 1-888-937-5150

www.westwoodps.com





# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Ecological Services  
3425 Miriam Avenue  
Bismarck, North Dakota 58501



JUN 18 2008

Mr. Robin P. Bouta  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, Minnesota 55344

Dear Mr. Bouta:

This is in response to your May 13, 2008, request for environmental information in relation to the proposed Border Winds Renewable Energy Project in Rolette and Towner Counties, North Dakota. The proposed 100 megawatt (MW) project includes 42 wind turbines, each with a capacity of 2.4-MW and associated infrastructure. At this time, it is not known if this project will entail funding or permitting by a Federal agency. We offer the following comments under the authority of and in accordance with the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.), Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d, 54 Stat. 250), the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), and the National Environmental Policy Act (NEPA) ( Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended.

The U.S. Fish and Wildlife Service (Service) holds certain resources in trust and manages them for the benefit of the American people. These resources include migratory birds, inter-jurisdictional fish, federally-listed threatened and endangered species of plants and animals and their habitats, and units of the National Wildlife Refuge system. When planning an activity, project proponents should give careful consideration to potential impacts to these trust resources and compliance with the laws mentioned above. Additional information is provided below.

### **Migratory Birds**

Adequate consideration for avian resources early in the site evaluation process can help to minimize impacts and facilitate project review. Although current wind turbine technology and proper siting can help to minimize the incidence of avian deaths due to blade, aerial line, and tower strikes, the potential for direct mortality of some migratory birds will remain. Wind power developers, in concert with the Service, can help to ensure that projects proceed with as little impact to migratory birds as possible. This can be accomplished by gathering information on avian resources as they relate to project siting and by implementing measures to minimize impacts to migratory birds from the construction and operation of the wind facility. The Service's Interim Wind Turbine Siting Guidelines are enclosed to assist in project planning

(enclosure 1). We encourage project proponents to conduct a Potential Impact Index (PII) analysis to assist in the selection of a wind power site that minimizes the potential to impact migratory birds. Please inform this office whether or not you plan to use the Service's interim guidelines in selecting your site and if not, whether you intend to use a different method to assess avian resources and impacts to migratory birds.

To minimize the electrocution hazard to birds, the Service, with support from the Rural Utilities Service, recommends that new or updated overhead power lines be constructed in accordance with the current guidelines for preventing raptor electrocutions. The recommended guidelines can be found in "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996". To increase power line visibility and reduce bird fatalities resulting from collisions with power lines, the Service recommends new power lines that cross or run adjacent to rivers or large wetlands be modified according to "Mitigating Bird Collisions with Power Lines: The State of the Art in 1994". Both publications can be obtained by writing or calling the Edison Electric Institute, P.O. Box 266, Waldorf, Maryland 20604-0266, (1-800-334-5453) or visiting their website at [www.eei.org](http://www.eei.org).

### **Threatened and Endangered Species**

A list of federally threatened and endangered species that may occur within the proposed project's area of influence is enclosed (enclosure 2). This list fulfills requirements of the Fish and Wildlife Service under Section 7 of the Endangered Species Act.

If a Federal agency authorizes, funds, or carries out a proposed action, the responsible Federal agency, or its delegated agent, is required to evaluate whether the action "may affect" listed species or critical habitat. If the Federal agency or its designated agent determines the action "is likely to adversely affect" listed species or modify critical habitat, the responsible Federal agency shall request formal section 7 consultation with this office. If the evaluation shows a "no effect" determination on listed species or critical habitat, further consultation is not necessary. If a private entity receives Federal funding for a construction project, or if any Federal permit or license is required, the Federal agency may designate the fund recipient or permit applicant as its agent for purposes of section 7 consultation.

Section 10(a)(1)(B) of the ESA allows non-Federal parties planning activities that have no Federal nexus, but which could result in the incidental taking of listed animals, to apply for an incidental take permit. (A Federal nexus exists whenever an activity is conducted, funded, or licensed or permitted by a Federal agency). The application must include a habitat conservation plan (HCP) laying out the proposed actions, determining the effects of those actions on affected federally-listed fish and wildlife species and their habitats (often including proposed or candidate species), and defining measures to minimize and mitigate adverse effects.

The Aransas Wood Buffalo Population (AWBP) of whooping cranes is the only self-sustaining migratory population of whooping cranes remaining in the wild. These birds breed in the

wetlands of Wood Buffalo National Park in Alberta and the Northwest Territories of northern Canada, and overwinter on the Texas coast. Whooping cranes in the AWBP annually migrate through North Dakota during their spring and fall migrations.

Endangered whooping cranes have been documented using roosting habitat in the vicinity of the proposed wind resource area. The proposed site is located outside the primary 180 mile-wide migration corridor that includes 95% of all confirmed whooping crane sightings in North Dakota (enclosure 3). The presence of suitable roosting and feeding habitat for whooping cranes in the wind resource area and confirmed whooping crane sightings, document the potential for whooping crane presence in the proposed wind resource area. A wind energy project in this wind resource area has the potential to affect whooping cranes during their annual spring and fall migration through North Dakota. Potential effects may be direct (e.g. collision mortality) or indirect (e.g. avoidance of the site resulting in cranes seeking alternate habitat). The interactions of whooping cranes with wind turbines and wind farms are currently not fully known, although it is expected that these large birds with relatively low maneuverability are susceptible to mortality via collisions with turbines. Currently, collisions with power lines are the greatest known source of mortality for fledged whooping cranes, and have accounted for the death or serious injury of at least 46 whooping cranes since 1956.

The Service does not believe that a determination of "no effect" is appropriate for this wind resource area because of, but not limited to, the presence of migrating whooping cranes in this area. However, due to the project location outside of the main migration corridor with only 5% of all confirmed whooping crane sightings in North Dakota, the Service believes that with suitable conservation measures included as part of the project, a determination of "may effect, not likely to adversely affect" for the whooping crane may be appropriate. Effective conservation measures to avoid or reduce potential impacts to whooping cranes include, but are not limited to: burying all new electrical transmission lines; if new lines cannot be buried, marking all new overhead transmission lines with visual marking devices such as aviation marker balls, swinging plates, spiral vibration dampeners, or swan flight diverters.

#### **Fish and Wildlife Service Property Interests**

The Service administers Waterfowl Production Areas owned in fee title as well as wetland and grassland easements throughout North Dakota. A review of Service realty records indicate Service property interests are located in the planning area. In your letter, you state that you are currently coordinating with David Bolin, J. Clark Salyer National Wildlife Refuge, and Neil Shook, Devils Lake Wetland Management District, regarding the proposed project's potential impacts to Service property interests. If Service lands are proposed to be impacted, the Service will be required to conduct an analysis of impacts and examine alternatives, pursuant to NEPA.

#### **High Value Habitat Avoidance**

The proposed project area is located in the Drift Prairie region of North Dakota and includes areas of native mixed-grass prairie. Since the 1800s, North Dakota has lost over 70 percent of its native grasslands, primarily due to crop production. The Service recommends avoiding construction or disturbance to native prairie areas.

Native prairie has significant natural resource values including:

1. Provides habitat for a number of migratory and resident grassland birds whose populations are declining.
2. Provides nesting habitat for millions of waterfowl.
3. Contains 200-300 plant species, which provide genetic diversity important to agriculture and medicine.
4. Provides habitat for thousands of insects including the Dakota skipper, a candidate species for listing under the ESA, and other butterflies (Ex: Regal fritillary, Tawny crescent).
5. Crucial for soil and water conservation.
6. Provides recreational opportunities (hunting, bird watching/wildlife observation, hiking).
7. Living laboratories for scientific research.

Our review of NWI maps indicate that wetland areas are located within the project area. NWI data can be accessed directly by visiting their website at ([wetlands.fws.gov](http://wetlands.fws.gov)). Section 404 of the Clean Water Act regulates placement of fill materials in certain wetlands. A Corps of Engineers (Corps) 404 permit may be required if fill material will be placed in aquatic sites, including wetlands. Contact Mr. Dan Cimarosti, Regulatory Office, Corps of Engineers, 1513 South 12th Street, Bismarck, North Dakota 58504 (701-255-0015), to determine their permit requirements. If a 404 permit is required, the Service will provide recommendations on this project to the Corps.

Other high value wildlife habitat types in North Dakota include wooded draws and riparian forests. We recommend that you avoid construction of wind towers and appurtenant facilities in the above habitat types whenever possible.

Construction activities should be conducted in a manner that will minimize impacts to the wildlife and the existing habitat in the project area. To help avoid impacts, we recommend that you:

- Schedule construction for late summer or fall/early winter so as not to disrupt waterfowl or other wildlife during the breeding season (February 1 to July 15). If work is proposed to take place during the breeding season or at any other time which may result in the take of migratory birds or active nests, the Service recommends that the project proponent arrange to have a qualified biologist conduct a field survey of the affected habitats to determine the absence or presence of nesting migratory birds. If nesting migratory birds are found, we request you contact this office, suspend construction, or take other

measures, such as maintaining adequate buffers, to protect the birds until the young have fledged. The Service further recommends that field surveys for nesting birds, along with information regarding the qualification of the biologist(s) performing the surveys, and any avoidance measures implemented at the project site, be thoroughly documented and that such documentation be shared with the Service and maintained on file by the project proponent at least until such time as construction on the proposed project has been completed.

- Avoid construction in native prairie, if possible, and reseed disturbed native prairie with a comparable native grass/forb seed mixture. Obtain seed stock from nurseries within 250 miles of the project area to insure the particular cultivars are well adapted to the local climate.
- Minimize grassland disturbance by using fewer, larger turbines and limiting new road construction.
- Use underground transmission lines between turbines, as well as to the primary substation.
- Locate appurtenant facilities to avoid placement of fill in wetlands along the route.
- Install and maintain appropriate erosion control measures to reduce sedimentation and water quality degradation of wetlands and streams near the project area.
- Replace unavoidable wetland losses with functionally equivalent wetlands.

#### **Research, Monitoring, and Assessment**

We encourage project proponents to conduct collision monitoring studies designed to determine the effect of several factors, such as site selection, turbine designs, the layout of wind plants, wind plant operations, habitat alteration, and changes in available perching and nesting sites, on bird deaths. The Avian Subcommittee of the National Wind Coordinating Committee (NWCC) has developed a guidance document to assist wind energy developers in designing studies that will produce credible and comparable results of avian interaction with wind power plants. The NWCC document, "Studying Wind Energy/Bird Interactions: A Guidance Document. Metrics and methods for determining or monitoring potential impacts on birds at existing and proposed wind energy sites," can be obtained by contacting the National Wind Coordination Committee, c/o RESOLVE, 1255 23<sup>rd</sup> Street, Suite 275, Washington, D.C. 20037, or by visiting their website at ([www.nationalwind.org](http://www.nationalwind.org)).

Given the Service requirements and recommendations above, as well as possible unforeseen issues that may arise, we encourage you to build sufficient planning time for coordination with the Service into your project time line. Thank you for the opportunity to comment. If you require further information as project planning proceeds, please contact Terry Ellsworth of my staff, or contact me directly, at (701) 250-4481, or at the letterhead address.

Sincerely,



Jeffrey K. Towner  
Field Supervisor  
North Dakota Field Office

Enclosures (3)

cc: Project Leader, Devils Lake WMD  
(Attn: N. Shook)  
Refuge Manager, J. Clark Salyer NWR  
(Attn: D. Bolin)  
Regulatory Office, Army Corps of Engineers, Bismarck  
(Attn: D. Cimaresti)  
ND Public Service Commission, Bismarck  
Director, ND Game & Fish Department, Bismarck  
(Attn: M. McKenna)

FEDERAL ENDANGERED AND CANDIDATE SPECIES  
FOUND IN  
ROLETTE COUNTY, NORTH DAKOTA  
June 2008

**ENDANGERED SPECIES**

Birds

Whooping crane (Grus Americana): Migrates through west and central counties during spring and fall. Prefers to roost on wetlands and stockdams with good visibility. Young adult summered in North Dakota in 1989, 1990, and 1993. Total population 140-150 birds.

**CANDIDATE SPECIES**

Invertebrates

Dakota skipper (Hesperia dacotae): Found in native prairie containing a high diversity of wildflowers and grasses. Habitat includes two prairie types: 1) low (wet) prairie dominated by bluestem grasses, wood lily, harebell, and smooth camas; 2) upland (dry) prairie on ridges and hillsides dominated by bluestem grasses, needlegrass, pale purple and upright coneflowers and blanketflower.

FEDERAL ENDANGERED CANDIDATE SPECIES  
FOUND IN  
TOWNER COUNTY, NORTH DAKOTA  
June 2008

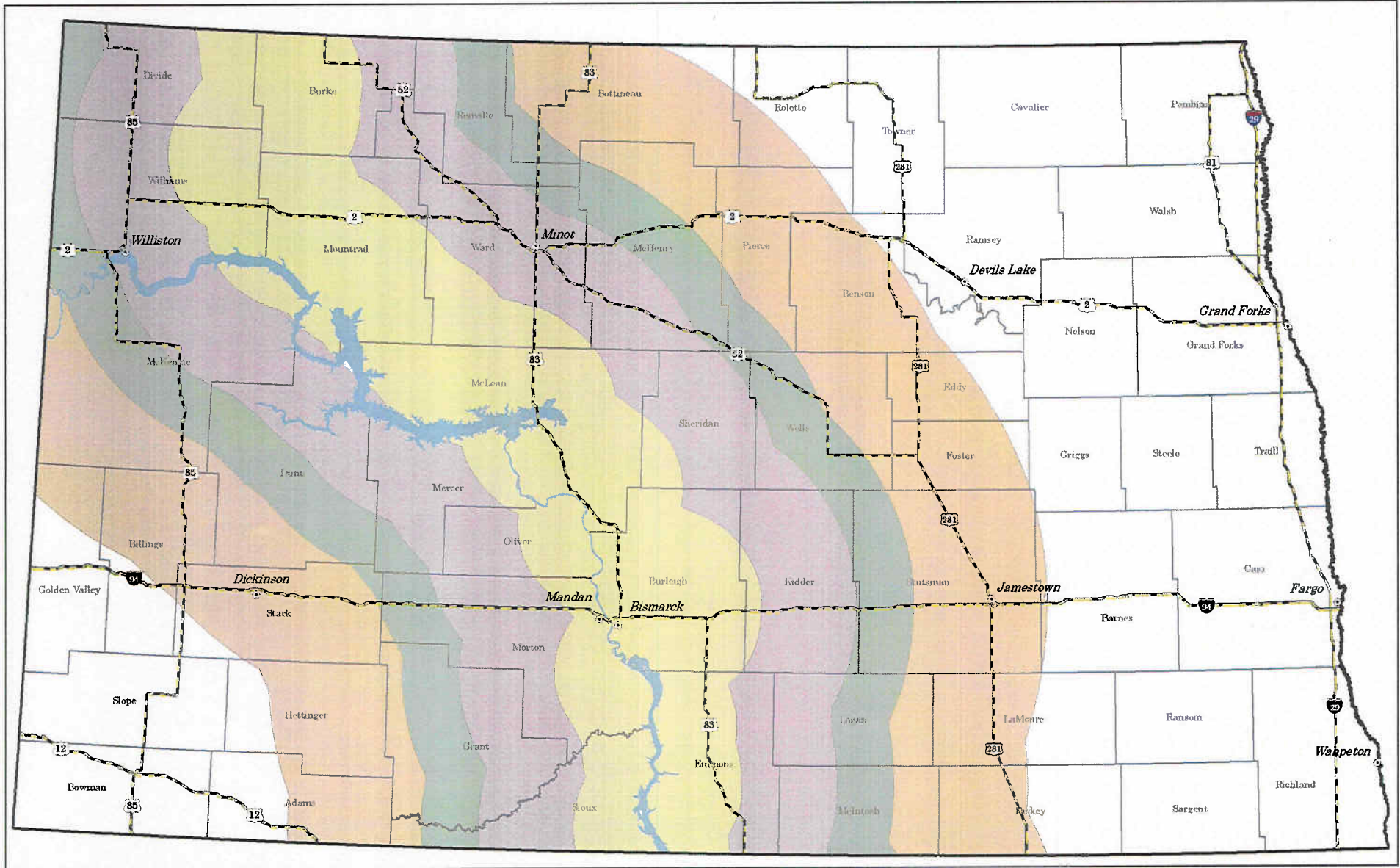
**ENDANGERED SPECIES**

Birds

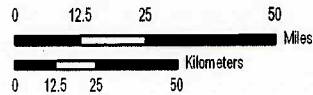
Whooping crane (Grus Americana): Migrates through west and central counties during spring and fall. Prefers to roost on wetlands and stockdams with good visibility. Young adult summered in North Dakota in 1989, 1990, and 1993. Total population 140-150 birds.



# Selected Percentages Of Whooping Crane Sightings



PRODUCED BY ECOLOGICAL SERVICES  
 BISMARCK, NORTH DAKOTA  
 MAP DATE: 03/18/08  
 SIGHTINGS THROUGH SPRING 2007  
 FILE: TOWERS\_NOLOCATIONS.MXD



Map Features	
	Major Roads
	County Boundaries
	Missouri/Yellowstone River System
	Percent Whooping Crane Sightings
	Approx. 50% (140 mile corridor)
	Approx. 75% (90 mile corridor)
	Approx. 85% (120 mile corridor)
	Approx. 95% (180 mile corridor)





John Hoeven, Governor  
Douglass A. Prchal, Director

1600 East Century Avenue, Suite 3  
Bismarck, ND 58503-0649  
Phone 701-328-5357  
Fax 701-328-5363  
E-mail [parkrec@nd.gov](mailto:parkrec@nd.gov)  
[www.parkrec.nd.gov](http://www.parkrec.nd.gov)

RECEIVED  
OCT 10 2008  
WESTWOOD  
PROFESSIONAL SERVICES

October 7, 2008

Amy Linnerooth  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344

Re: Border Winds Wind Energy Project

Dear Ms. Linnerooth:

The North Dakota Parks and Recreation Department (the Department) has reviewed the above referenced project proposal to construct the Border Winds Wind Energy Project located near the City of Rolla in Rolette and Towner Counties.

Our agency scope of authority and expertise covers recreation and biological resources (in particular rare plants and ecological communities). The project as defined does not affect state park lands that we manage. We do have some concerns regarding Land and Water Conservation Fund sites possibly within or adjacent to the project area. Projects in Rolla (project numbers 38-00018 and 38-00388) and Towner County (project number 38-00070) have received assistance from the federal Land and Water Conservation Funds and are under protection of section 6(f) of the LWCF Act. Any property taken from within the 6f boundaries of these areas must be replaced with property of equal market value. Should any public or private utilities need to be added or relocated on the LWCF recreational lands, the NDPRD must be consulted prior to any action taken. Please contact Michelle Vetter (701-328-5364 or [mvetter@nd.gov](mailto:mvetter@nd.gov)) if additional LWCF information is needed.

The North Dakota Natural Heritage biological conservation database has been reviewed to determine if any plant or animal species of concern or other significant ecological communities are known to occur within an approximate one-mile radius of the project area. Based on this review, several historical occurrences have been identified within or adjacent to the project area including: *Populus tremuloides/Prunus virginiana* woodland (aspen woodland), *Carex spp.* – *Triglochin maritime* – *Eleocharis pauciflora* fen (calcareous fen), *Eleocharis pauciflora* (few-flowered spikerush), *Andropogon gerardii* – *Schizachyrium scoparium* transition tallgrass prairie (Central mesic tallgrass prairie), *Momotropa uniflora* (indianpipe), *Potamogeton vaginatus* (sheathed pondweed), and *Dendroica pensylvanica* (chestnut-sided warbler). Historical occurrences indicate that habitat may still exist for these species and communities or other rare, threatened, sensitive or endangered species. Please see attached spreadsheet and map for more specific information on these species. We defer further comments regarding animal species to the North Dakota Game and Fish Department and the United States Fish and Wildlife Service.

Because this information is not based on a comprehensive inventory, there may be species of concern or otherwise significant ecological communities in the area that are not represented in the database. The lack of data for any project area cannot be construed to mean that no significant features are present. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Given the potential for not only habitat disturbance and disruption but threat to nesting, feeding and migratory bird and bats in the area we suggest that all efforts be made to avoid impacts to wildlife species and their habitats. In an effort to avoid or minimize impacts to wildlife and their habitats we encourage proper evaluation of all potential wind energy sites. To identify and assess adverse impacts to wildlife we suggest pre and post construction avian and bat monitoring studies be conducted.


The Department recommends that the project be accomplished with minimal impacts and that all efforts be made to ensure that critical habitats not be disturbed in the project area to help secure rare species conservation in North Dakota. Regarding any reclamation efforts, we recommend that any impacted areas be revegetated with species native to the project area.

.....  
*Play in our backyard!*

It is our policy to charge out-of-state requests for data services including data retrieval, data analysis, manual and computer searches, packaging and collection of data. An invoice for services provided has been enclosed.

Thank you for the opportunity to comment on this project. Please contact Kathy Duttonhefner (701-328-5370 or [kgduttonhefner@nd.gov](mailto:kgduttonhefner@nd.gov)) of our staff if additional information is needed.

Sincerely,

  
Jesse Hanson, Coordinator  
Planning and Natural Resources Division

R.USNDNHI\*2066

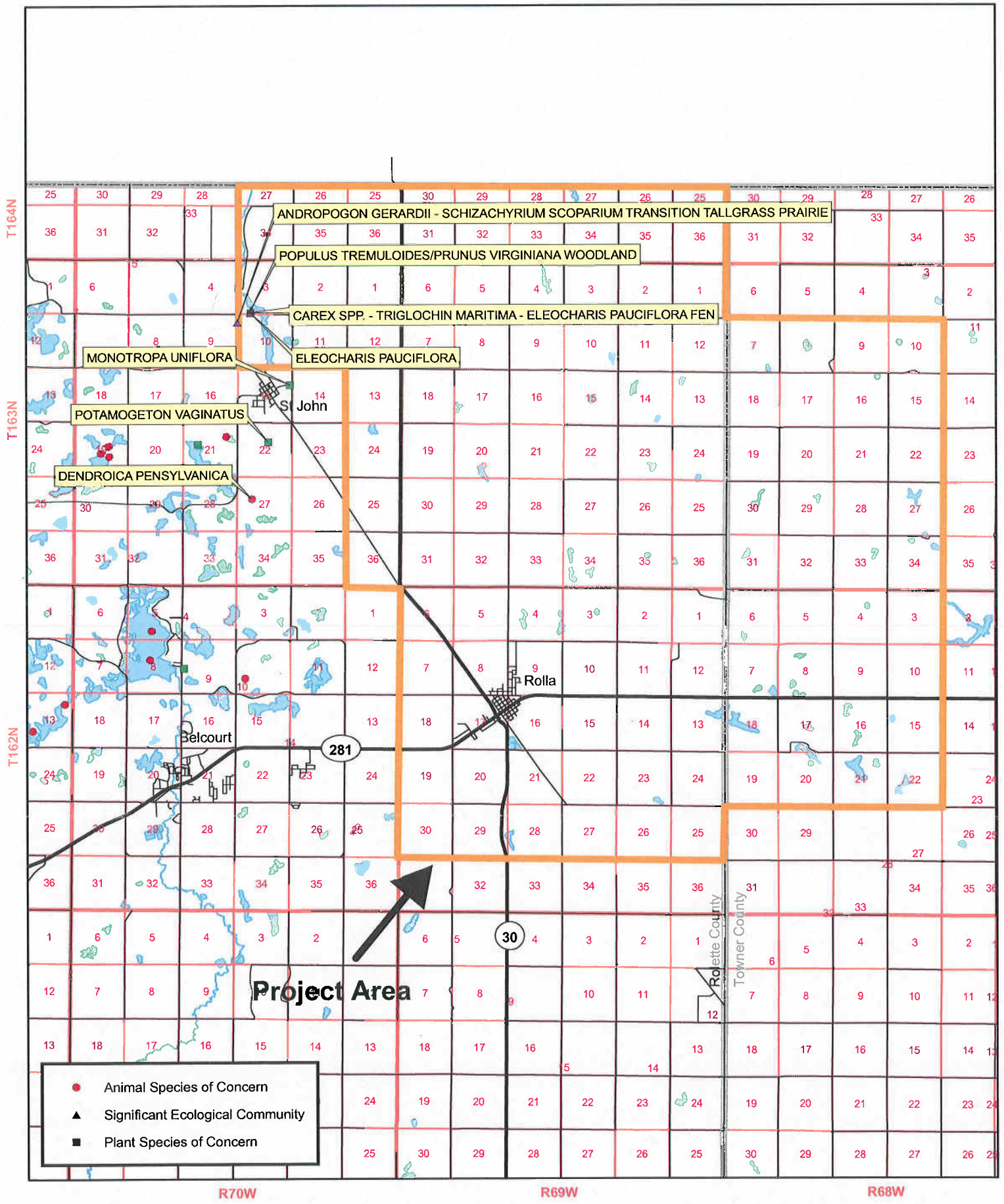
North Dakota Natural Heritage Inventory  
Species of Concern and Significant Ecological Communities

State Scientific Name	State Common Name	Township & Range	Section	TRS Notes	State Rank	Global Rank	Federal Status	Last Observation
POPULUS TREMULOIDES/PRUNUS VIRGINIANA WOODLAND	ASPEN WOODLAND	163N070W	3	SW4	S3			1987-08-18
CAREX SPP. - TRIGLOCHIN MARITIMA - ELEOCHARIS PAUCIFLORA FEN	CALCAREOUS FEN	163N070W	3	SW4	S1			1987-08-18
ELEOCHARIS PAUCIFLORA	FEW-FLOWERED SPIKERUSH	163N070W	3	SW4	S2S3	G5		1987-08-18
ANDROPOGON GERARDII - SCHIZACHYRIUM SCOPARIUM TRANSITION TALLGRASS PRAIRIE	CENTRAL MESIC TALLGRASS PRAIRIE	163N070W	9	NE4NE4	S1			1987-08-18
MONOTROPA UNIFLORA	INDIANPIPE	163N070W	15		S3	G5		1902-08-24
POTAMOGETON VAGINATUS	SHEATHED PONDWEED	163N070W	22		S3	G5		1902-08-24
DENDROICA PENNSYLVANICA	CHESTNUT-SIDED WARBLER	163N070W	27		S3	G5		

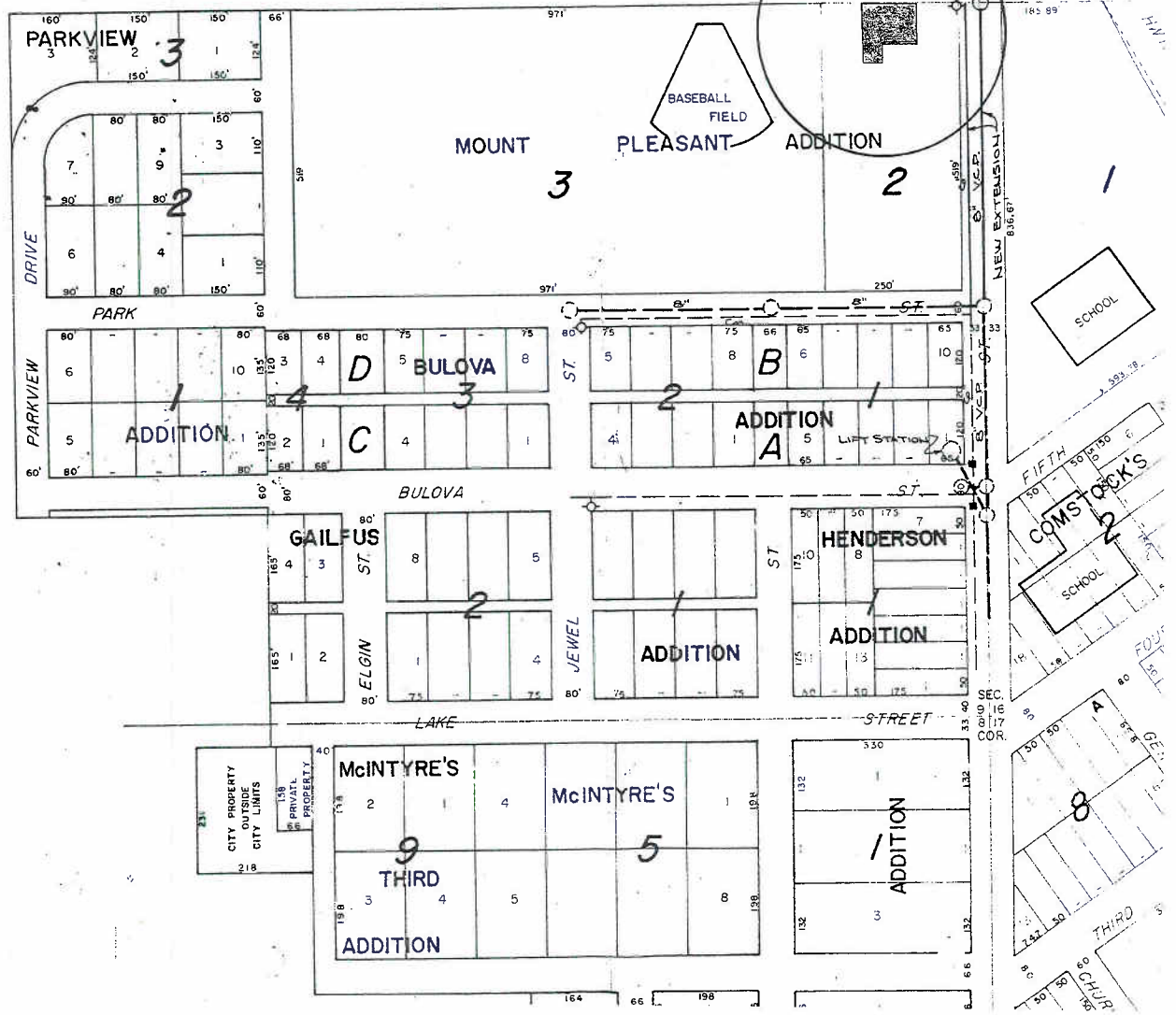
**North Dakota Natural Heritage Inventory Biological and Conservation Data Disclaimer**

The quantity and quality of data collected by the North Dakota Natural Heritage Inventory are dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in North Dakota have never been thoroughly surveyed, and new species are still being discovered. For these reasons, the Natural Heritage Inventory cannot provide a definite statement on the presence, absence, or condition of biological elements in any part of North Dakota. Natural Heritage data summarize the existing information known at the time of the request. Our data are continually upgraded and information is continually being added to the database. This data should never be regarded as final statements on the elements or areas that are being considered, nor should they be substituted for on-site surveys.

# North Dakota Natural Heritage Inventory Species of Concern and Significant Ecological Communities



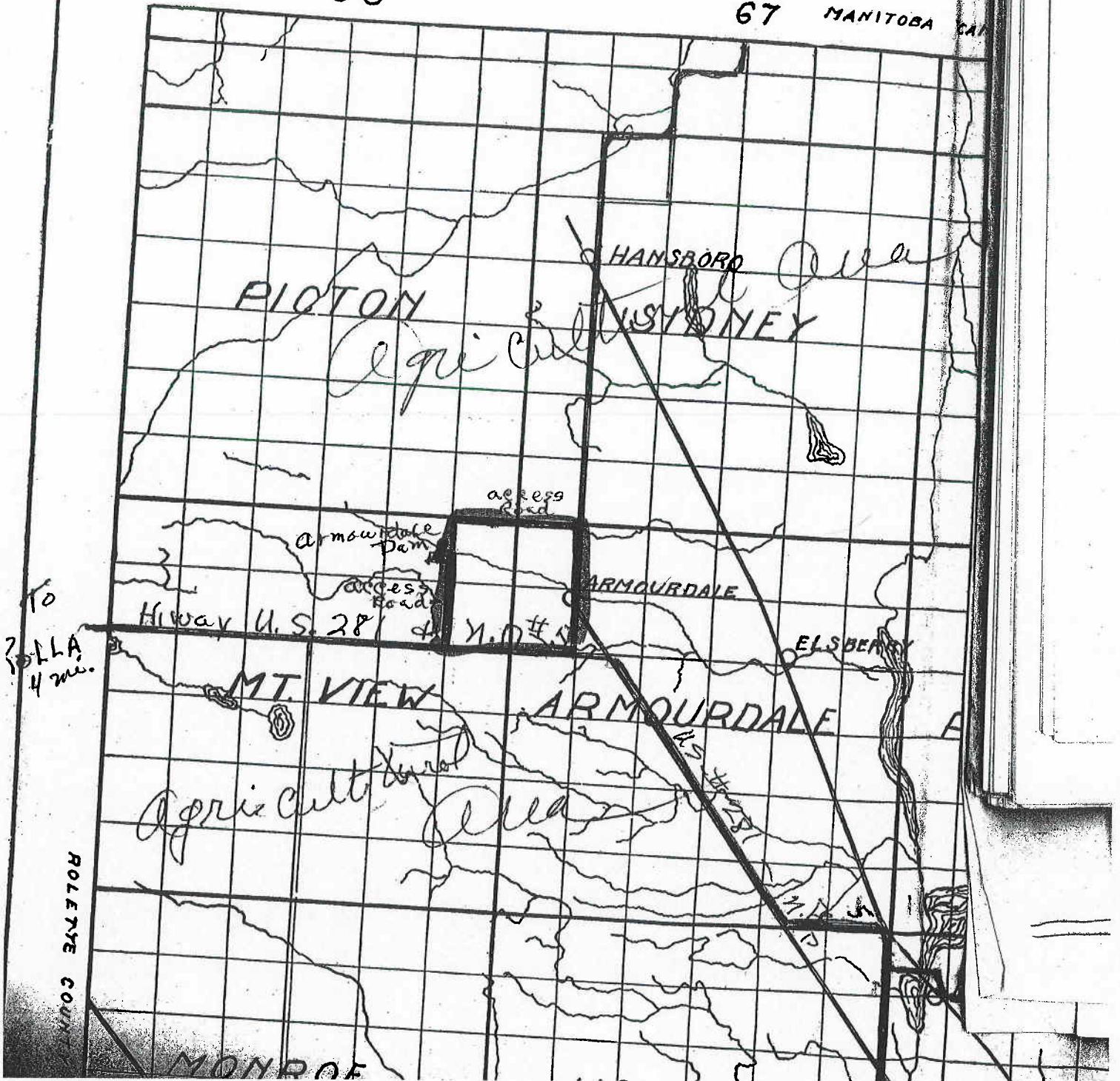
SEE DETAIL A



38-00070 (131.18 acres)

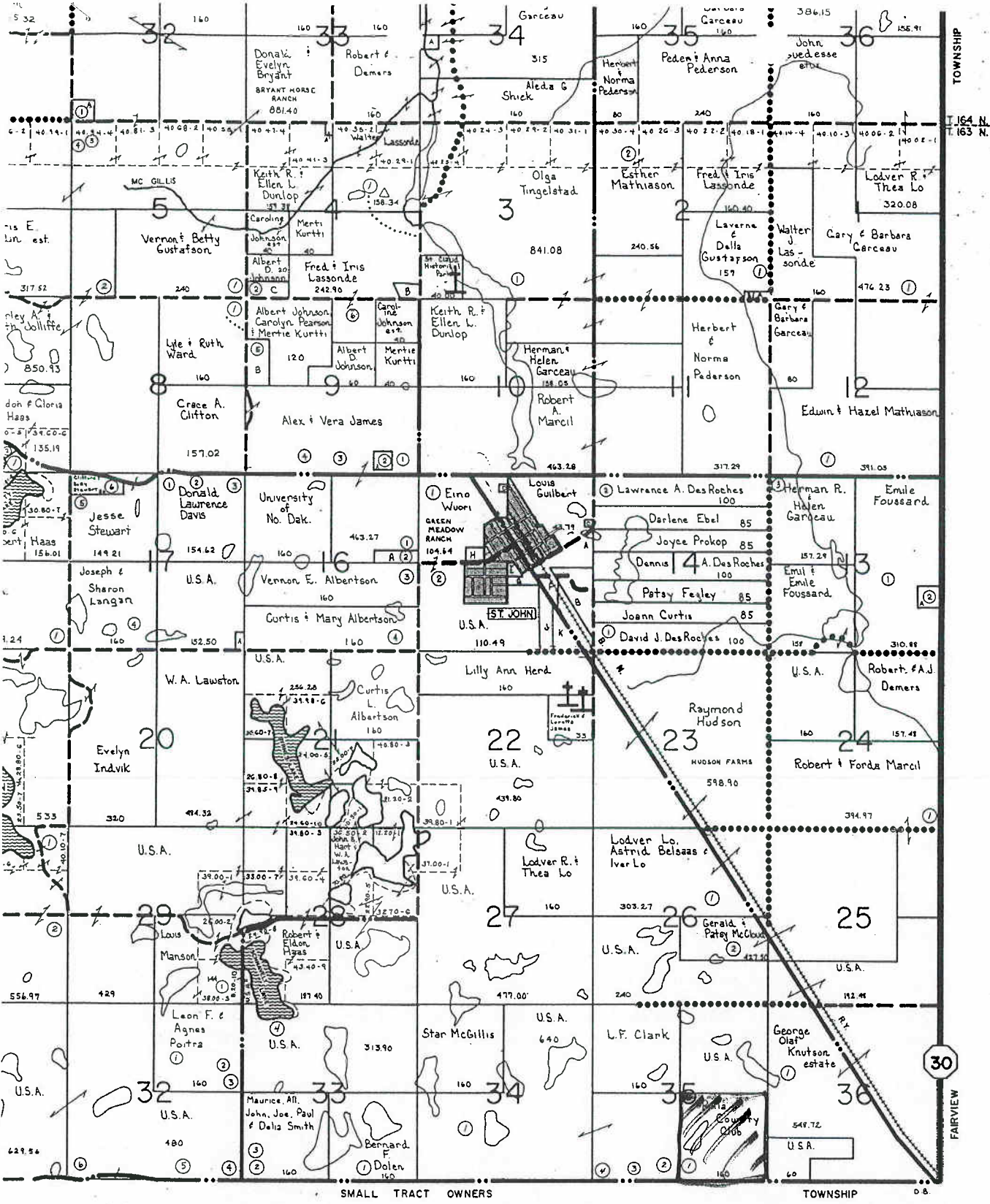
68

67 MANITOBA CAN



To  
PULLA  
4 mi.

ROLETTE COUNTY



SEE SMALL TRACT SECTION FOLLOWING TOWNSHIP MAPS

38-00388




**Appendix C.3**  
**Cultural Resource Class I Literature**  
**Study**





Class I Literature Search

# Proposed Border Winds Wind Project

Rolette and Towner Counties, North Dakota

June 2008



Prepared for:



Sequoia Energy, Inc.  
259 Portage Avenue  
Suite 210  
Winnipeg, MB R3B 2A9

Prepared by:



Ryan Grohnke and Dean Sather  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344 (952) 937-5150

# **Class I Cultural Resources Literature Search Proposed Border Winds Wind Energy Project**

Rolette and Towner Counties, North Dakota

Prepared for:

Sequoia Energy, Inc.  
259 Portage Avenue  
Suite 210  
Winnipeg, MB R3B 2A9  
Canada

Prepared by:

Ryan Grohnke  
Dean T. Sather, MA, RPA

Westwood Professional Services, Inc.  
7699 Anagram Drive  
Eden Prairie, MN 55344  
(952) 937-5150

Project Number: 20071163.00

June 30, 2008

## **1.0 MANAGEMENT SUMMARY**

Westwood Professional Services, Inc. (Westwood) was contracted by Sequoia Energy, Inc. (Sequoia) of Winnipeg, Manitoba, Canada to conduct a Class I Literature Search for the proposed Border Winds Wind Energy Project in Rolette and Towner Counties, North Dakota. Sequoia is developing the 100 to 200 MW Border Winds Project on approximately 123 square miles of land surrounding the town of Rolla in the Townships of Fairview, Mount Pleasant and Baxter, Rolette County, and the Townships of Picton and Mount View in Towner County, North Dakota.

Upon review of the archaeological sites and historic properties inventories compiled for the defined project area, Westwood concludes that the archaeological and historic investigations executed to date have not examined the entire potential for existence of cultural resources in the area. While several investigations have been carried out in the project area, many of these have been limited in scope and concentrated on relatively small property parcels or immediate right-of-ways.

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## EXHIBITS

- Exhibit 1: Project Boundary over USGS Topographic Map  
 Exhibit 2: Cultural Resource Locations

## 2.0 INTRODUCTION

Westwood Professional Services, Inc. (Westwood) was contracted by Sequoia Energy, Inc. (Sequoia) of Winnipeg, Manitoba, Canada to conduct a Class I Cultural Resources Literature Search for the proposed Border Winds Project in Rolette and Towner Counties, North Dakota. Sequoia is developing the 100 to 200 MW Border Winds Project on approximately 123 square miles of land surrounding the town on Rolla in the Townships of Fairview, Mount Pleasant and Baxter, Rolette County, and the Townships of Picton and Mount View in Towner County, North Dakota (Exhibit 1).

A Class I Cultural Resources Literature Search is a typical first step at the initiation of a wind energy project of this magnitude in North Dakota. A Class I Cultural Resources Literature Search is almost always conducted prior to field surveys and the resulting report is typically reviewed by the North Dakota State Historic Preservation Office (SHPO). Westwood was contracted to facilitate the collection of information regarding the cultural resources identified within the defined project boundary and the one-mile buffer. This one-mile buffer is a standard applied for the collection of corroborating data regarding regional distribution of cultural resources. The data collected are then used to identify the types of cultural properties that might be encountered as well as landforms and regions that might have a high potential for containing significant cultural resources. A listing of townships and sections included in either the defined project boundary or the surrounding buffer are summarized in Table 2-1 below.

**Table 2-1: Sections Included in Project Area and One Mile Buffer**

County	Township	Range	Project Sections	Buffer Sections
Towner	161N	68W		6
Rolette	161N	69W		1-6
Rolette	161N	70W		1
Towner	162N	68W	3-10, 15-22	2, 11, 14, 23, 26-31
Rolette	162N	69W	1-36	
Rolette	162N	70W		1, 2, 12, 13, 24, 25, 36
Towner	163N	68W	7-10, 15-22, 27-34	2-6, 11, 14, 23, 26, 35
Rolette	163N	69W	1-36	
Rolette	163N	70W	1, 12, 13, 24, 25, 36	2, 11, 14, 23, 26, 35
Towner	164N	68W		30, 31
Rolette	164N	69W	25-36	
Rolette	164N	70W	25, 36	26, 35

Key: County = project area county of interest; Township = north/south coordinate of township; Range = east/west coordinate of township; Project Sections = sections within the township included in the defined project area; Buffer Sections = sections included in the one-mile buffer surrounding the defined project boundaries.

A catalog of previously identified and recorded cultural resources for the area was compiled from the records maintained at the Historical Preservation Division (HPD) of the State Historical Society of North Dakota (SHSND), and the ND State Archives and Librarian Bismarck, North

Dakota. The data collected from these sources includes the state archaeological site files, historic property files, the North Dakota National Register inventory, and archival collections of published and unpublished reports of previous cultural resource investigations. Westwood staff also consulted historic documents in order to identify potential cultural features relating to the proto-historic to early historic periods that may exist in the project area. A total of nine recorded archaeological properties were identified within the project boundaries. Seven of the identified archaeological properties are recorded as archaeological site leads. A total of 29 recorded historic properties were identified within the project boundary. Description of site typology follows.

### **3.0 SCOPE OF WORK**

The Class I Literature Search was conducted to provide an inventory of the recorded archaeological sites and historic properties within the proposed project area. The area of consideration also included a one-mile buffer surrounding the entire project area in order to ascertain if any recorded properties located immediately adjacent to the project area might be impacted by the proposed work either physically or visually.

### **4.0 METHODOLOGY**

On April 14th 2008, Westwood Cultural Resource Specialist Ryan Grohne conducted a background literature search at the State Historical Society of North Dakota (SHSND) located in the North Dakota Heritage Center in Bismarck, North Dakota. The North Dakota Cultural Resources Survey database was examined to obtain a list of all archaeological (historic and prehistoric) and architectural sites within the area of potential effect (APE) along with a listing of all surveys conducted within the project area. County and township histories, and historic maps and atlases were examined at the North Dakota State Library and Archives. The original Government Land Office (GLO) survey records were investigated on line.

### **5.0 RESULTS OF INVESTIGATION**

#### **5.1 Environmental Background**

The project area is located within both the Northern Black Glaciated Plains (NBGP) portion of the Northern Great Plains (DesLauriers and Lambert 1997). A majority of the land within the NBGP is utilized in agricultural production with over 80% dedicated to dry-farmed cropland. The elevation of the region varies from 300m (ca. 980 ft.) to 700m (2300 ft.) exhibiting a general increase in elevation from the east to west. The ground surface of the region is a level to slightly undulating till plains which includes a number of kettle holes, kames and moraines. The average annual temperature is 3-4° Celsius (37-40° Fahrenheit). The region receives an annual average precipitation of 375-450mm (15-18 inches). The region is freeze free between 100 and 120 days per year. Generally the precipitation per year is insufficient for maximum agricultural production. The few

sources of surface water in the region are too small, too distant from need, or only seasonally available to be applied to agricultural needs. Water from underground sources is most effectively obtained in areas covered in glacial drift.

Soils in the region are dominated by Borolls and Aquolls. The soils are generally deep and well drained to poorly drained. On the well drained level surfaces located on till plains the soils are classified as Haploborolls. In undulating, poorly drained areas the soils are classified as Argiaquolls with Argialbolls in wetlands. Natural vegetation in the region was dominated historically by prairie vegetation. Native vegetation species common on the till plains include western wheatgrass, needle-and-thread, green needlegrass, and blue grama. Species commonly in association with the wetlands are prairie cordgrass, northern cordgrass, big bluestem, and slim sledge.

Wildlife species occupying the project area have changed somewhat since historic times, mostly as a result of habitat changes associated with mechanized agriculture. Historically, avian species listed as occurring in the greater geographic region include the piping plover, least tern, chimney swift, eastern phoebe, purple martin, eastern bluebird, black-and-white warbler, ovenbird, indigo bunting, rose-breasted grosbeak, orchard oriole, and field and swamp sparrows. Mammals on the historic list for the region include white-tailed deer, mule deer, pronghorn, bobcat, white-tailed jackrabbit, white-tailed prairie dog, and black-tailed prairie dog. The black-footed ferret and bison were also historically associated with the area. Herpetofauna historically inhabiting the region include the snapping turtle, spiny softshell turtle, smooth green snake, and the prairie rattlesnake. Since European settlement, many of these species have become either extirpated from the area or considerably less abundant than in historic times.

## **5.2 Cultural History**

The HPD of the SHSND has developed several historic contexts for the state of North Dakota. These contexts examine North Dakota's recent (historic) and distant (Pre-Contact) past, and are based on decades of archaeological and historical research. They are designed to help generally describe and interpret the history of the state, and give basic insight into the prevailing theories pertaining to the Pre-Contact and historic communities existing in specific locations and at discrete points of time. The current defined boundaries of the project area are included in the Northern Red River Study unit (SHSND, 1990).

The cultural histories focusing solely on American Indian communities are divided into several major traditions: Paleoindian, Archaic, and Woodland, Plains Woodland, Plains Village, Equestrian/Nomadic, and Historic. These traditions are defined on the basis of significant changes in how American Indian communities lived and what resources, local or exotic, they utilized.

The cultural histories that integrate American Indian history and Euro-American history are generally divided into the Contact and Post-Contact periods. These contexts range from the first contact between Europeans and American Indians during European exploration in the region, through Euro-American settlement of traditionally American Indian lands.

### **5.2.1 Paleo-Indian Tradition (9,500 to 5,500 B.C.)**

The Paleo-Indian Tradition refers to the period of time at the close of the Pleistocene era and into the Holocene era, when American Indian communities were small, mobile and focused on hunting. This period is marked by the retreat of glacial ice, the decline of the megafauna (e.g. woolly mammoth, mastodons, and camels), and the growth of modern vegetation. The small number of artifacts found at Paleoindian sites indicates that these communities hunted a limited number of large animals in a variety of environmental settings. As the Pleistocene era ended and the Holocene era began, the megafauna gradually died out. This caused the Paleoindian people to shift their focus from hunting animals such as the mammoth to the largest remaining species, bison. In addition to bison, it is likely that gathering wild plant foods and hunting smaller animals also contributed significantly to the diet of the Paleo-Indian people (SHSND 1990).

### **5.2.2 Plains Archaic Tradition (5,500 to 400 B.C.)**

The Plains Archaic Tradition is divided into Early, Middle, and Late components. The people of the Plains Archaic Tradition remained hunters and gatherers as their Paleo-Indian forbearers. However, shifts in diet and settlement patterns define the transition to the Archaic Tradition. It seems that native people were adapting to environmental changes by using more diverse plant and animal resources

During this period, Plains Archaic people began developing regional differences within their material culture, interaction between different populations became less common, and the quality of craftsmanship exhibited by their lithic tools diminished. As with Paleo-Indian sites, Archaic sites are relatively small and ephemeral. Similarly, with Paleo-Indian sites, it is believed that Archaic sites are likely deeply buried in the floodplains.

### **5.2.3 Plains Woodland Tradition (400 B.C to A.D. 1850)**

Throughout the Midwest, the Woodland Tradition is generally divided into three periods: Early, Middle, and Late. The transition to the Woodland Tradition occurred when American Indians began manufacturing ceramic vessels, using bows and arrows, constructing earthen burial mounds, cultivating various plant species, and harvesting select plant species. Notwithstanding these developments, life for communities during the Woodland Tradition in many ways remained similar to that of the Archaic period.

Despite some similarities between Initial Woodland and Archaic period community size, populations began to grow during the Late or Terminal Woodland period. One

possible reason is that American Indians became increasingly efficient in how they acquired food toward the end of the Woodland period. Site types assigned to the Woodland Tradition throughout the region range from cemeteries and small limited use sites to extensive village and habitation sites. Woodland period communities were situated in locations that ranged from focusing on a specific resource to general environments capable of sustaining a large community for a long time.

#### **5.2.4 Plains Village (A.D. 1000 to 1850)**

Significant changes in subsistence and settlement patterns characterize the shift to the Plains Village Tradition. Ceramic vessels differ from previous types in form as well as decoration, and settlement patterns shift to larger, more permanent villages typically located in riverine settings. The subsistence strategies of these populations appear to incorporate hunting and gathering with limited agriculture focusing on specific plants. The Plains Village primary adaptation was "...the production of a dependable storable surplus food supply primarily in the form of dried corn" (SHSND 1990). Evidence indicates that the Plains Village complex relied heavily on bison hunting and intensive corn horticulture.

#### **5.2.5 Equestrian Nomadic Tradition (mid 1700s to 1851)**

The introduction of the horse is the primary characteristic of the Equestrian Nomadic Tradition. This period is also referred to as protohistoric; a time when the indigenous people were coming into contact with and being influenced by European culture. This contact was not always direct interaction between Native and Euro-American peoples, but sometimes through contact with items of Euro-American cultural material being traded throughout the area.

#### **5.2.6 Historic Period**

The Historic Period refers to the time when the Euro-American presence and influence became unavoidable. During the Historic Period, Euro-Americans pushed westward and increasingly settled in the Dakotas. Although North and South Dakota were initially within the Missouri Territory, the Dakota Territory was eventually established in 1861 and encompassed South Dakota, North Dakota, and much of Montana and Wyoming. Dakota Territory was opened to homesteaders in 1862. Following the opening of the Dakota Territory several railroads that served the territory, including the Dakota Southern and Manitoba (known later as the Great Northern) Railways, were built, and the Gold Rush of 1876 began. These events led to massive Euro-American settlement of the Dakota Territory between 1872 and 1887. This period is known as the Great Dakota Boom. A severe drought brought the Boom to an end between 1886 and 1887.

In 1889 North and South Dakota were admitted to the Union as the 39th and 40th states, in no particular order. The states were the leading producers of wheat until the drought and Great Depression in the 1930s, and railroads continued to expand and run until the collapse of the farming industry in the 1980s. Significant events witnessed by residents of North and South Dakota throughout the 20th century include discovering oil in 1927 and 1951, enduring record blizzards, creating numerous military bases and nuclear missile silos, and constructing dams.

## 6.0 CULTURAL RESOURCES REPORTS AND SITES

Westwood staff inventoried previously executed cultural resource investigations for the townships included in the Border Winds Wind Farm project area (Table 2-1). Table 5-1 lists the project reports submitted to and maintained at the Historic Preservation Division of the SHSND. The inventory identified 17 previously submitted reports documenting cultural resource investigations within the defined project boundaries. A majority of the identified reports relate the findings from location specific investigations involving limited or small land parcels.

**Table 5-1: Previous Cultural Resources Reports**

Year	Manuscript	Title	Author(s)
1992	5966	U.S. Highway 281 Archaeology: Class III Cultural Resource Inventory in Rolette County	Christensen, R.
1995	6449	North Dakota Department of Transportation Safety Project Cultural Resource Review 1992-1994	Borchert, J
1996	6783	U.S. West Rolla Exchange: A Class III Cultural Resource Inventory in Rolette County, North Dakota	Stine, E.
1997	6913	Rolla Sewage Lagoon Expansion Class III Cultural Resource Inventory Rolette County, North Dakota	Graham, C. Fuller, T.
1997	7027	Rolla Water Treatment Facility Expansion, Parcel Number Two, Level III Cultural Resource Inventory Rolette County, ND	Scott, J.
1998	7351	Results of a Class II/Class III Cultural Resource Inventory for the All Seasons Water Project in Cavalier, Rolette and Towner Counties, ND	Larson, T.
1999	7376	Hansboro Bridge Replacement, Bridge Number 101-06.0: A Class III Cultural Resource Inventory, Towner County, ND	Morrison, J.
1999	7503	Otter Tail Company's 230kV Harvey/Rolla Transmission Line: A Class III Cultural Resources Inventory of Selected Segments in Wells, Pierce, and Rolette Counties, ND	Olson, B
1999	7533	Project Walking Shield: A Cultural Resources Inventory of 25 Proposed Tribal Homesites on Turtle Mountain Chippewa Trust Lands in Rolette Co., ND	Ferris, K
2000	7660	Addendum To: Ottertail Company's 230 kV Harvey/Rolla Transmission Line Cultural Resources Inventory, Wells, Pierce, and Rolette Counties, ND	Olson, B.
2000	7554	DeMers Gravel Pit: A Class III Cultural Resource Inventory, Rolette Co., ND	Bluemle, W.
2000	7622	Ducks Unlimited: A Class III Cultural Resource Inventory, Towner Co., ND	Bluemle, W.

Year	Manuscript	Title	Author(s)
2000	7560	Results of a Class II/Class III Cultural Resource Inventory for the All Seasons Water Project: System IV, Phase II, Rolette and Towner CO., ND	Larson, T.
2002	8283	Rolla Lagoon: A Class III Cultural Resource Inventory, Rolette Co., ND	Morrison, J.
2005	9056	A Cultural Resource Inventory of Structure Replacement, Leeds-Rolla 115-Kv Transmission Line, Benson and Towner Co., ND	Barger, M. Giliberti, J.
2005	9198	Northern Plains Electric Cooperative 2004 Cultural Resources Inventory of Specific Projects in Benson, Foster, Kidder, Pierce, Rolette, Stutsman, Towner, and Wlls Co., ND	Kordecki, C
2007	10015	Wakopa Trail Survey: A Class III Cultural Resources Inventory in Rolette Co., ND	Bluemle, W

Key: Year = year of report publication or submission; Manuscript = archival number applied to project report; Title = Project Report Title; Author(s) = principal author of report.

## 6.1 Archaeological Properties

Previous recorded cultural resource investigations within the defined project area and the proscribed one-mile buffer yielded evidence of nine archaeological properties. Properties identified with an X (i.e. 32ROX23) are site leads. Site leads have been identified through historical records, reported to the SHSND but not verified by a professional archaeologist, or were identified with less than five artifacts and no features. Regardless of status as recorded site or site lead five of the nine identified properties are located within the boundaries of the defined project area. Four of the sites are located in the one-mile buffer surrounding the project area. Three of the buffer sites are identified as historic sites. The only prehistoric site is also located in the buffer. This site (32ROX98) is the location at which a single chipped stone artifact was recovered. No associated materials were reported. The five sites recorded within the defined project area are all historic period sites. The list of recorded archaeological properties is summarized in Table 5-2. Sections containing archaeological properties are highlighted in Exhibit 2.

**Table 5-2: Previously Identified Archaeological Resources**

Site Number	Site Type	Cultural Period	Project Area / Buffer
32 RO 65	Burlington Northern Railroad Bed	Historic	Buffer
32 RO x23	Galloway Post Office	Historic	Buffer
32 RO x29	Boydon Post Office	Historic	Project
32 RO x30	Rolla Roller Mill	Historic	Project
32 RO x57	Boundary Post Office	Historic	Project
32 RO x98	Isolate (debitage)	Prehistoric	Buffer
32 TO 13	Historic Site House Site	Historic	Project
32 TO x42	Historic Site	Historic	Buffer
32 TO x48	Picton Post Office	Historic	Project

Key: Site Number = site designation applied by State Archaeologist; Site Type = defined site use type; Cultural Period = reported culture historic period affiliation; Project Area / Buffer = denotes if listed site is within the defined project area or within the one-mile buffer.

## 6.2 Architectural Properties

Westwood reviewed the History/Architecture Inventory Files at the HPD of the SHSND to identify historic properties recorded within the project area and the proscribed one-mile buffer (Table 5-3). Previous architectural surveys of the area identified 29 properties within the defined project area. The majority of these properties were inventoried, but were not evaluated for National Register for Historic Places (NRHP) eligibility. None of the properties within the buffer are listed on the NRHP. It is interesting to note that a majority of the properties identified in this survey are clustered within the City of Rolla, North Dakota. The few locations in rural portions of the project area are a farmstead, a national border station and a private residence. Sections containing architectural properties are highlighted in Exhibit 2.

**Table 5-3: Previously Recorded Architectural Resources**

Site Number	Description	Location	Project Area / Buffer	Rolla City Limits
32RO20	W.M. Langer Jewel Bearing Plant	T162N R 69W, Sec 7	Project	Y
32RO36	Our Savior Lutheran	T162N, R69W, Sec 9	Project	Y
32RO37	Apostolic Lutheran	T162N, R69W, Sec 17	Project	Y
32RO38	Rolla Assembly of God	T162N, R69W, Sec 17	Project	Y
32RO39	Immanuel Lutheran	T162N, R69W, Sec 17	Project	Y
32RO40	Rolla Presbyterian	T162N, R69W, Sec 17	Project	Y
32RO41	St. Joachim Catholic	T162N, R69W, Sec 17	Project	Y
32RO42	United Methodist	T162N, R69W, Sec 17	Project	Y
32RO50	St. John Border Station	T164N, R70W, Sec 25	Project	N
32RO51	Coghlan House	T163N, R69W, Sec 19	Project	N
32ROX68	Law Office	T162N, R69W, Sec 16	Project	Y
32ROX69	Coast to Coast	T162N, R69W, Sec 17	Project	Y
32ROX70	Obrien Store	T162N, R69W, Sec 17	Project	Y
32ROX71	Residence	T162N, R69W, Sec 17	Project	Y
32ROX84	Olson Farm	T162N, R69W, Sec 21	Project	N
32ROX85	Unnamed	T162N, R69W, Sec 16	Project	Y
32ROX86	Unnamed	T162N, R69W, Sec 17	Project	Y
32ROX87	Unnamed	T162N, R69W, Sec 17	Project	Y
32ROX88	Unnamed	T162N, R69W, Sec 8	Project	Y
32ROX89	Unnamed	T162N, R69W, Sec 16	Project	Y
32ROX90	Unnamed	T162N, R69W, Sec 17	Project	Y
32ROX91	Unnamed	T162N, R69W, Sec 17	Project	Y

Site Number	Description	Location	Project Area / Buffer	Rolla City Limits
32ROX92	Unnamed	T162N, R69W, Sec 17	Project	Y
32ROX93	Unnamed	T162N, R69W, Sec 17	Project	Y
32ROX94	Unnamed	T162N, R69W, Sec 8	Project	Y
32ROX95	Unnamed	T162N, R69W, Sec 16	Project	Y
32ROX96	Unnamed	T162N, R69W, Sec 16	Project	Y
32ROX97	Unnamed	T162N, R69W, Sec 16	Project	Y
32TO8	Bridge 48-101-060	T163N, R68W, Sec 30	Project	N

Key: Site Number = reference number for recorded property; Description = name of historic structure or description of type of structure; Location = amended legal description of recorded property; Project/Buffer = relative location of recorded structure; Rolla City Limits = notes if the historic architectural property is located within the city limits of Rolla, North Dakota.

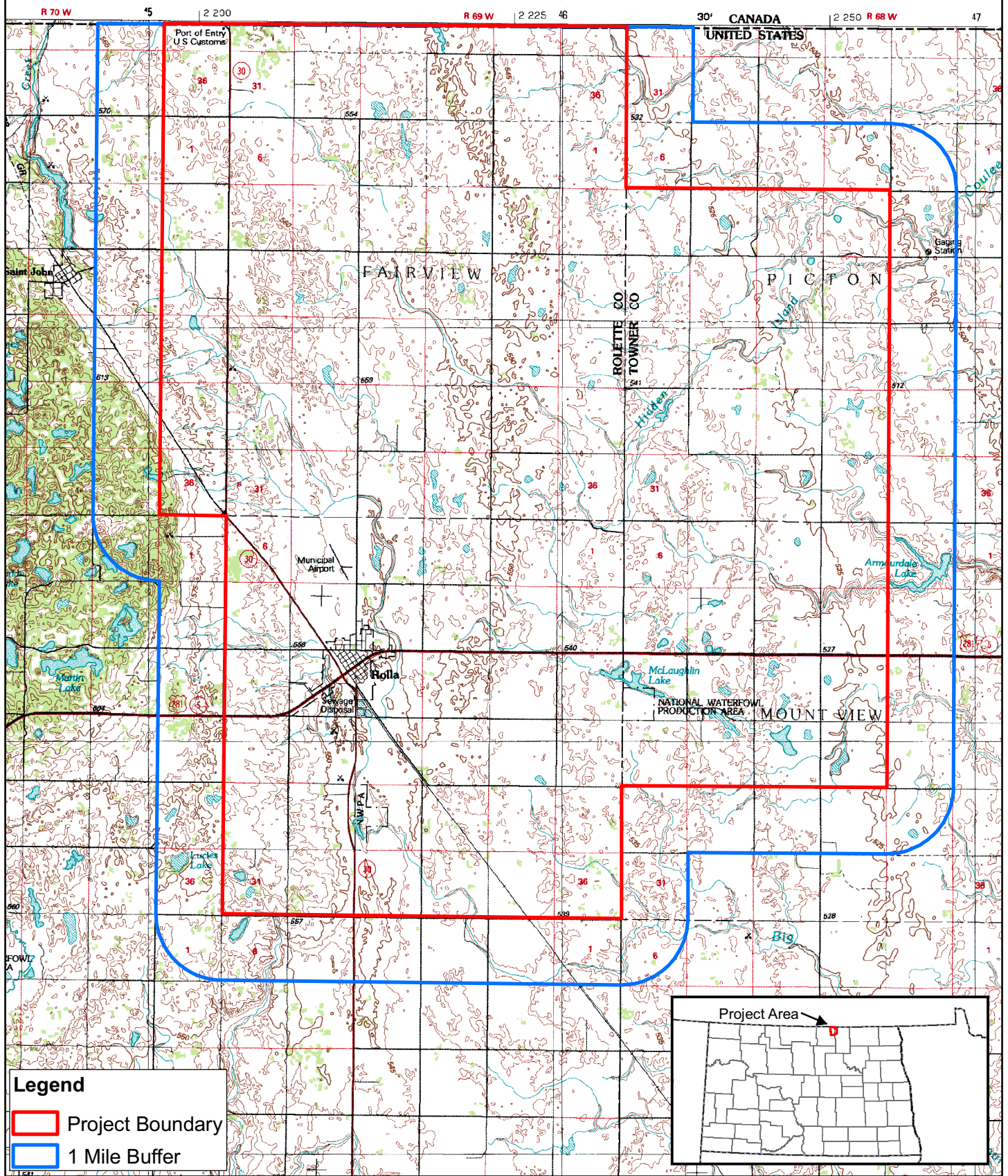
## 7.0 CONCLUSIONS AND RECOMMENDATIONS

Upon review of the archaeological sites and historic properties inventories compiled for the defined project area, Westwood concludes that the archaeological and historic investigations executed to date have not examined the entire potential for existence of cultural resources in the area. While several investigations have been carried out in the project area, many of these have been limited in scope and concentrated on relatively small property parcels or immediate right-of-ways.

Based upon the result of the investigations reported here, Westwood recommends a Class III cultural resources survey be conducted within the defined project construction area for the Border Winds project. Attention should be paid to the location of the recorded archaeological and architectural properties identified during this investigation and those potentially identified in subsequent field investigations to ensure that negative impacts to the properties can be avoided during the construction phase of the project. Ultimately, the project should follow the guidelines for cultural resource investigations as defined by the ND SHPO.

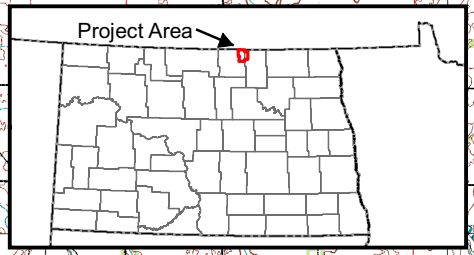
## 8.0 REFERENCES CITED

- DesLauriers, L.L. and R.E. Lambert. 1997. Soil Survey of Rolette County, North Dakota. United States Department of Agriculture, Soil Conservation Service. U.S. Government Printing Office.
- SHSND (State Historical Society of North Dakota). 1990. The North Dakota Comprehensive Plan For Historic Preservation: Archaeological Component. State Historical Society of North Dakota, Bismarck, North Dakota.



**Legend**

- Project Boundary
- 1 Mile Buffer



Data Source(s): USGS 100K DRG Quad Rock Lake-48099.

# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

## Project Boundary over USGS Topographic Map

EXHIBIT 1



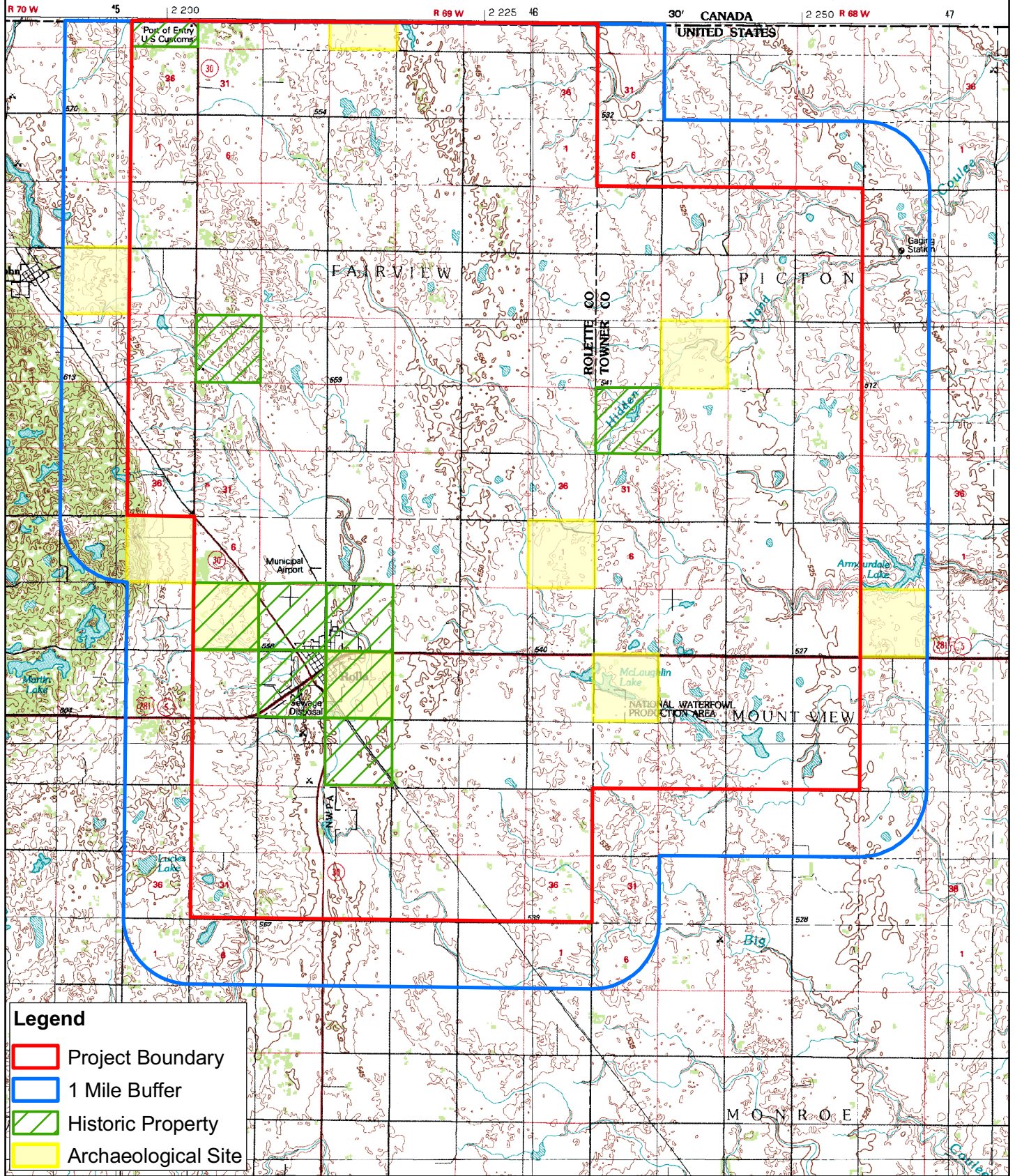
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Map Document: P:\2007\1163\gis\20071163\fig01A\_cmn.mxd  
6/30/2008 - 4:30:28 PM



Data Source(s): USGS 100K DRG Quad Rock Lake-48099.

# Border Winds Energy Project

Rolette and Towner Counties, North Dakota

## Cultural Resource Locations

- Legend**
- Project Boundary
  - 1 Mile Buffer
  - Historic Property
  - Archaeological Site



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**Appendix C.4**  
**Noise Assessment Prepared for Towner**  
**County**



June 17, 2008

Westwood Professional Services

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Mr. Kent M. Haugen  
Towner County Auditor's Office  
P.O. Box 603  
315 2<sup>nd</sup> Street  
Cando, ND 58324-0603

**Re: Request for Concurrence Regarding Compliance of the Border Winds  
Wind Energy Project with the 50 dBA Noise Standard of the Towner  
County Zoning Ordinance**  
File 209071163.00

Dear Kent:

The purpose of this letter is to assess the acceptability of sound levels that will be emitted by turbines on the Border Winds Wind Energy Project proposed on Rolette and Towner Counties, North Dakota. This letter also requests written concurrence from Towner County that turbine sound levels will be acceptable, provided that turbines are setback: (1) at least 800 feet from the nearest occupied residence, and (2) at least 800 feet from the nearest non-participating landowner property boundary.

We understand that Towner County requires that wind turbine noise at property lines be limited to 50 dBA unless a Conditional Use Permit is obtained. Although the Border Winds project will require a Conditional Use Permit, some assurance of reasonable that noise levels may be desirable prior to issuing a Conditional Use Permit. A Conditional Use Permit is required for utilities, and also for wind power facilities if they are not consistent with Article II, Section 12 of County Zoning Regulations (i.e., if > 5 MW) (Towner County, North Dakota 2007).

#### **Wind Turbine Noise Assessment Basics**

Noise is defined as unwanted sound (Rogers et al. 2006). The sound generated by wind turbines becomes noise only when humans perceive it to be objectionable. Noise concerns of humans can depend upon: (1) the intensity and frequency of sound, (2) background or ambient noise or sound levels, (3) terrain and vegetation, and (4) the nature and attitude of the receptor (i.e., the person hearing the noise) (Rogers et al. 2006).

Wind turbines generate two types of sound (Rogers et al. 2006). Mechanical sound originates from the mechanical components in a wind generator. Aerodynamic sound originates from the flow air around wind turbine blades. Aerodynamic sound is typically louder than mechanical sound and it generally increases with wind speed (Rogers et al. 2006). In natural environments, the sound emitted by wind turbines combines with background ambient sound levels to produce the sound level detected by the receptor. The sound from wind turbines is described in terms of sound



pressure, and is typically expressed in dBA, which are decibels corrected or A-weighted for the sensitivity of the human ear (National Research Council 2007).

### **Noise Regulation**

A typical noise regulation standard is 50 dBA. This corresponds to the standard in the Towner County Zoning Ordinance, which limits noise from wind generation facilities to 50 dBA at the nearest property line (Towner County, North Dakota 2007). It also corresponds to the Pierce County, North Dakota noise standard (North Dakota Public Service Commission 2005) and the Minnesota nighttime noise standard in residential areas (Minnesota Department of Commerce 2007).

### **Noise Assessment**

Detailed noise assessment for wind energy facilities typically involves: (1) an estimate of ambient background noise levels, (2) prediction or measurement of turbine noise levels, (3) sound propagation modeling, and (4) comparison of modeled sound levels with ambient sound levels (Rogers et al. 2006).

This assessment takes a slightly more simple approach because: (1) the Border Winds project will require a Conditional Use Permit from Towner County and therefore is not bound by the 50 dBA nearest property line noise standard, (2) the project wind turbine locations are very preliminary and may be subject to change, and (3) detailed property boundary mapping and detailed turbine sound emission specifications are not yet available for this project.

The Border Winds project will tentatively use 42 Mitsubishi 2.4 MW turbines. Only seven of the preliminary wind turbine locations (a total of 16.8 MW) are situated in Towner County. The remainder will likely be located in Rolette County.

Several studies provide information useful in constructing a general assessment of wind turbine sound on the Border Winds project. An analysis of the Rugby Wind Farm in Pierce County, North Dakota, concluded that a setback of 1,000 feet from residences would meet the 50 dBA noise standard (North Dakota Public Service Commission 2005). The Minnesota Department of Commerce (2007) wrote that depending on the turbines, layout, and site conditions, turbines typically need to be 750 to 1,500 feet from residences to meet the 50 dBA noise standard. The most useful information comes from the National Research Council (2007):

The sound power level from a single turbine is usually around 90-105 dB(A); such a turbine creates a sound pressure of 50-60 dB(A) at a distance of 40 meters [131.2 feet] (this is about the same level as conversational speech).

Sound from a point source such as a wind turbine increases by 6 dBA when you move twice as close to the source (Rogers et al. 2006). It follows that each time you double



the distance between a receptor and a sound source, the sound decreases by 6 dBA. A 3 dBA change in sound is considered a barely discernible to the human ear (Rogers et al. 2006).

Based on the information above, the sound from a single turbine would typically be:

- 44 to 54 dBA at a distance of 262.5 feet,
- 38 to 48 dBA at a distance of 524.9 feet, and
- 35 to 45 dBA at a distance of 787.4 feet.

### **Literature Cited**

- Minnesota Department of Commerce. 2007. Summary of Historic PUC Wind Setbacks and Standards. PUC Docket No. E,G999/M-07-1102. <http://energyfacilities.puc.state.mn.us/documents/19302/Summary%20PUC%20Setbacks%20Standards%202.pdf>, Accessed May 15, 2008.
- Mitsubishi Heavy Industries. 2008a. Mitsubishi wind turbine generator MWT-95/2.4. <http://www.mhi.co.jp/en/products/pdf/mwt95.pdf>, Accessed May 7, 2008.
- Mitsubishi Heavy Industries. 2008b. Mitsubishi wind turbine generator MWT-92/2.4. <http://www.mhi.co.jp/en/products/pdf/mwt92.pdf>, Accessed May 7, 2008.
- National Research Council. 2007. Environmental Impacts of Wind-Energy Projects. Committee on Environmental Impacts of Wind Energy Projects, National Academies Press. 375p. Available online at: [www.national-academies.org](http://www.national-academies.org) ([http://www.nap.edu/catalog.php?record\\_id=11935](http://www.nap.edu/catalog.php?record_id=11935)).
- North Dakota Public Service Commission. 2005. Rugby Wind Farm, Pierce County, North Dakota Siting Application; Finding of Fact, Conclusion of Law and Order; Case No. PU-05-47. <http://www.psc.state.nd.us/jurisdiction/siting/Redacted%20order%20revised%20for%20web%20posting%2010-7-05.pdf>, Accessed May 15, 2008.
- Rogers, A.L., J.F. Manwell, and S. Wright. Amended 2006. Wind Turbine Acoustic Noise: a white paper. Renewable Energy Research Laboratory, U of Massachusetts at Amherst. [http://www.ceere.org/rerl/publications/whitepapers/Wind\\_Turbine\\_Acoustic\\_Noise\\_Rev2006.pdf](http://www.ceere.org/rerl/publications/whitepapers/Wind_Turbine_Acoustic_Noise_Rev2006.pdf), Accessed May 7, 2008.
- Towner County, North Dakota. 2007. Draft Zoning Ordinance. <https://mylocalgov.com/townercountynd/ShowImage.asp?thumb=0&rowid=153&show=0>, Accessed October 24, 2007.

Mr. Kent M. Haugen  
June 17, 2008  
Page 4



### **Conclusion**

The assessment above suggests that the sound of turbines on the Border Winds project will be acceptable to Towner County if turbines are setback at least 800 feet from the nearest occupied residence and the nearest non-participating landowner property boundary. The 50-dBA noise limit at the nearest property boundary appears to relate to the potential for objections to noise at the nearest occupied residence. The use of property boundaries in regulation of wind turbine noise can be problematical unless the regulation distinguishes between participating and non-participating landowners. Landowners who participate in wind energy projects are less likely to object to wind turbine noise. Therefore, we believe that the 50 dBA limit is intended to apply to the nearest non-participating landowner property boundary.

### **Request**


We request a written response indicating that Towner County concurs with our conclusion. Our conclusion is that the sound of turbines on the Border Winds project will be acceptable to Towner County if turbines are setback: (1) at least 800 feet from the nearest occupied residence, and (2) at least 800 feet from the nearest non-participating landowner property boundary. Please call me at (952) 906-7436 or email me at [rob.bouta@westwoodps.com](mailto:rob.bouta@westwoodps.com) if you have questions.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES

Robin P. Bouta  
Senior Environmental Scientist

cc: Mr. Ian Witherspoon, Sequoia Energy  
Mr. Galen J. Mack, Mack Law Offices, PC



**Appendix D**  
**Pre-Construction Investigation Protocols**

- 
- D.1 Avian Field Study**
  - D.2 Wetland Field Study**
  - D.3 Cultural Resource Field Study**



**Appendix D.1  
Avian Field Study**



**Draft Protocol for Pre-Construction Avian Field Study  
Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Westwood Professional Services

October 23, 2008

***Objective:** Conduct avian field surveys during the spring migration period to identify the use of the Project Area by breeding and migratory bird species, evaluate avian habitat associations, and further assess the risk of avian mortality from collision with wind turbines.*

### **Study Site**

The Border Winds Wind Energy Project (Project) encompasses approximately 122 square miles (78,080 acres) and is located immediately south of the Canadian border in Rolette and Towner Counties, North Dakota. The predominant land cover in the project area is agricultural cropland consisting mostly of small grains. Grasslands and pastures are present in certain areas. Woodlands are limited primarily to farmsteads that are scattered throughout the area. Wetlands are abundant and exist primarily as seasonally flooded prairie potholes.

The project area contains lands designated for avian use by the U.S. Fish and Wildlife Service (USFWS). These include USFWS wetland easement lands and Waterfowl Production Areas (WPAs). USFWS wetland easements provide wetland breeding, loafing, and migratory habitat for birds by protecting wetlands through easement agreements on privately-owned land. The easements prevent conversion of wetlands to upland through fill or drainage. Waterfowl Production Areas are public lands managed by the USFWS that preserve wetlands and grasslands critical to waterfowl and other wildlife.

### **Methods**

#### Breeding and Migratory Bird Surveys

Westwood will conduct avian field surveys during a 10-week period in the spring (approximately March 15 – May 30). The surveys will involve identification of species observed in the project area and calculation of the relative abundance of those species. The movement status (stationary or in flight) will also be recorded, along with the altitude of flight (low, medium, high), if applicable. Altitude categories will be based on the height of the sweep area of wind turbine blades. Estimates of flight altitude will be field-calibrated using the known height of four meteorological towers (160 and 200 feet) in the project area. Weather data (cloud cover, visibility, temperature, wind speed) will also be recorded for each survey day. Surveys are anticipated to take place once a week for the duration of the survey period. Species that are detected by both sight and sound will be recorded. The survey will follow a standard protocol based on point counts and/or transects. Point counts locations will be selected based on representative areas and transects will be located on the existing road network at specific intervals in the Project Area.

## Raptor Nest Location

The raptor nesting season will coincide with breeding and migratory bird surveys. Observed raptor nests will be recorded and the UTM coordinates of each nest will be estimated on mapping or recorded in the field with a GPS unit. The coordinates will then be mapped and buffered at a specific distance using GIS to facilitate avoidance of known raptor nest locations with wind energy facilities to the extent practical.

## **Analysis**

Field survey data will be summarized by compiling species lists and relative abundance data. Westwood will also address the risk of avian collisions with wind turbines and transmission lines by conducting an analysis that takes into account both flight height and species abundance. The results will be compared to available outcomes of similar studies from other wind resource areas. Westwood will determine the conservation status of bird species observed in the project area by consulting federal threatened and endangered species lists, as well as the North Dakota Comprehensive Wildlife Conservation Plan, known as the Wildlife Action Plan in North Dakota. The habitat associations and spatial distribution of birds observed during the surveys will be reviewed in GIS to assess the risk of bird mortality and habitat impacts associated with the Border Winds Energy Project, with an emphasis on species of conservation status.

## **Deliverables**

Westwood will provide a written report summarizing results of field surveys and assessing the risk of bird mortality associated with the Border Winds Energy Project. The report will include tables and/or graphs of observed bird species, their relative abundance, and conservation status. Maps will be included to show sampling locations, and to the extent that data are available, species-habitat characteristics.



**Appendix D.2  
Wetland Field Study**



**Draft Protocol for Pre-Construction Wetlands Inventory  
Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Westwood Professional Services

October 23, 2008

***Objective:** Conduct wetland field surveys to identify wetlands and other aquatic resources that could be affected by project facilities within the Project Area.*

Wetlands and other waters of the United States (WOUS) within the Border Winds Wind Energy Project (Project) boundary have been mapped prior to the initiation of field work. These maps were generated from publically available wetland mapping sources including the National Wetlands Inventory, National Hydrography Dataset, North Dakota Farm Service Agency wetland mapping, and the most recent aerial photographs available. Water resources shown on these maps were digitized into one comprehensive map to refine and advance wetland boundaries for use during field studies.

An initial, preliminary field survey that was conducted in June 2008 included a field meeting with U.S. Fish and Wildlife Service (USFWS) staff. An objective of the initial survey was to identify specific areas of concern within the Project Area, including wetlands and WOUS that are subject to U.S. Army Corps of Engineers (USACE) jurisdiction. Another objective of the initial survey was to identify and discuss wetlands on USFWS wetland easement lands that are subject to USFWS jurisdiction. Once resources had been field reviewed in the Project Area, adjustments to the siting of turbines and other project facilities could be made to address agency concerns and avoid and minimize effects on those resources.

An additional, more intensive field effort will be necessary to identify wetlands and WOUS that are located in proximity to the locations of turbines, access roads, met towers, the operations and maintenance facility, the substation, and construction staging areas. This field effort will identify those jurisdictional resources that could be impacted during construction of the proposed Project. A USACE jurisdictional determination will be requested prior to or around the time of this field effort. The objective of this field visit will be to refine the jurisdictional wetland mapping, delineate wetlands where necessary using methods set forth in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987), and identify micrositing adjustments that will minimize wetland impacts. If Project facilities do not completely avoid USFWS wetland easement lands, those easement lands will be reviewed in the field with USFWS staff to identify micrositing adjustments that may be necessary to minimize and avoid impacts to USFWS jurisdictional wetlands. Wetland and WOUS boundaries located in close proximity to Project facilities will be located with a GPS unit. Wetland boundary coordinates will be uploaded into project mapping to facilitate wetland avoidance and impact assessment for permitting purposes.

The necessary field wetland delineation data forms will be completed, wetland impacts will be calculated based on project plans, and if necessary, USACE and/or USFWS permit applications will be completed and submitted to request authorization under a Section 404 Permit and/or Special Use Permit, as appropriate.



**Appendix D.3**  
**Cultural Resource Field Study**



**Draft Protocol for Pre-Construction Cultural Resources Inventory  
Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Westwood Professional Services

October 23, 2008

***Objective:** Conduct a Class III Intensive Cultural Resources Inventory to identify cultural resources that could be affected by project facilities within the Project Area.*

Westwood Professional Services, Inc. conducted a Class I Literature Search for the defined project area. The results of the Class I Literature Search provided an inventory of previously recorded historic properties (archaeological sites and architectural structures). The results suggested that archaeological and historic investigations executed in the region to date have not determined the potential for the existence of cultural resources in the area. While several investigations have been carried out in the project area, many of these have been limited in scope and concentrated on relatively small property parcels or immediate right-of-ways. Based upon the result of a previous Class I investigation, the North Dakota State Historic Preservation Office (ND SHPO) has concurred with the recommendation that a Class III Intensive Cultural Resources Inventory be conducted within the defined project area for the Border Winds Wind Energy Project.

The Class III Intensive Cultural Resources Inventory will entail a systematic field inspection of the defined project area performed by or under the direction of a qualified professional archaeologist. The results of such investigations provide for the determination of significant cultural resources and their eligibility for inclusion on the National Register for Historic Places (NRHP) and/or the North Dakota State Historic Sites Registry.

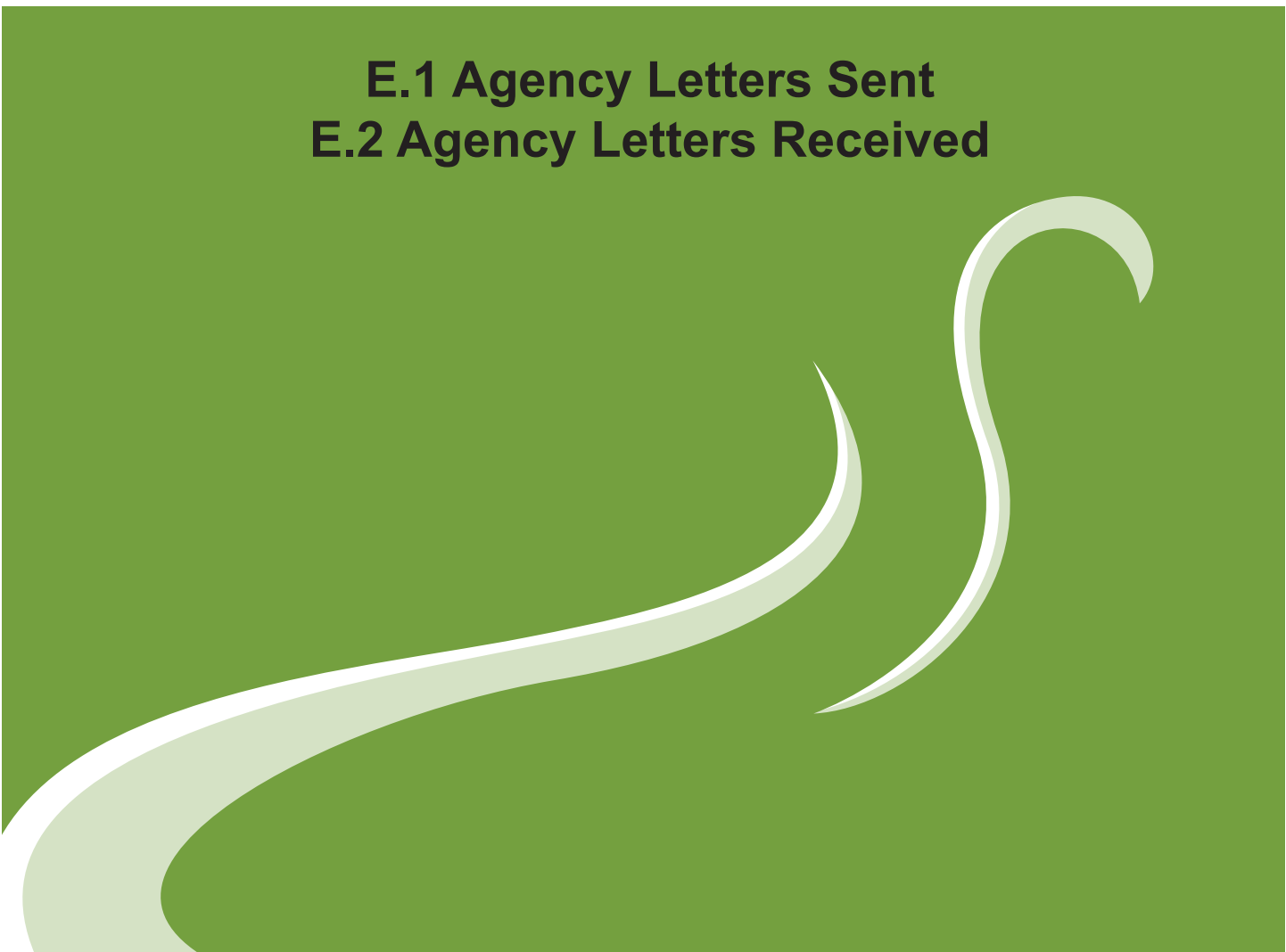
Districts, sites, buildings, structures, and objects of possible historical or architectural value will be examined by or under the supervision of a qualified researcher. The surface of the land and districts, sites, buildings, structures, and objects of possible historic or prehistoric archeological value will be inspected by or under the supervision of a professional archeologist. A comprehensive effort will be made to identify potential resources within the area that may qualify for the NRHP and/or the North Dakota State Historic Sites Registry. Cultural resources will be evaluated against the criteria established under 36 CFR 60.6 (redesignated 36 CFR 1202).

The locations of archaeological and architectural properties identified and recorded during the Class III and potential subsequent field investigations will be mapped to facilitate the avoidance of negative impacts to recorded properties during project construction. Ultimately, the project should follow the guidelines for cultural resource investigations as defined by the North Dakota State Historic Preservation Office.



**Appendix E  
Agency Letters**

**E.1 Agency Letters Sent  
E.2 Agency Letters Received**





**Appendix E.1  
Agency Letters Sent**



September 24, 2008

Westwood Professional Services

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Mr. Barry Cooper, Regional Administrator  
Federal Aviation Administration  
Great Lakes Region  
O'Hare Lake Office Center  
2300 East Devon Avenue  
Des Plaines, IL 60018

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Cooper:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Mr. J.R. Flores, State Conservationist  
Natural Resources Conservation Service  
North Dakota State Office  
220 East Rosser Avenue  
PO Box 1458  
Bismarck, ND 58502-1458

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Flores:

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Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

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Ms. Paulette M. Gustafson, District Conservationist  
Natural Resources Conservation Service  
Rolla Field Office  
1106 Main Avenue West, Suite 3  
Rolla, ND 58367-7609

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Ms. Gustafson:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouda, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Mr. Dan Cimarosti, Regulatory State Program Manager  
North Dakota Regulatory Office-Omaha District  
US Army Corps of Engineers  
1513 South 12th Street  
Bismarck, ND 58504

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Cimarosti:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Port Director Morin  
U.S. Customs and Border Protection  
Saint John Port of Entry  
RR1 Box 75  
Saint John, ND 58369

**Re: Proposed Boarder Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Director Morin:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

May 13, 2008

Westwood Professional Services

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Mr. Terry Ellsworth  
U. S. Fish and Wildlife Service  
North Dakota Field Office  
3425 Miriam Avenue  
Bismarck, North Dakota 58501

**Re: Request for Comments Regarding Proposed Border Winds Renewable Energy Project, Rolette and Towner Counties, North Dakota**  
File 20071163.00

Dear Terry:

We are writing to request comments from the USFWS regarding the Border Winds Renewable Energy Project proposed in Rolette and Towner Counties, North Dakota. The project area covers approximately 123 square miles and the project is planned for a nameplate capacity of approximately 100 MW, consisting of 42 2.4-megawatt wind turbines. The project location and a very preliminary layout are shown on the enclosed confidential map.

Regarding the Endangered Species Act, we understand that federally listed species known to occur in Rolette County include the Whooping Crane (endangered) and Dakota Skipper (candidate), and that only the Whooping Crane is known to occur in Towner County. We would appreciate any guidance or mapping you could provide on these species and their critical habitats. We would also appreciate your comments on migratory birds, native prairie, and the potential need for field surveys. We do not yet know if this project will entail federal involvement.

We are aware that the project area includes USFWS wetland easements. We are coordinating with David Bolin of the J. Clark Salyer NWR and Neil Shook of the Devils Lake WMD regarding those easements. We would like to meet with USFWS staff in the project area between June 9 and 13 and we would welcome your participation in that meeting. Please email me or call me at (952) 906-7346 if you have questions or need additional information.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES

Robin P. Bouta  
Senior Environmental Scientist

Enclosure

cc: Mr. Ian Witherspoon, Sequoia Energy  
Mr. David Bolin, USFWS  
Mr. Neil Shook, USFWS

September 24, 2008

Westwood Professional Services

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Ms. Janine E. Powell, Director  
United States Geological Survey  
Northern Prairie Wildlife Research Center  
8711 37<sup>th</sup> Street Southeast  
Jamestown, ND 58401-7317

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Ms. Powell:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Ms. Maren Daley, Executive Director  
Job Service North Dakota  
PO Box 5507  
Bismarck, ND 58506-5507

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Ms. Daley:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Mr. Gary R. Ness, Director  
Aeronautics Commission  
P.O. Box 5020  
Bismarck, ND 58502-5020

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Ness:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouda, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Mr. Roger Johnson, Agricultural Commissioner  
North Dakota Department of Agriculture  
600 East Boulevard Avenue  
Department 602  
Bismarck, ND 58505-0020

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Johnson:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Mr. Wayne Kutzer, Director  
North Dakota Department of Career and Technical Education  
State Capitol 15th Floor  
600 East Boulevard Avenue  
Department 270  
Bismarck, ND 58505-0610

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Kutzer:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Mr. Shane Goettle, Commissioner  
North Dakota Department of Commerce  
Economic Development & Finance Division  
Century Center, 1600 East Century Avenue, Suite 2  
PO Box 2057  
Bismarck, ND 58503

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Goettle:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

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Dr. Terry Dwelle, M.D., State Health Officer  
North Dakota Department of Health  
600 East Boulevard Avenue  
Bismarck, ND 58505-0200

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Dr. Dwelle:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Ms. Carol K. Olson, Executive Director  
North Dakota Department of Human Services  
600 East Boulevard Avenue  
Dept 325  
Bismarck, N.D. 58505-0250

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Ms. Olson:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

7699 Anagram Drive  
Eden Prairie, MN 55344

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Ms. Lisa Fair McEvers, Commissioner of Labor  
North Dakota Department of Labor  
600 East Boulevard Avenue  
Dept 406  
Bismarck, ND 58505-0340

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Ms. McEvers:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

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cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

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Mr. Wayde Swenson, District Engineer  
North Dakota Highway Department  
District 3 – Devil's Lake  
316 Sixth Street South East  
Devils Lake, ND 58301-3628

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Swenson:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

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Mr. Michael McKenna, Division Chief  
North Dakota Game and Fish Department  
Conservation and Communications Division  
100 North Bismarck Expressway  
Bismarck, ND 58501-5095

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. McKenna:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES

Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Mr. Randy Kreil, Division Chief  
North Dakota Game and Fish Department  
Wildlife Division  
100 North Bismarck Expressway  
Bismarck, ND 58501-5095

**Re: Proposed Boarder Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Kreil:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

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Mr. Greg Power, Division Chief  
North Dakota Game and Fish Department  
Fisheries Division  
100 North Bismarck Expressway  
Bismarck, ND 58501-5095

**Re: Proposed Boarder Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Power:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouda, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Mr. Edward C. Murphy, State Geologist  
North Dakota Geological Survey  
600 East Boulevard Avenue  
Bismarck, ND 58505-0840

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Murphy:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

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Governor John Hoeven  
Governor's Office  
600 East Boulevard Avenue  
Bismarck, ND 58505-0001

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Governor Hoeven:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

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Ms. Cheryl Kulas, Executive Director  
North Dakota Indian Affairs Commission  
600 East Boulevard Avenue, Room #117  
1st Floor - Judicial Wing  
Bismarck, ND 58505-0300

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Ms. Kulas:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of Sequoia's plans to obtain necessary approvals to construct and operate the Border Winds Wind Energy Project (Border Winds). With this letter, Sequoia is seeking your input regarding Tribal concerns relating to the proposed wind energy project. Your involvement during this early phase of project development will allow Sequoia to identify potential impacts to features within the project area which may relate to significant Tribal cultural resources and practices. Results of this communication will provide information by which impacts to these resources could be minimized or avoided as project planning proceeds.

Sequoia proposes to construct the Border Winds, which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental and other resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the North Dakota Public Services Commission. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES

Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

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Ms. Pam Sharp, Director  
North Dakota Office of Management and Budget  
600 East Boulevard Avenue, Department 110  
Bismarck, ND 58505-0400

**Re: Proposed Boarder Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Ms. Sharp:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

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[www.westwoodps.com](http://www.westwoodps.com)



Mr. Wayne Stenehjem, Attorney General  
State Capitol,  
600 East Boulevard Avenue  
Department 125  
Bismarck, ND 58505

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Stenehjem:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

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WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

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cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

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Mr. Douglass A. Prchal, Director  
North Dakota Parks and Recreation Department  
1600 East Century Avenue, Suite 3  
Bismarck, ND 58503-0649

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Prchal:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

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[www.westwoodps.com](http://www.westwoodps.com)



Mr. Jeff Engleson, Investment Division Director  
Energy Development Impact Grant Office  
c/o North Dakota State Land Department  
PO Box 5523  
Bismarck, ND 58506-5523

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Engleson:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouda, Westwood Professional Services

September 22, 2008

Westwood Professional Services

7699 Anagram Drive  
Eden Prairie, MN 55344

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Mr. Scott Hochhalter, Soil Conservation Specialist  
North Dakota State University Extension Service  
North Dakota State Soil Conservation Committee  
2718 Gateway Avenue, Unit #104  
Bismarck, ND 58503

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Hochhalter:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting your review of the proposed project and to provide comments and information about applicable permits that may be required from your office. You will also be receiving notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the wind resource for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



Comments, questions, concerns your office may provide are appreciated. Those received by October 22, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have any questions or require additional information please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES

Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Mr. Dale Frink, State Engineer  
North Dakota State Water Commission  
900 East Boulevard Avenue, Dept 770  
Bismarck, ND 58505-0850

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Frink:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

# TRANSMITTAL

Westwood Professional Services

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Date: June 30, 2008

Re: **Proposed Border Winds Wind Energy Project, Rolette and Towner  
Counties, ND**  
File 20071163

To: Paul Picha  
Historic Preservation Division State Historical Society of North Dakota  
612 East Boulevard Avenue  
Bismarck, ND 58505-0830

From: Steven J. Blondo

Items:	No	Description
	1	Class I Literature Search for Proposed Border Winds Wind Energy Project

Purpose: For your information

Remarks: Please find enclosed the Class I Literature Search Report. As we discussed on the phone, the project is in early stages of planning and we are currently unsure of Section 106 triggers or other federal compliance issues.

Delivery: Mail

cc: File20071163

September 24, 2008

Westwood Professional Services

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Mr. Ralph Olson, Director  
North Dakota Township Officers Association  
5054 47<sup>th</sup> Street NE  
Maddock, ND 58348

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Olson:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Mr. Scott Mitchell, Mayor  
City of Rolla  
P.O. Box 1200  
Rolla, ND 58367

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Mitchell:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Eden Prairie, MN 55344

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[www.westwoodps.com](http://www.westwoodps.com)



Mr. Paul Juntunen, Chairman  
Mount View Township  
5851 99<sup>th</sup> Street NE  
Rolla, ND 58367

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Juntunen:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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[www.westwoodps.com](http://www.westwoodps.com)



Mr. C. John Peterson, Chairman  
Picton Township  
5267 106<sup>th</sup> Street NE  
Rolla, ND 58367

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Peterson:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Mr. Allen Krech  
Rolla Municipal Airport Authority  
RR1 Box 103B  
Rolla, ND 58367

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Krech:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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[www.westwoodps.com](http://www.westwoodps.com)



Mr. Joseph S. Baker, Chair  
Rolette County Commissioner's Office  
P.O. Box 939  
Rolla, ND 58367

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Baker:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouda, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Mr. Chuck Tastad, Chair  
Rolette County Soil Conservation District  
1106 Main Avenue West  
Rolla, ND 58367-7609

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Tastad:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Mr. Kent Haugen, Auditor/Treasurer  
Towner County  
P.O. Box 603  
Cando, ND 58324

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Haugen:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood has had previous contact with Towner County regarding noise issues for this project. However, the project is moving forward and Westwood is now in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

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Mr. Robert Curl, Chair  
Towner County Soil Conservation District  
1200 Highway 281 South  
Cando, ND 58324-6100

**Re: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota**

Dear Mr. Curl:

On behalf of Sequoia Energy US Inc. (Sequoia), Westwood Professional Services (Westwood) is notifying you of the above-mentioned project in accordance with North Dakota Administrative Code (NDAC) 69-06-01-05. Westwood is in the process of preparing a Certificate of Site Compatibility Application for submission to the North Dakota Public Service Commission (PSC). As part of this application process, Westwood is requesting that you review the proposed project and provide comments and information about applicable permits that may be required from your office. You will also receive notice once the application is filed.

Sequoia proposes to construct the Border Winds Wind Energy Project (Border Winds), which will consist of approximately 66 wind turbines with a combined capacity of approximately 150 megawatts (MW). Individual turbine size will be approximately 2.3 MW; however, their specific locations have not yet been determined. The system will include wind turbines mounted on tubular steel towers, a collection system consisting of buried electrical cables, access roads, an operations and maintenance facility, and a substation that will connect the system to an Xcel Energy transmission line that runs through the project area.

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties. To facilitate your review, a map is attached (Exhibit 1) detailing the location of the proposed Border Winds project.

Sequoia is committed to optimizing the design for the proposed Border Winds project. All decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Sequoia will evaluate the site to optimize wind resources, transmission interconnection opportunities, and economic factors, while avoiding and minimizing impacts to environmental resources.



We appreciate any comments, questions, or concerns your office may provide. Those received prior to October 24, 2008 will be included in the Certificate of Site Compatibility Application to the PSC. Should you have questions or require additional information, please do not hesitate to contact me at (952) 906-7423. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services

September 24, 2008

Westwood Professional Services

7699 Anagram Drive  
Eden Prairie, MN 55344

MAIN 952-937-5150  
FAX 952-937-5822  
TOLL FREE 1-888-937-5150  
EMAIL wps@westwoodps.com

www.westwoodps.com



Ms. Kathy Duttonhefner, Natural Resources Coordinator  
North Dakota Natural Heritage Program  
North Dakota Parks and Recreation  
1600 East Century Avenue, Suite 3  
Bismarck, ND 58503-0649

**Re: Request for natural heritage information for Rolette and Towner Counties, North Dakota**

Dear Ms. Duttonhefner:

Westwood has previously requested natural heritage information for a wind farm project in North Dakota (09/28/07 and 10/26/07). However, because the project area has since changed and also because new data may be available, we are requesting an additional Natural Heritage Inventory review of project area

The proposed Border Winds wind energy conversion facility will be located in northeastern North Dakota near the community of Rolla, in Rolette and Towner Counties as shown on the attached map (Exhibit 1). The following table shows the township, range, and sections that are within the existing Project area.

Township	Range	Sections
164N	69W	25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
164N	70W	25, 26, 27, 28, 33, 34, 35, 36
163N	68W	7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30, 31, 32, 33, 34
163N	69W	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
163N	70W	1, 2, 3, 4, 9, 10, 11, 12, 13, 24, 25, 36
162N	68W	3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19, 20, 21, 22
162N	69W	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30

We are requesting information on records of rare plants and animals, ecological communities (state and federal listed endangered or threatened), and state lands and waters.



We would like to request the information prior to October 24, 2007, if possible. Please call me at (952) 906-7433 if you have any questions or need additional information in order to expedite this request. You may direct the invoice for this data request to my attention at Westwood Professional Services. Thank you for your time and attention.

Sincerely,

WESTWOOD PROFESSIONAL SERVICES



Amy Linnerooth  
Environmental Scientist

Attachment: Exhibit 1

cc: Ian Witherspoon, Sequoia Energy US Inc.  
Rob Bouta, Westwood Professional Services



**Appendix E.2**  
**Agency Letters Received**





REPLY TO  
ATTENTION OF

**DEPARTMENT OF THE ARMY**  
CORPS OF ENGINEERS, OMAHA DISTRICT  
NORTH DAKOTA REGULATORY OFFICE  
1513 SOUTH 12<sup>TH</sup> STREET  
BISMARCK ND 58504-6640

October 14, 2008

North Dakota Regulatory Office

Westwood Professional Services  
Attn: Ms. Amy Linnerooth, Environmental Scientist  
7699 Anagram Drive  
Eden Prairie, Minnesota 55344

RECEIVED  
OCT 17 2008  
WESTWOOD  
PROFESSIONAL SERVICES

Dear Ms. Linnerooth:

This is in response to your letter received **October 9, 2008**, requesting Department of the Army (DA), US Army Corps of Engineers (Corps) comments on behalf of Sequoia Energy US Inc. regarding a proposed Border Winds Energy project located in Rolette and Towner Counties, North Dakota.

Corps Regulatory Offices administer Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Section 10 of the Rivers and Harbors Act regulates work in or affecting navigable waters. This would include work over, through, or under a Section 10 water. Section 404 of the Clean Water Act regulates the discharge of dredge or fill material (temporarily or permanently) in waters of the United States. Waters of the United States may include, but are not limited to, rivers, streams, ditches, coulees, lakes, ponds, and their adjacent wetlands. Fill material includes, but is not limited to, rock, sand, soil, clay, plastics, construction debris, wood chips, overburden from mines or other excavation activities and materials used to create any structure or infrastructure in the waters of the United States.

If this project would require a Section 10 and/or Section 404 permit, please complete and submit the enclosed Corps of Engineers permit application to the U S Army Corps of Engineers, North Dakota Regulatory Office, 1513 South 12<sup>th</sup> Street, Bismarck, North Dakota 58504. If you are unsure if a permit is required, you may submit an application; include a project location map, description of work, and construction methodology.

If we can be of further assistance or should you have any questions regarding our program, please do not hesitate to contact this office by letter or phone at (701) 255-0015.

Sincerely,

Daniel E. Cimarosti  
Regulatory Program Manager  
North Dakota

Enclosure (Application)

**Instructions for Preparing a  
Department of the Army Permit Application**

**Blocks 1 through 4.** To be completed by Corps of Engineers.

**Block 5. Applicant's Name.** Enter the name of the responsible party or parties. If the responsible party is an agency, company, corporation or other organization, indicate the responsible officer and title. If more than one party is associated with the application, please attach a sheet with the necessary information marked **Block 5**.

**Block 6. Address of Applicant.** Please provide the full address of the party or parties responsible for the application. If more space is needed, attach an extra sheet of paper marked Block 6.

**Block 7. Applicant Telephone Number(s).** Please provide the number where you can usually be reached during normal business hours.

**Blocks 8 through 11.** To be completed if you choose to have an agent.

**Block 8. Authorized Agent's Name and Title.** Indicate name of individual or agency, designated by you, to represent you in this process. An agent can be an attorney, builder, contractor, engineer or any other person or organization. Note: An agent is not required.

**Blocks 9 and 10. Agent's Address and Telephone Number.** Please provide the complete mailing address of the agent, along with the telephone number where he/she can be reached during normal business hours.

**Block 11. Statement of Authorization.** To be completed by applicant if an agent is to be employed.

**Block 12. Proposed Project Name or Title.** Please provide name identifying the proposed project (i.e., Landmark Plaza, Burned Hills Subdivision or Edsall Commercial Center).

**Block 13. Name of Waterbody.** Please provide the name of any stream, lake, marsh or other waterway to be directly impacted by the activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

**Block 14. Proposed Project Street Address.** If the proposed project is located at a site having a street address (not a box number), please enter here.

**Block 15. Location of Proposed Project.** Enter the county and state where the proposed project is located. If more space is required, please attach a sheet with the necessary information marked Block 15.

**Block 16. Other Location Descriptions.** If available, provide the Section, Township and Range of the site and/or the latitude and longitude. You may also provide description of the proposed project location, such as lot numbers, tract numbers or you may choose to locate the proposed project site from a known point (such as the right descending bank of Smith Creek, one mile down from the Highway 14 bridge). If a large river or stream, include the river mile of the proposed project site if known.

**Block 17. Directions to the Site.** Provide directions to the site from a known location or landmark. Include highway and street numbers as well as names. Also provide distances from known locations and any other information that would assist in locating the site.

**Block 18. Nature of Activity.** Describe the overall activity or project. Give appropriate dimensions of structures such as wingwalls, dikes (identify the materials to be used in construction, as well as the methods by which the work is to be done), or excavations (length, width, and height). Indicate whether discharge of dredged or fill material is involved. Also, identify any structure to be constructed on a fill, piles or float supported platforms.

The written descriptions and illustrations are an important part of the application. Please describe, in detail, what you wish to do. If more space is needed, attach an extra sheet of paper marked Block 18.

**Block 19. Proposed Project Purpose.** Describe the purpose and need for the proposed project. What will it be used for and why? Also include a brief description of any related activities to be developed as the result of the proposed project. Give the approximate dates you plan to both begin and complete all work.

**Block 20. Reason(s) for Discharge.** If the activity involves the discharge of dredged and/or fill material into a wetland or other waterbody, including the temporary placement of material, explain the specific purpose of the placement of the material (such as erosion control).

**Block 21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards.** Describe the material to be discharged and amount of each material to be discharged within Corps jurisdiction. Please be sure this description will agree with your illustrations. Discharge material includes: rock, sand, clay, concrete, etc.

**Block 22. Surface Areas of Wetlands or Other Waters Filled.** Describe the area to be filled at each location. Specifically identify the surface areas, or part thereof, to be filled. Also include the means by which the discharge is to be done (backhoe, dragline, etc.). If dredged material is to be discharged on an upland site, identify the site and the steps to be taken (if necessary) to prevent runoff from the dredged material back into a waterbody. If more space is needed, attach an extra sheet of paper marked **Block 22**.

**Block 23. Is Any Portion of the Work Already Complete?** Provide any background on any part of the proposed project already completed. Describe the area already developed, structures completed, any dredged or fill material already discharged, the type of material, volume in cubic yards, acres filled, if a wetland or other waterbody (in acres or square wet). if tile work was done under an existing Corps permit, identify the authorization if possible.

**Block 24. Names and Addresses of Adjoining Property Owners, Lessees, etc., Whose Property Adjoins the Project Site.** List complete names and full mailing addresses of the adjacent property owners (public and private) lessees, etc., whose property adjoins the waterbody or aquatic site where the work is being proposed so that they may be notified of the proposed activity (usually by public notice). If more space is needed, attach an extra sheet of paper marked Block 24.

**Information regarding adjacent landowners is usually available through the office of the tax assessor in the county of counties where the project is to be developed.**

**Block 25. Information about Approvals or Denials by Other Agencies.** You may need the approval of other Federal, state or local agencies for your project. identify any applications you have submitted and the status, if any (approved or denied) of each application. You need not have obtained all other permits before applying for a Corps permit.

**Block 26. Signature of Applicant or Agent.** The application must be signed by the owner or other authorized party (agent) . This signature shall be an affirmation that the party applying for the permit possesses the requisite property rights to undertake the activity applied for (including compliance with special conditions, mitigation, etc.).

## DRAWINGS AND ILLUSTRATIONS

General Information.

Three types of illustrations are needed to properly depict the work to be undertaken. These illustrations or drawings are identified as a **Vicinity Map**, a **Plan View** or a **Typical Cross-Section Map**. Identify each illustration with a figure or attachment number.

Please submit one original, or good quality copy, of all drawings on 8 1/2x11 inch plain white paper (tracing paper or film may be substituted). Use the fewest number of sheets necessary for your drawings or illustrations.

Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view or cross-section). **While illustrations need not be professional (many small, private project illustrations are prepared by hand), they should be clear, accurate and contain all necessary information.**

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT  
(33 CFR 325)

OMB APPROVAL NO. 0710-0003  
Expires December 31, 2004

The Public burden for this collection of information is estimated to average 10 hours per response, although the majority of applications should require 5 hours or less. This includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research and Sanctuaries Act, 33 USC 1413, Section 103. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED
--------------------	----------------------	------------------	-------------------------------

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE <i>(an agent is not required)</i>
6. APPLICANT'S ADDRESS	7. AGENT'S ADDRESS
7. APPLICANT'S PHONE NOS. W/AREA CODE	10. AGENT'S PHONE NOS. W/AREA CODE
a. Residence b. Business	a. Residence b. Business

11. STATEMENT OF AUTHORIZATION

I hereby authorize \_\_\_\_\_ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

\_\_\_\_\_  
APPLICANT'S SIGNATURE

\_\_\_\_\_  
DATE

NAME, LOCATION AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE *(see instructions)*

13. NAME OF WATERBODY, IF KNOWN *(if applicable)*

14. PROJECT STREET ADDRESS *(if applicable)*

15. LOCATION OF PROJECT

\_\_\_\_\_  
COUNTY

\_\_\_\_\_  
STATE

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN *(see instructions)*

17. DIRECTIONS TO THE SITE

18. Nature of Activity *(Description of project, include all features)*

19. Project Purpose *(Describe the reason or purpose of the project, see instructions)*

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards

22. Surface Area in Acres of Wetlands or Other Waters Filled *(see instructions)*

23. Is Any Portion of the Work Already Complete? Yes \_\_\_\_\_ No \_\_\_\_\_ IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

25. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

\*Would include but is not restricted to zoning, building and flood plain permits

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

\_\_\_\_\_  
SIGNATURE OF APPLICANT

\_\_\_\_\_  
DATE

\_\_\_\_\_  
SIGNATURE OF AGENT

\_\_\_\_\_  
DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than \$10,000 or imprisoned not more than five years or both.

United States Department of Agriculture



Natural Resources Conservation Service  
P.O. Box 1458  
Bismarck, ND 58502-1458

RECEIVED  
SEP 29 2008  
WESTWOOD  
PROFESSIONAL SERVICES

September 26, 2008

Amy Linnerooth  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344

RE: Proposed Border Winds Wind Energy Project – Rolette and Towner Counties, ND

Dear Ms. Linnerooth:

The Natural Resources Conservation Service (NRCS) has reviewed your letter regarding the referenced activity. NRCS is not a permitting agency. We are interested in the project impacts to wetlands, prime farmlands, and conservation easement acreage. We would require more information to address those issues, such as the exact location of where the turbines will be placed, where the collection systems for the buried electrical cables will be, where the access roads will be built, the location of the operations and maintenance facility, and the location of the substation.

If you have additional questions pertaining to FPPA, please contact Donald Felch, Biologist, at (701) 530-2023.

Sincerely,

A handwritten signature in black ink, appearing to read "J.R. Flores".

J.R. FLORES  
State Conservationist

cc:

Paulette Gustafson, DC, NRCS, Rolla, ND  
Lena Bohm, DC, NRCS, Cando, ND  
Andy Wingenbach, ASTC (FO), NRCS, Devils Lake, ND

*Helping People Help the Land*

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# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Ecological Services  
3425 Miriam Avenue  
Bismarck, North Dakota 58501



JUN 18 2008

Mr. Robin P. Bouta  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, Minnesota 55344

Dear Mr. Bouta:

This is in response to your May 13, 2008, request for environmental information in relation to the proposed Border Winds Renewable Energy Project in Rolette and Towner Counties, North Dakota. The proposed 100 megawatt (MW) project includes 42 wind turbines, each with a capacity of 2.4-MW and associated infrastructure. At this time, it is not known if this project will entail funding or permitting by a Federal agency. We offer the following comments under the authority of and in accordance with the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.), Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668-668d, 54 Stat. 250), the Endangered Species Act (ESA) (16 U.S.C. 1531 et seq.), the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57), and the National Environmental Policy Act (NEPA) ( Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970, as amended.

The U.S. Fish and Wildlife Service (Service) holds certain resources in trust and manages them for the benefit of the American people. These resources include migratory birds, inter-jurisdictional fish, federally-listed threatened and endangered species of plants and animals and their habitats, and units of the National Wildlife Refuge system. When planning an activity, project proponents should give careful consideration to potential impacts to these trust resources and compliance with the laws mentioned above. Additional information is provided below.

### **Migratory Birds**

Adequate consideration for avian resources early in the site evaluation process can help to minimize impacts and facilitate project review. Although current wind turbine technology and proper siting can help to minimize the incidence of avian deaths due to blade, aerial line, and tower strikes, the potential for direct mortality of some migratory birds will remain. Wind power developers, in concert with the Service, can help to ensure that projects proceed with as little impact to migratory birds as possible. This can be accomplished by gathering information on avian resources as they relate to project siting and by implementing measures to minimize impacts to migratory birds from the construction and operation of the wind facility. The Service's Interim Wind Turbine Siting Guidelines are enclosed to assist in project planning

(enclosure 1). We encourage project proponents to conduct a Potential Impact Index (PII) analysis to assist in the selection of a wind power site that minimizes the potential to impact migratory birds. Please inform this office whether or not you plan to use the Service's interim guidelines in selecting your site and if not, whether you intend to use a different method to assess avian resources and impacts to migratory birds.

To minimize the electrocution hazard to birds, the Service, with support from the Rural Utilities Service, recommends that new or updated overhead power lines be constructed in accordance with the current guidelines for preventing raptor electrocutions. The recommended guidelines can be found in "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996". To increase power line visibility and reduce bird fatalities resulting from collisions with power lines, the Service recommends new power lines that cross or run adjacent to rivers or large wetlands be modified according to "Mitigating Bird Collisions with Power Lines: The State of the Art in 1994". Both publications can be obtained by writing or calling the Edison Electric Institute, P.O. Box 266, Waldorf, Maryland 20604-0266, (1-800-334-5453) or visiting their website at [www.eei.org](http://www.eei.org).

#### **Threatened and Endangered Species**

A list of federally threatened and endangered species that may occur within the proposed project's area of influence is enclosed (enclosure 2). This list fulfills requirements of the Fish and Wildlife Service under Section 7 of the Endangered Species Act.

If a Federal agency authorizes, funds, or carries out a proposed action, the responsible Federal agency, or its delegated agent, is required to evaluate whether the action "may affect" listed species or critical habitat. If the Federal agency or its designated agent determines the action "is likely to adversely affect" listed species or modify critical habitat, the responsible Federal agency shall request formal section 7 consultation with this office. If the evaluation shows a "no effect" determination on listed species or critical habitat, further consultation is not necessary. If a private entity receives Federal funding for a construction project, or if any Federal permit or license is required, the Federal agency may designate the fund recipient or permit applicant as its agent for purposes of section 7 consultation.

Section 10(a)(1)(B) of the ESA allows non-Federal parties planning activities that have no Federal nexus, but which could result in the incidental taking of listed animals, to apply for an incidental take permit. (A Federal nexus exists whenever an activity is conducted, funded, or licensed or permitted by a Federal agency). The application must include a habitat conservation plan (HCP) laying out the proposed actions, determining the effects of those actions on affected federally-listed fish and wildlife species and their habitats (often including proposed or candidate species), and defining measures to minimize and mitigate adverse effects.

The Aransas Wood Buffalo Population (AWBP) of whooping cranes is the only self-sustaining migratory population of whooping cranes remaining in the wild. These birds breed in the

wetlands of Wood Buffalo National Park in Alberta and the Northwest Territories of northern Canada, and overwinter on the Texas coast. Whooping cranes in the AWBP annually migrate through North Dakota during their spring and fall migrations.

Endangered whooping cranes have been documented using roosting habitat in the vicinity of the proposed wind resource area. The proposed site is located outside the primary 180 mile-wide migration corridor that includes 95% of all confirmed whooping crane sightings in North Dakota (enclosure 3). The presence of suitable roosting and feeding habitat for whooping cranes in the wind resource area and confirmed whooping crane sightings, document the potential for whooping crane presence in the proposed wind resource area. A wind energy project in this wind resource area has the potential to affect whooping cranes during their annual spring and fall migration through North Dakota. Potential effects may be direct (e.g. collision mortality) or indirect (e.g. avoidance of the site resulting in cranes seeking alternate habitat). The interactions of whooping cranes with wind turbines and wind farms are currently not fully known, although it is expected that these large birds with relatively low maneuverability are susceptible to mortality via collisions with turbines. Currently, collisions with power lines are the greatest known source of mortality for fledged whooping cranes, and have accounted for the death or serious injury of at least 46 whooping cranes since 1956.

The Service does not believe that a determination of "no effect" is appropriate for this wind resource area because of, but not limited to, the presence of migrating whooping cranes in this area. However, due to the project location outside of the main migration corridor with only 5% of all confirmed whooping crane sightings in North Dakota, the Service believes that with suitable conservation measures included as part of the project, a determination of "may effect, not likely to adversely affect" for the whooping crane may be appropriate. Effective conservation measures to avoid or reduce potential impacts to whooping cranes include, but are not limited to: burying all new electrical transmission lines; if new lines cannot be buried, marking all new overhead transmission lines with visual marking devices such as aviation marker balls, swinging plates, spiral vibration dampeners, or swan flight diverters.

#### **Fish and Wildlife Service Property Interests**

The Service administers Waterfowl Production Areas owned in fee title as well as wetland and grassland easements throughout North Dakota. A review of Service realty records indicate Service property interests are located in the planning area. In your letter, you state that you are currently coordinating with David Bolin, J. Clark Salyer National Wildlife Refuge, and Neil Shook, Devils Lake Wetland Management District, regarding the proposed project's potential impacts to Service property interests. If Service lands are proposed to be impacted, the Service will be required to conduct an analysis of impacts and examine alternatives, pursuant to NEPA.

#### **High Value Habitat Avoidance**

The proposed project area is located in the Drift Prairie region of North Dakota and includes areas of native mixed-grass prairie. Since the 1800s, North Dakota has lost over 70 percent of its native grasslands, primarily due to crop production. The Service recommends avoiding construction or disturbance to native prairie areas.

Native prairie has significant natural resource values including:

1. Provides habitat for a number of migratory and resident grassland birds whose populations are declining.
2. Provides nesting habitat for millions of waterfowl.
3. Contains 200-300 plant species, which provide genetic diversity important to agriculture and medicine.
4. Provides habitat for thousands of insects including the Dakota skipper, a candidate species for listing under the ESA, and other butterflies (Ex: Regal fritillary, Tawny crescent).
5. Crucial for soil and water conservation.
6. Provides recreational opportunities (hunting, bird watching/wildlife observation, hiking).
7. Living laboratories for scientific research.

Our review of NWI maps indicate that wetland areas are located within the project area. NWI data can be accessed directly by visiting their website at ([wetlands.fws.gov](http://wetlands.fws.gov)). Section 404 of the Clean Water Act regulates placement of fill materials in certain wetlands. A Corps of Engineers' (Corps) 404 permit may be required if fill material will be placed in aquatic sites, including wetlands. Contact Mr. Dan Cimarosti, Regulatory Office, Corps of Engineers, 1513 South 12th Street, Bismarck, North Dakota 58504 (701-255-0015), to determine their permit requirements. If a 404 permit is required, the Service will provide recommendations on this project to the Corps.

Other high value wildlife habitat types in North Dakota include wooded draws and riparian forests. We recommend that you avoid construction of wind towers and appurtenant facilities in the above habitat types whenever possible.

Construction activities should be conducted in a manner that will minimize impacts to the wildlife and the existing habitat in the project area. To help avoid impacts, we recommend that you:

- Schedule construction for late summer or fall/early winter so as not to disrupt waterfowl or other wildlife during the breeding season (February 1 to July 15). If work is proposed to take place during the breeding season or at any other time which may result in the take of migratory birds or active nests, the Service recommends that the project proponent arrange to have a qualified biologist conduct a field survey of the affected habitats to determine the absence or presence of nesting migratory birds. If nesting migratory birds are found, we request you contact this office, suspend construction, or take other

measures, such as maintaining adequate buffers, to protect the birds until the young have fledged. The Service further recommends that field surveys for nesting birds, along with information regarding the qualification of the biologist(s) performing the surveys, and any avoidance measures implemented at the project site, be thoroughly documented and that such documentation be shared with the Service and maintained on file by the project proponent at least until such time as construction on the proposed project has been completed.

- Avoid construction in native prairie, if possible, and reseed disturbed native prairie with a comparable native grass/forb seed mixture. Obtain seed stock from nurseries within 250 miles of the project area to insure the particular cultivars are well adapted to the local climate.
- Minimize grassland disturbance by using fewer, larger turbines and limiting new road construction.
- Use underground transmission lines between turbines, as well as to the primary substation.
- Locate appurtenant facilities to avoid placement of fill in wetlands along the route.
- Install and maintain appropriate erosion control measures to reduce sedimentation and water quality degradation of wetlands and streams near the project area.
- Replace unavoidable wetland losses with functionally equivalent wetlands.

### **Research, Monitoring, and Assessment**

We encourage project proponents to conduct collision monitoring studies designed to determine the effect of several factors, such as site selection, turbine designs, the layout of wind plants, wind plant operations, habitat alteration, and changes in available perching and nesting sites, on bird deaths. The Avian Subcommittee of the National Wind Coordinating Committee (NWCC) has developed a guidance document to assist wind energy developers in designing studies that will produce credible and comparable results of avian interaction with wind power plants. The NWCC document, "Studying Wind Energy/Bird Interactions: A Guidance Document. Metrics and methods for determining or monitoring potential impacts on birds at existing and proposed wind energy sites," can be obtained by contacting the National Wind Coordination Committee, c/o RESOLVE, 1255 23<sup>rd</sup> Street, Suite 275, Washington, D.C. 20037, or by visiting their website at ([www.nationalwind.org](http://www.nationalwind.org)).

Given the Service requirements and recommendations above, as well as possible unforeseen issues that may arise, we encourage you to build sufficient planning time for coordination with the Service into your project time line. Thank you for the opportunity to comment. If you require further information as project planning proceeds, please contact Terry Ellsworth of my staff, or contact me directly, at (701) 250-4481, or at the letterhead address.

Sincerely,



Jeffrey K. Towner  
Field Supervisor  
North Dakota Field Office

Enclosures (3)

cc: Project Leader, Devils Lake WMD  
(Attn: N. Shook)  
Refuge Manager, J. Clark Salyer NWR  
(Attn: D. Bolin)  
Regulatory Office, Army Corps of Engineers, Bismarck  
(Attn: D. Cimarosti)  
ND Public Service Commission, Bismarck  
Director, ND Game & Fish Department, Bismarck  
(Attn: M. McKenna)

FEDERAL ENDANGERED AND CANDIDATE SPECIES  
FOUND IN  
ROLETTE COUNTY, NORTH DAKOTA  
June 2008

**ENDANGERED SPECIES**

Birds

Whooping crane (Grus Americana): Migrates through west and central counties during spring and fall. Prefers to roost on wetlands and stockdams with good visibility. Young adult summered in North Dakota in 1989, 1990, and 1993. Total population 140-150 birds.

**CANDIDATE SPECIES**

Invertebrates

Dakota skipper (Hesperia dacotae): Found in native prairie containing a high diversity of wildflowers and grasses. Habitat includes two prairie types: 1) low (wet) prairie dominated by bluestem grasses, wood lily, harebell, and smooth camas; 2) upland (dry) prairie on ridges and hillsides dominated by bluestem grasses, needlegrass, pale purple and upright coneflowers and blanketflower.

FEDERAL ENDANGERED CANDIDATE SPECIES  
FOUND IN  
TOWNER COUNTY, NORTH DAKOTA  
June 2008

**ENDANGERED SPECIES**

Birds

Whooping crane (Grus Americana): Migrates through west and central counties during spring and fall. Prefers to roost on wetlands and stockdams with good visibility. Young adult summered in North Dakota in 1989, 1990, and 1993. Total population 140-150 birds.

## **GUIDELINES TO AVOID AND MINIMIZE WILDLIFE IMPACTS FROM WIND TURBINES**

Wind-generated electrical energy is renewable, produces no emissions, and is a generally environmentally clean technology. Development of wind energy is strongly endorsed by the Secretary of the Interior, as expressed in the Secretary's Renewable Energy on Public Lands Initiative. However, wind energy facilities can adversely impact wildlife, especially birds, bats and insects. As more facilities with larger turbines are built, the cumulative effects of this rapidly growing industry may initiate or contribute to the decline of some wildlife populations. The potential harm to these populations from an additional source of mortality makes careful evaluation of proposed facilities essential. Due to local differences in wildlife concentration and movement patterns, habitats, area topography, facility design, and weather, each proposed development site is unique and requires detailed, individual evaluation.

The following guidance was prepared by the U.S. Fish and Wildlife Service. It is intended to assist the wind industry in avoiding or minimizing impacts to wildlife through 1) proper evaluation of potential Wind Resource Areas; 2) proper siting and design of turbines within development areas; and 3) pre- and post-construction research and monitoring to identify and/or assess impacts to wildlife.

These guidelines are voluntary. They are based on the best available science and will be updated as new information becomes available. Data on wildlife use and mortality collected at one site is not necessarily applicable to others; each site poses unique possibilities for negative effects on wildlife. In addition, the wind industry is rapidly expanding into habitats and regions that have not been well studied. The Service therefore suggests a precautionary approach to site selection and development, and will employ this approach in making recommendations and assessing impacts of wind energy developments. We encourage the wind industry to follow these guidelines, and to conduct scientific research to provide additional information on the impacts of wind energy development on wildlife. We further encourage the industry to look for opportunities to promote bird and other wildlife conservation when planning wind energy facilities (e.g., voluntary habitat acquisition or conservation easements) to compensate for habitat that is lost or degraded through development activities.

The Service is guided by the Fish and Wildlife Service Mitigation Policy (Federal Register Vol. 46, No. 15, January 1981) in evaluating modifications to or loss of habitat caused by development. This policy follows the sequence of steps recommended in the National Environmental Policy Act in seeking to avoid, minimize or compensate for negative impacts. Mitigation can involve avoiding the impact of an activity by taking no action; minimizing impacts by limiting the degree of activity; rectifying an impact by repairing, rehabilitating, or restoring an affected environment; reducing or eliminating an impact by conducting activities that preserve and maintain the resources; or compensating for an impact by replacing or providing substitute resources or environments. Any mitigation recommended by the Service for wind energy development would be for the purpose of offsetting habitat loss, degradation or fragmentation, and would be voluntary on the part of the developer. Mitigation does not apply to "take" of species under the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, or Endangered Species Act.

The guidelines contain a protocol for pre-development evaluation of all potential WRAs in a geographic area (Appendix 1), and recommendations for siting, designing, constructing, and operating turbines within WRAs. Pre-development evaluations should be conducted by a team that includes Federal and/or State agency wildlife professionals with no vested interest in the sites selected. The pre-development evaluation may also identify additional studies needed prior to development. Post-construction monitoring is recommended at all sites developed. Pre- and post-development studies and monitoring may be conducted by any qualified wildlife biologist.

Definitions of terms used in this document can be found in Appendix 2.

### **A. Site Evaluation**

The site evaluation protocol presented in Appendix 1 was developed by a team of Federal, State, university and industry biologists to rank potential wind energy development sites by impacts on wildlife. There are two steps to follow:

1. Identify and evaluate reference sites, preferably within the general geographic area of WRAs. Reference sites are areas where wind development would result in the maximum negative impact on wildlife (i.e., sites selected

to have the highest possible rank using the protocol). Reference sites are used to put risks of developing, specific sites within WRAs into perspective.

2. Evaluate potential development sites within WRAs to determine risk to wildlife, and rank sites against each other using the highest-ranking reference site as a standard. While high ranking sites are generally less desirable for wind energy development, a high rank does not preclude development of a site, nor does a low rank automatically eliminate the need to conduct pre-development assessments of impacts on wildlife.

## **B. Studies to Assess and Monitor Wildlife Impacts**

1. While ranking potential development sites, the site evaluation team may identify pre-development studies that are needed to better assess potential impacts. Ranking may also suggest the degree and depth of study required. Developers are encouraged to conduct any studies suggested by the team, in consultation with Service and other agency wildlife biologists.
2. Post-development mortality studies should be a part of any site development plan, in order to obtain additional information on the extent of mortality, if any. As with pre-development studies, ranking may be suggestive of the degree and depth of study needed. Studies should be designed in consultation with Federal and other agency wildlife biologists.

## **C. Site Development Recommendations**

1. Avoid siting turbines on major bird migration corridors or in areas where birds are highly concentrated, unless mortality risk is low (i.e., birds present rarely enter the rotor-swept area, such as Sage Grouse). Examples of high concentration areas for birds are wetlands, State or Federal refuges, staging areas, rookeries, and landfills. Avoid known migratory or daily movement flyways and areas with a high incidence of fog, mist, low cloud ceilings and low visibility.
2. For off-shore sites, including oceanic sites and the Great Lakes, avoid areas with consistent water bird and sea bird flight lines, colonies, foraging sites, staging and rafting areas, and areas of nutrient upwelling.
3. Configure turbines to avoid areas or features of the landscape known to attract raptors (hawks, falcons, eagles, owls). For example, Golden Eagles, hawks and falcons use cliff/rim edges extensively; setbacks from these edges may reduce mortality. Other examples include avoiding siting turbines in a dip or pass in a ridge, or in or near prairie-dog colonies.
4. Develop a habitat restoration plan for the proposed site that avoids negative impacts on vulnerable wildlife while maintaining or enhancing habitat values for other species. For example, avoid attracting high densities of prey animals (rodents, rabbits, etc.) used by raptors; reduce availability of carrion by practicing responsible animal husbandry to avoid attracting Golden Eagles and other raptors; avoid creating wetlands adjacent to turbines; and maintain contiguous habitat for area-sensitive species (e.g. Sage Grouse).
5. Configure turbines to minimize mortality; for example, orient rows of turbines parallel to known bird movements.
6. Where the height of the rotor-swept area produces a high risk for wildlife, adjust tower height where feasible to reduce the risk of strikes.
7. Avoid placing turbines near bat hibernation and breeding colonies, in migration corridors, and in flight paths between colonies and feeding areas.
8. Avoid siting turbines in habitats of any species of wildlife, fish or plant protected under the Federal Endangered Species Act.

#### D. Turbine Design and Operation Recommendations

1. Use tubular supports with pointed tops rather than lattice supports to minimize bird perching and nesting opportunities. Avoid placing external ladders and platforms on tubular towers to minimize perching and nesting. Do not use guy wires for turbine or meteorological tower supports. All existing guy wires should be marked with recommended bird deterrent devices (*see Mitigating Bird Collisions with Power Lines. APLIC. 1994*).
2. When using three-bladed turbines, paint one of the three blades black and the other two white to increase visibility to birds.
3. If taller turbines (top of the rotor-swept area is >199 feet above ground level) requiring lights for aviation safety must be constructed, the minimum amount of pilot warning and obstruction avoidance lighting specified by the Federal Aviation Administration should be used. Unless otherwise requested by the FAA, only white strobe lights should be used at night, and these should be the minimum number, minimum intensity, and minimum number of flashes per minute (longest duration between flashes) allowable by the FAA. Solid red or pulsating red incandescent lights should not be used, as they appear to attract night-migrating birds at a much higher rate than white strobe lights.
4. Where feasible, place electric power lines underground to avoid electrocution of birds. Use *Mitigating Bird Collisions With Power Lines* (APLIC 1994), and *Suggested Practices for Raptor Protection on Power Lines* (APLIC, 1996) for any required above-ground lines, transformers or conductors.
5. High seasonal concentrations of birds may cause problems in some areas. If, however, power generation is critical in these areas, an average of three years monitoring data (e.g., acoustic, radar, infrared, or observational) should be collected and used to determine peak use dates for specific sites. Where feasible, turbines should be shut down during periods when birds are highly concentrated at those sites.
6. When upgrading or retrofitting turbines, follow the above guidelines as closely as possible. If studies indicate high mortality at specific older towers, retrofitting or relocating is highly recommended.

#### Literature Cited

Avian Power Line Interaction Committee (APLIC). 1996. *Suggested Practices for Raptor Protection on Power Lines*. Edison Electric Institute/Raptor Research Foundation, Washington, D.C., 128 pp.

Avian Power Line Interaction Committee (APLIC). 1994. *Mitigating Bird Collisions with Power Lines: the State of the Art in 1994*. Edison Electric Institute, Washington, D.C. 78 pp.

## **APPENDIX 1 -- PROTOCOL TO RANK POTENTIAL WIND ENERGY DEVELOPMENT SITES BY IMPACTS ON WILDLIFE**

This protocol was developed by a team of Federal, State, university and industry biologists to rank potential wind development sites in Montana by their impacts on wildlife (USFWS, 2002). It has been modified to apply nationwide. The protocol focuses on a process of pre-development evaluation of potential sites and subsequent ranking against a reference site. Objectives are to: 1) assist developers in deciding whether to proceed with development; 2) provide a procedure to determine pre-construction study needs to verify use of WRAs by wildlife; and 3) provide recommendations for monitoring sites post-construction to identify, quantify, or verify actual impacts (or lack thereof).

Although this protocol focuses on impacts to wildlife, potential impacts to fish and plants should be considered as well. Surveys for rare, threatened or endangered plants should be conducted at all proposed land development sites.

Recommendations presented here are intended to provide a conceptual framework for initial steps in investigating a site. They are not intended to be all-inclusive relative to objectives, methods, and analysis nor to serve as the definitive reference or directive for any step in wind power related investigations. Further direction may be obtained in Anderson *et al.* (1999).

### **Potential Impact Index (PII)**

The Potential Impact Index represents a “first cut” analysis of the suitability of a site proposed for development by estimating use of the site by selected wildlife species as an indicator of impact. Emphasis of the PII is on initial site evaluation and is intended to provide more objectivity than simple reconnaissance surveys.

There are two steps to follow in ranking sites by their potential impact on wildlife.

1. Identify and evaluate reference sites within the general geographic area of Wind Resource Areas (WRAs). Reference sites are areas where wind development would result in the maximum negative impact on wildlife, resulting in a high PII score. Reference sites are used to put risks of developing sites within WRAs into perspective.
2. Evaluate potential development sites within WRAs to determine risk to wildlife, and rank sites against each other using the **highest-ranking** reference site as a standard. While high ranking sites are generally less desirable for wind development, a high rank does not preclude development of a site, nor does a low rank automatically eliminate the need to conduct pre-development assessments of impacts on wildlife.

PII scores are relative, and are to be compared with those of other sites within the WRAs. The following assumptions are implicit in the PII process:

1. All WRA sites, regardless of turbine design, configuration or placement, present hazard and risk to wildlife from both an individual and population perspective.
2. Some sites present less hazard and risk to wildlife than others.
3. No adequate and defensible information exists regarding appropriateness of the proposed WRA site being evaluated, relative to impact on wildlife.
4. Evaluations will be conducted by qualified biologists without competitive interest in site selection, including those from State and Federal agencies who are familiar with local and regional wildlife.

The primary determinate of PII is evaluation of potential impacts on aerial wildlife from collision with turbines and infrastructure. The PII is derived from results of three checklists (forms are attached). These checklists should be developed and applied as follows:

- A. The PHYSICAL ATTRIBUTE CHECKLIST considers topographic, meteorological, and site characteristics that may influence bird, bat and butterfly occurrence and movements.
- B. The SPECIES OCCURRENCE AND STATUS CHECKLIST includes Birds of Conservation Concern at the Bird Conservation Region level (<http://fws.gov/birds/education/surveys/survey-reports/>); all federally-listed Threatened and Endangered Species and Candidate Species (<http://endangered.fws.gov/>), and State Endangered, Threatened, and Candidate species; and bats and butterflies as listed by State Natural Heritage Programs.
- C. The ECOLOGICAL ATTRACTIVENESS CHECKLIST evaluates the presence and influence of ecological magnets and other conditions that would draw birds, bats, or butterflies to the site or vicinity.

Cells in a checklist are checked if the condition or species is known or strongly suspected to occur. Criteria for checklist conditions marked with an asterisk (\*) are explained on the following page. Conditions that are self-explanatory are not included. Conditions are not weighted. Cells are checked in the SPECIES OCCURRENCE & STATUS CHECKLIST if presence of species is unconfirmed but strongly suspected (i.e., WRA is within range and habitat of checklist species). This permits more liberal assignment of potential impact, reduces the probability of missing impacts on specific species due to lack of empirical data, and focuses future study and monitoring effort. Totals for each checklist are simple column sums. The PII is calculated from the checklist totals. A completed example from Montana is attached.

#### **Determining Checklist Scores**

- A. Each checklist has boxes to be checked for a particular attribute found at each site. The maximum number of boxes that can be checked is 145. This maximum number is derived from the total number of boxes from all three checklists – Physical Attribute 36, Species Occurrence & Status 91, Ecological Attractiveness 17. These numbers were developed for Montana, and will vary from area to area due to variations in the number of physical attributes and species of concern. Keep in mind that all cells are very unlikely to be checked at a single site because all species and all ecological and physical conditions would not exist in one area.
- B. After completing the three checklists for each site, add the total number of checks in a checklist for an ending sum (each box checked equals one). Each checklist has a divisor assigned (i.e. Physical Attribute checklist 0.25, Species Occurrence & Status 0.63, Ecological Attractiveness 0.12). The divisor is assigned because each checklist has a different total number of boxes, and the divisor is used in calculating the proportion each checklist represents of the total of all checklists (145). This expands the spread of index values and more dramatically displays the magnitude of differences among sites. (Example: the physical attribute checklist has 36 boxes; divide 36 by 145 =.025, the divisor.) You can change the number of boxes in any of the checklists to fit your geographic area. However, if you change the number of boxes you will have to recalculate the divisor.

#### **Determining PII Score**

- A. Place the sums from each of the three checklists in the POTENTIAL IMPACT INDEX table sum boxes ( $\Sigma$  column) in the appropriate category.
- B. Divide each checklist sum by the previously calculated divisor to adjust the sum for disproportionate numbers of conditions in each checklist, and place this adjusted sum in the  $\Sigma/p$  boxes for each checklist.
- C. Add the adjusted checklist sums ( $\Sigma/p$  column) to produce the PII score.

Include any questions, statements, comments, or concerns regarding any checklist cell or category on the SITE SPECIFIC COMMENTS sheet. These comments are critical to determining pre-construction study needs. They will also help identify and refine questions and objectives to be addressed by follow-up study and monitoring. The nature of suspected Significant Ecological Events should be noted on the SITE SPECIFIC COMMENTS SHEET.

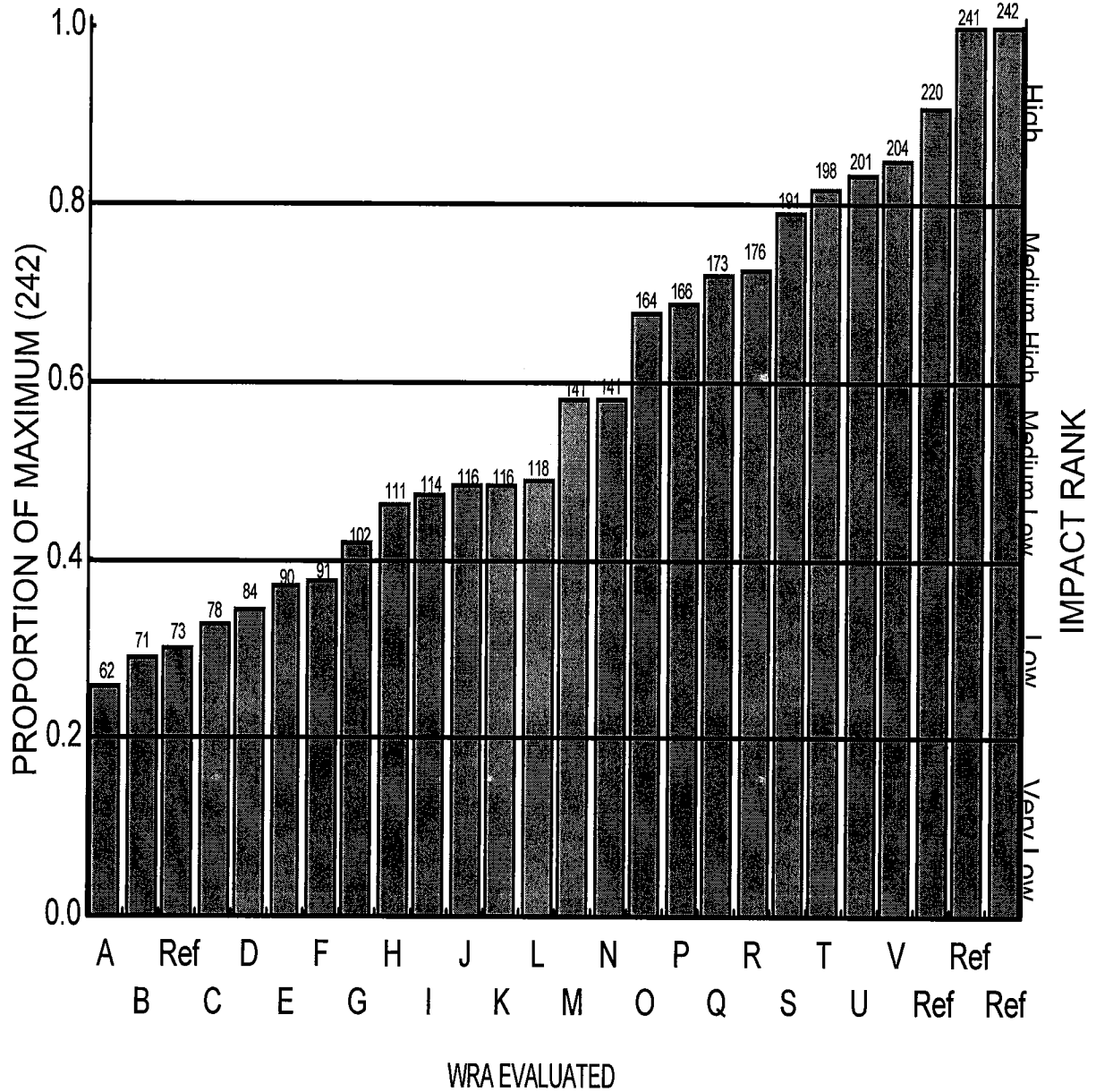


Figure 1. Impact ranks of proposed Wind Resource Areas in Montana. The number above each bar is the PII Score. Rank is a function of the proportional relationship of proposed development sites to the maximum score of four Reference Sites evaluated.

## Ranking PII Scores

PII of each site evaluated is assigned a ranking based on its proportional relationship to the reference area that has the maximum PII score, as shown in Figure 1. Ranking categories (High, Low, etc.) are arbitrarily set at intervals of 20% of maximum.

Rankings are intended as a guide to developers. They are designed as indicators of relative risk to wildlife and thus the level of impact that may be expected should a site be developed. A high rank does not preclude development, nor does a low rank automatically eliminate the need to conduct pre-development assessments of impacts on wildlife. More intensive pre-construction studies may be needed for both scenarios if development of the site is pursued. Ranks may also suggest the extent of additional study needed.

In the case of federally listed threatened, endangered, or candidate species of wildlife, fish or plants, consultation under the Endangered Species Act is required, and may preclude development of a site regardless of its PII score.

## Determining Pre-construction Study Needs

The goal of pre-construction studies is to estimate impacts of proposed wind power development on wildlife by addressing areas of concern identified during the PII process. Objectives, intensity, and methods of pre-construction studies are likely to be site specific, but may be independent of ranking. Regardless of ranking, studies should be designed to address 1) verification of use of WRAs by *all* species recorded in the "SPECIES OCCURRENCE & STATUS" CHECKLIST; 2) identification of natural conditions (*e.g.*, "Significant Ecological Events", magnitude, timing, and location of suspected bird/bat migration); or 3) questions noted in the SITE SPECIFIC COMMENTS SHEET for that site. The SITE SPECIFIC COMMENTS SHEET may also indicate conditions that need not be investigated. As a result, a site with a low rank may require radar surveillance (*e.g.*, important shorebird staging or stop-over site) while a site with a high rank may require only a single season visual survey (*e.g.*, site potentially contains autumn Whooping Crane habitat). The process should involve a feedback mechanism within an adaptive management (Walters 1986) strategy (Figure 2). Timely review of study results will determine if data are adequate, if conclusions are defensible (Anderson et al. 1999) and if additional investigational effort is required (*e.g.*, if Black-footed Ferrets are found on Mountain Plover searches). Beyond estimation of impacts prior to development, studies should be designed to detect major impacts after construction (Anderson et al. 1999).

Projects with Federal involvement also may require additional analysis under the National Environmental Policy Act or Endangered Species Act. Also, mere existence of a pre-construction study, whether in progress or completed, does not validate development of a site.

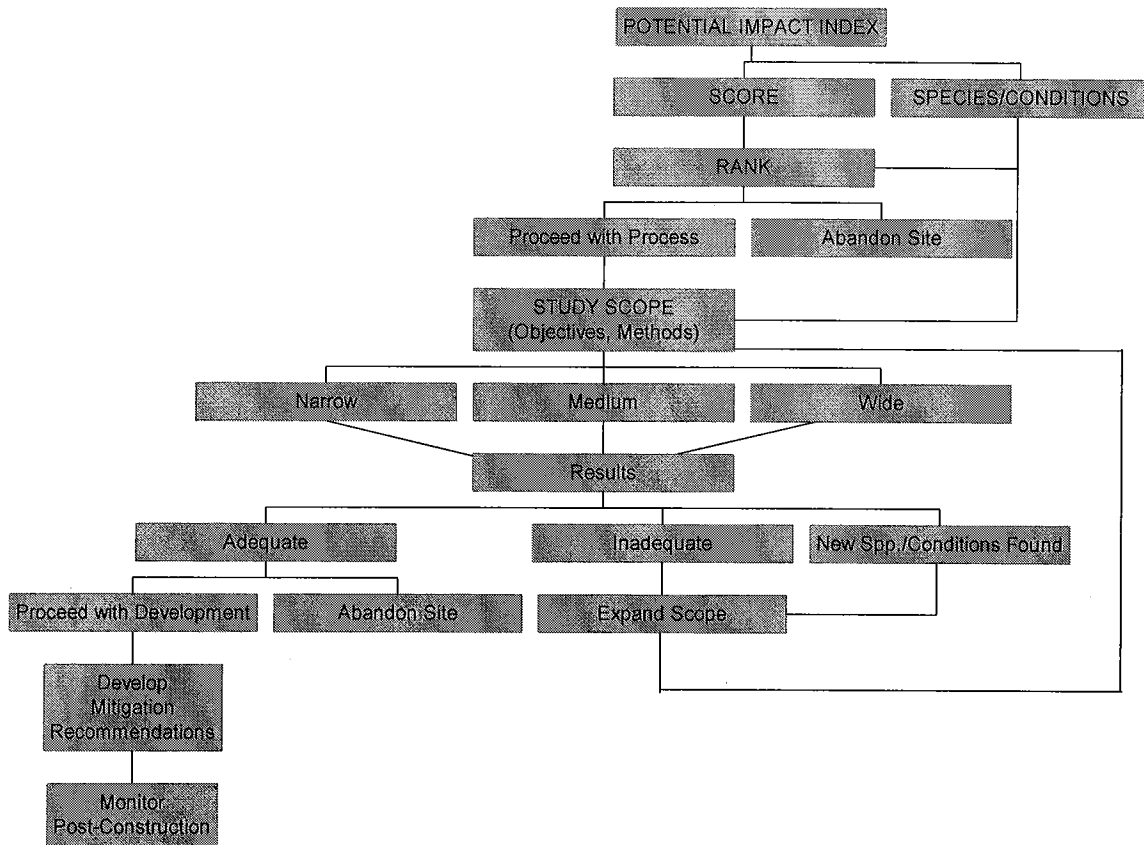


Figure 2. A suggested decision tree for assessing potential development sites. Begin by developing a PII score.

### Post-construction Studies

The Service recommends that all sites be monitored for impacts on wildlife after construction is completed. Some sites may be so obviously benign that little more than simple reconnaissance study may be needed and any impact will be revealed during post-construction monitoring. Otherwise, pre-construction study should be designed to dovetail with post-construction monitoring to permit statistically valid evaluation of actual impacts. Accordingly, studies should be conducted as much as possible within a Before-After-Control-Impact (BACI) (Green 1979) study design. Such design requires investigation of at least two sites (Impact [proposed site] and Control) simultaneously, both pre-construction (Before) and post-construction (After). Because true “Control” sites are seldom available, other sites may be substituted, including Reference Areas used in developing the PII ranking. In the case of radar surveillance studies, “In” and “Out” of the proposed WRA boundaries may be acceptable (e.g., Harmata *et al.* 1998). Structuring pre-construction studies within a hypothesis-testing framework will help identify appropriate metrics, focus effort, and permit comparisons with “After” conditions or other WRAs.

Where feasible, post-construction studies should also be utilized to test measures that may eliminate or reduce impacts to wildlife. See Appendix 4, Research Needed.

### Metrics and Methods

Metrics are specific tools used to assess wildlife populations and their status (e.g., point counts, line transects, nest success studies, radar surveys, mortality rates, and risk). They can provide important information about birds, bats, insects and other wildlife at proposed development sites. Metrics may be selected to collect seasonal, species, group, guild, or habitat specific information, based on data and comments in the SPECIES OCCURRENC &

STATUS CHECKLIST and SITE SPECIFIC COMMENTS SHEET. For example, a proposed WRA may be in a narrow north-south oriented valley of relatively monotypic habitat. These conditions suggest a heavy seasonal avian migration corridor but little avian breeding habitat. Accordingly, study emphasis should be on defining use and mortality of migratory birds during autumn or spring or both, with little effort directed at defining use and mortality of breeding birds. Conversely, a potential WRA on a flat plain in diverse habitat would indicate the exact opposite in study emphasis.

While metrics represent specific measurements, concepts and relationships, methods refer to observational or manipulative study techniques that may be used to verify the location of birds and other wildlife, estimate their numbers, and document their use and behavior (Anderson et al. 1999). Table 2 depicts some commonly used metrics and methods for wildlife studies in Montana.

Studies should also strive to generate information to avoid or mitigate impacts by siting, configuration, or operation of turbines (Johnson et al. 2000). Every effort should be made to choose metrics and methods that allow comparisons of pre-construction studies with “After” studies, other WRAs, and other regions.

Table 2. Examples of metrics and methods associated with evaluating use and mortality of wildlife at proposed Wind Resource Areas in Montana.

Data Need	Metric	Methods
Use Profile	Individuals/Count	Species/guild/group List
		Point Counts (birds)
	Species/Count	Winter Raptor Surveys
		Lek Counts (grouse)
		Migration Counts
		Ungulate Surveys
		Spotlight Surveys
		Point Counts (neotropical migrants)
		Raptor Nesting Surveys
		Raptor Migration Counts
Acoustic Surveillance (bats)		
Use duration/minute/season	Pellet Counts	Bait Stations
		Track Boards
		Radar
Individuals/capture effort	Migration Counts	Raptors/watch
		Area Searches
		Various techniques for Raptor/Passerine/Mammal/herptile capture
Productivity	Nests/area	Raptor Nesting Surveys
		Ungulate surveys
Events/height category (Altitude Profile)		Radar
Events/distance category (Spatial Profile)		Radar
Passage Rate (events/time/unit area)		Radar
Mortality	Dead/injured individuals/unit	Transects
		Spot Searches

## Interpreting Metrics

Just what constitutes high use (i.e., potentially high impact) may or may not be a matter of conjecture. When looking at the distribution and movements, and local, regional, or range-wide population estimates for particular species, relative proportions of species, groups or guilds of wildlife using proposed WRAs may indicate risk. If, however, baseline population data are unknown, consult with a qualified biologist who can recommend a specific metric.

It is likely that little or no evidence of mortality will be found during pre-construction study. If, however, post-construction mortality is found, and statistical evaluation is not possible, that mortality should be assessed in regard to the species status (ESA listed) or the effect of the loss of that species on a local, regional, or continental-wide populations basis.

## Determining Post-construction Monitoring Needs

Post-construction monitoring is important to the Service, industry, and public because of the limited information available on impacts of wind turbines and WRAs on wildlife. Therefore, post-construction monitoring should be designed to detect major impacts. The intended time frame for post-construction monitoring is not expected to exceed 3 years, however. Major impacts may be considered as statistically significant changes in use profiles by species of concern, or limited to statistically significant increases in mortality rates of any wildlife. Monitoring effort may be intensive or cursory, depending on results of pre-construction use and mortality studies. Simple, infrequent mortality surveys on impact and control plots may be all that is needed at WRAs where recorded pre-construction use by wildlife is low. Documented high use of a proposed WRA may require monitoring methods identical to those employed in pre-construction studies. Anderson *et al.* (1999) provides specific, detailed direction in post-construction study design and monitoring. Manville (2002) developed a monitoring protocol for use by the U.S. Forest Service at three National Forests in Arizona that could be modified for use at land-based wind turbines (Appendix 5).

## Literature Cited

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Walters, C.J. 1986. Adaptive management of renewable resources. MacMillan Publ. Co., New York, N.Y. 374 pp.

**POTENTIAL IMPACT INDEX CHECKLISTS**

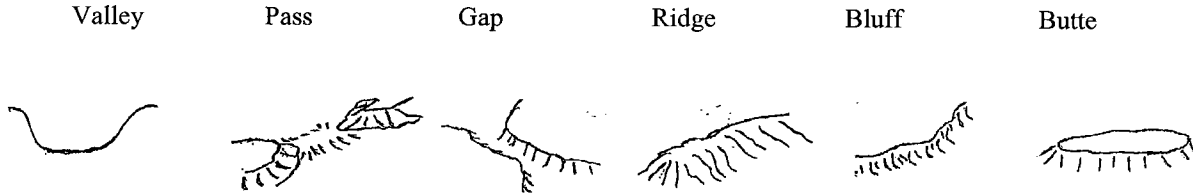
PHYSICAL ATTRIBUTE CHECKLIST

				Site				
Physical Attribute								
Topography (modify as necessary for marine environments)	Mountain Aspect*	Side	W					
			E					
			N					
			S					
		Top						
		Foothill	W					
			E					
			N					
			S					
		Valley*						
	Pass*							
	Gap*							
	Ridge*							
Bluff*								
Butte*								
Wind* Direction	S							
	N							
	E							
	W							
	Updrafts*							
Migratory* Corridor Potential	Latitudinal (N / S)							
	Longitudinal (E / W)							
	Wide Approaches (>30 km)*							
	Funnel Effect	Horizontal						
Vertical								
Site Size (acres) & Configuration*	<640							
	>640 <1000							
	>1000 <1500							
	Turbine Rows not Parallel to							
Infrastructure To Build	Transmission							
	Roads							
	Buildings*							
	Maintenance							
	Daily Activity							
	Substation							
Increased Activity*								
Totals								

PHYSICAL ATTRIBUTE CRITERIA - categories, max3 = , (p = ).

Topography - Terrain characteristic within the ecological influence of the proposed wind development site, generally, but not restricted to  $\pm 8$  km.

Mountain Aspect - Aspect of topography for site of proposed development. Multiple categories may be checked.



Wind Direction - Compass direction *from* which prevailing winds approach. Multiple categories may be checked.

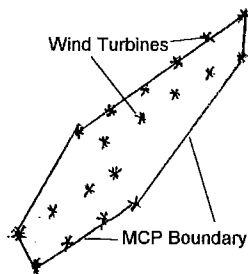
Updrafts - Do updrafts/upslope winds prevail?

Migratory Corridor Potential - Subjective estimate of area to be a potential avian/bat migratory corridor based strictly on topographical characteristics. Multiple categories may be checked.

Wide (>30 km) - Terrain characteristics of approaches to site from each migratory direction, i.e., a large plain, river corridor, long valley. The larger the area that migrant birds/bats are drawn from, the more may be at risk

Funnel Effect - Is the site in or near an area where migrant birds/bats may be funneled (concentrated) into a smaller area, either altitudinally, laterally, or both?

Site Size & Configuration – Size is estimated as if a minimum convex polygon (MCP) were drawn around peripheral turbines.



Successive boxes are checked to convey relationship of larger size = increased impact to birds/bats, e.g., a 700 acre site will have 2 categories checked while a 1200 acre site will have all 3 categories checked.

Configuration of turbine rows is usually perpendicular to prevailing wind direction. Rows aligned perpendicular or oblique to route of migration intuitively presents more risk to birds than rows aligned parallel to movement.

Buildings – Building are categorized by relative size and visitation frequency, i.e., structures that are visited daily are usually larger and present more impact than those that are not. If a “Daily Activity” building is required, all Building categories are checked. If a maintenance structure is required, Storage is also checked.

Increased Activity - Will any type of human activity increase? Sites in urban-suburban or otherwise developed areas (oil, gas, mines) will have less impact on wildlife than those in remote or undeveloped areas.



Avian Species of Special Concern Checklist (species, max 3 =)

Column totals of this list are added to appropriate cells in the SPECIES OCCURRENCE & STATUS CHECKLIST. Consult Birds of Conservation Concern (USFWS, 1995, 2000). Appropriate avian field guides and species accounts should be consulted for confirmation of species distribution and habitat associations. State Natural Heritage Programs may also provide species accounts which include additional information useful in completing checklists.

In addition to species lists (rows), season of occurrence is also indicated (columns). "B" indicates breeding or summer occurrence and "M/W" indicates presence during migration or as wintering species. If occurrence within or in the vicinity (# 7 km) of a proposed site is confirmed or suspected, an "X" is entered.

Bat Species Of Special Concern Checklist  
 (Complete prior to SPECIES OCCURRENCE & STATUS CHECKLIST)

Bats ( <i>n</i> =)	Site											
Occurrence	B	M/W	3	B	M/W	3	B	M/W	3	B	M/W	3
Subtotals												
Total												

Bat Species Of Special Concern Checklist (species, max 3 = ).

Column totals of this list are added to appropriate cells in the SPECIES OCCURRENCE & STATUS CHECKLIST. Appropriate bat field guides and references (Barbour and Davis 1969, Harvey et al. 1999, Rauscher 2000) should be consulted for confirmation of species distribution and habitat associations. State Natural Heritage Programs may also provide species accounts which include additional information useful in completing checklists.

In addition to species lists (rows), season of occurrence is also indicated (columns). "B" indicates breeding or summer occurrence and "M/W" indicates presence during migration or as wintering species. If occurrence within or in the vicinity (# 7 km) of a proposed site is confirmed or suspected, an "X" is entered.

SPECIES OCCURRENCE & STATUS CHECKLIST

Species		Site												
		Occurrence												
Threatened & Endangered (includes wildlife, fish, and plants)	Occurrence	B	M/W	3	B	M/W	3	B	M/W	3	B	M/W	3	
	Candidate*													
Special Concern*	Birds (max 3=)													
	Bats (max 3=)													
	Subtotals													
	Total													

SPECIES OCCURRENCE & STATUS CHECKLIST ( categories, max 3 = , (p = ).

Checklist totals for each column in “Avian Species of Special Concern List” and “Bat Species of Special Concern List are inserted in this checklist.

Threatened & Endangered Species - Species include in the Federal List of Endangered and Threatened Species (USFWS 2001a).

Candidate Species - Species being investigated for inclusion in the Federal List of Endangered and Threatened Species (USFWS 2001b).

Species of Special Concern - Species included in this checklist are those listed in Birds of Conservation Concern, and by Natural Heritage Programs that are known or suspected to be rare, endemic, disjunct, threatened or endangered.

Golden eagles may be included in this checklist because of special protective status afforded under the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d). Other species (e.g., sage grouse) may be included because of recent concern over population declines range wide. Bats (other than bat Species of Special Concern) should be included due to generally unknown impacts of wind farms on individual and populations.

ECOLOGICAL ATTRACTIVENESS CHECKLIST

Site

Ecological Attractor						
Migration Route*	Local					
	Continental*	N				
		S				
		E				
		W				
Ecological Magnets*	Lotic System					
	Lentic System					
	Wetlands					
	Native Grassland					
	Forest					
	Food Concentrated					
	Energetic Foraging					
	Vegetation/ Habitat	Unique				
Diverse						
Significant Ecological Event*						
Site of Special Conservation Status*						
Total						

ECOLOGICAL ATTRACTIVENESS CRITERIA - categories, max3 = , (p = ).

Migration Route - Indicates predominate direction of movement of seasonal migrations. Multiple categories may be checked.

Local - Some avian populations move only altitudinally & direction may be East-West (sage grouse, owls, bald eagles).

Continental - Some migratory corridors experience mass movements in only one season/direction annually (e.g., Bridger Mountains autumn eagle migration).

Ecological Magnets - Special, unique, unusual, or super ordinary habitats or conditions within the vicinity of the site that may attract wildlife. Lotic systems include small perennial or seasonal creeks to major rivers. Lentic systems include stock ponds to lakes to marine environments. Multiple categories may be checked.

Vegetation/Habitat - Unique or exceptionally diverse vegetation or habitat in the vicinity may indicate exceptional diversity and abundance of avian species or bats.

Significant Ecological Event - Special, unique, unusual, or super ordinary events that occur or are suspected to occur in the vicinity of the site, e.g., up to one third of the Continental population of Trumpeter Swans visit Ennis Lake, < 4 km from a proposed Wind Resource Area; the Continental migration of shorebirds passes over (many stop) @ Benton Lake National Wildlife Refuge) and up to 2000 golden eagles pass over the Bridger Mountains in autumn. If unknown but suspected a “?” is entered. Specifics regarding the cell are then addressed in the appropriate box of the SITE SPECIFIC COMMENTS sheet to focus follow-up investigation and assist in definition of study objectives.

Site of Special Conservation Status - Any existing or proposed covenants, conservation easements, or other land development limitations intended to conserve, protect, or enhance wildlife or habitat. This criterion is weighted (2 entered if true) because of previous financial or other investment in ecological values. Specifics regarding the easement are then addressed in the appropriate box of the SITE SPECIFIC COMMENTS sheet to focus follow-up attention.

POTENTIAL IMPACT INDEX

Checklist (p) <sup>1</sup>	Site							
	3	3/p	3	3/p	3	3/p	3	3/p
Physical ( )								
Species Occurrence & Status ( )								
Ecological ( )								
Totals								

<sup>1</sup>Proportion of total ( ) checklist categories.

SITE SPECIFIC COMMENTS

Checklist	Site			
Physical				
Species Occurrence				
Ecological				

**EXAMPLE CALCULATION OF POTENTIAL IMPACT INDEX  
(PII)**

APPENDIX 1  
POTENTIAL IMPACT INDEX CHECKLISTS

PHYSICAL ATTRIBUTE CHECKLIST

Site

Physical Attribute				Snowy Mtn.Range				
Topography (modify as necessary for marine environments)	Mountain Aspect*	Side	W	X				
			E					
			N					
			S					
		Top						
		Foothill	W	X				
			E					
			N					
	S							
	Valley*			X				
	Pass*							
Gap*								
Ridge*			X					
Bluff*								
Butte*								
Wind* Direction	S							
	N			X				
	E							
	W							
	Updrafts*			X				
Migratory* Corridor Potential	Latitudinal (N <input type="checkbox"/> S)							
	Longitudinal (E <input type="checkbox"/> W)			X				
	Wide Approaches (>30 km)*							
	Funnel Effect	Horizontal		X				
Vertical								
Site Size (acres) & Configuration*	<640							
	>640 <1000							
	>1000 <1500			X				
	Turbine Rows not Parallel to							
Infrastructure To Build	Transmission			X				
	Roads			X				
	Buildings*			X				
	Maintenance			X				
	Daily Activity			X				
	Substation				X			
Increased Activity*				X				
Totals				16				



Bat Species Of Special Concern Checklist  
 (Complete prior to SPECIES OCCURRENCE & STATUS CHECKLIST)

Bats (n = )	Site											
	Snowy Mtn. Range											
Occurrence	B	M/W	Σ	B	M/W	□	B	M/W	□	B	M/W	□
Fringed Myotis	X		1									
Spotted Bat	X		1									
Subtotals	2		2									
Total			2									



ECOLOGICAL ATTRACTIVENESS CHECKLIST

Site

Ecological Attractor			Snowy Mtn. Range			
Migration Route*	Local					
	Continental*	N	X			
		S	X			
		E				
		W				
Ecological Magnets*	Lotic System					
	Lentic System					
	Wetlands		X			
	Native Grassland		X			
	Forest		X			
	Food Concentrated					
	Energetic Foraging		X			
	Vegetation/ Habitat	Unique				
Diverse		X				
Significant Ecological Event*						
Site of Special Conservation Status*						
Total			7			

POTENTIAL IMPACT INDEX

Checklist (p) <sup>1</sup>	Site							
	Σ	Σ/p	Σ	Σ/p	Σ	Σ/p	Σ	Σ/p
Physical (0.25 ) 15÷.25=60	15	60						
Species Occurrence & Status (0.63 ) 20÷.63=32	20	32						
Ecological (0.12) 7÷.12=58	7	58						
Totals	42	150						

<sup>1</sup>Proportion of total ( ) checklist categories.

## **Appendix 2: Definitions Related to Wind Energy Development and Evaluation**

**AGL:** height above ground level in feet *vs.* **MSL,** height above mean sea level in feet.

**Dead Bird Search:** an assessment of all birds killed at a turbine study site, conducted at a time (*e.g.*, first light for passerines) that minimizes scavenging by predators. Complete coverage of the search area is important to detect dead and injured birds. As dead birds or dead bird parts are discovered, they are documented according to species, location, condition, and estimated time of death. Necropsies are helpful in assessing blunt trauma, electrocution, or other causes of death.

**Carcass Removal Study:** a known number of bird carcasses are randomly placed at specified locations to monitor removal by scavengers or by other means. The rate of carcass removal can be calculated.

**Deterrent Devices:** specific equipment, devices, or techniques which are intended to be seen or heard to alert and deter birds from contacting turbine towers, rotors, guy wires, or related equipment. These include diverters installed on turbine or meteorological tower guy wires, dark (*e.g.*, black) paint on single turbine blades or portions of a blade, or noise-making devices that alert (*e.g.*, infrasound) or frighten (*e.g.*, pingers and Brecka buoys) birds.

**Fish and Wildlife:** any member of the animal kingdom, including any bird (including any migratory, nonmigratory, or endangered bird for which protection is afforded by treaty or other international agreement), mammal, fish, amphibian, reptile, mollusk, crustacean, arthropod, or other invertebrate. Unless otherwise indicated, the Fish and Wildlife Service is particularly concerned about the impacts of wind turbines on birds, bats, and butterflies.

**Flyway:** a concentrated, predictable flight path of migratory bird species (*e.g.*, particularly waterbirds such as ducks, geese, large waders, and shorebirds, but also raptors, and sometimes songbirds) from their breeding ground to wintering area. Except along coast lines, the flyway concept may not generally apply to songbirds because they tend to migrate in broad fronts rather than down specific flyways. The term *Ac*orridors@ has sometimes been used. These frontal movements of songbirds can change within and between seasons and years B as can, for example, movements of waterfowl B making specific designation more difficult. The concept applies both biologically and administratively. For administrative purposes, for example, there are 4 waterfowl flyways (Atlantic, Mississippi, Central, and Pacific) and 3 shorebird flyways (East, Central and Pacific). “Daily flyways” may also exist between roosting and feeding areas.

**Impact Area:** the area of risk to birds, bats, butterflies and other organisms from collisions and electrocutions that will likely kill or injure wildlife. The rotor swept area is the location of greatest risk, particularly the distal/outer portion of the area as blade speeds are the greatest and visibility is the poorest at this location when turbines are rapidly spinning. The turbine tower also creates a risk because, especially under lighted conditions in inclement weather, night-migrating songbirds may be vulnerable to collisions. Electrical wires and live, uninsulated wires in phase-to-phase or phase-to-ground configurations can also be deadly due to electrocutions.

**Mitigation:** The President’s Council on Environmental Quality defined the term “mitigation” in the National Environmental Policy Act regulations to include: “(a) avoiding the impact altogether by not taking a certain action or parts of an action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment; (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (e) compensating for the impact by replacing or providing substitute resources or environments.” (40 CFR Part 1508.20(a-e)). The Service has adopted this definition of mitigation and considers the specific elements to represent the desirable sequence of steps in the mitigation planning process.

**Observer Detection Efficiency:** determining how good observers are at finding dead birds and bird parts by placing a known number of dead birds or bird parts in a variety of locations with differing vegetative structure and color, then having observers search an area throughout the day under differing sunlight conditions and differing observer alertness (*i.e.*, first, second or third search of the day). This results in an observer detection rate B a measure of the searchers= detection probability under varying vegetative conditions, time of day, and search number.

**Passerines:** a general term for migratory songbirds, most of which winter in tropical areas.

**Precautionary Approach:** a conservative, scientific approach to conserving and managing habitats and species. Absent definitive data, the approach suggests taking the best steps available to initiate appropriate conservation actions. Those actions should then be refined through the use of principles of adaptive management and sound science. The absence of complete or definitive scientific information should not be used as a reason for postponing or failing to take measures to conserve target species, associated or dependent species, or non-target species and their environments. Specifically, developers should apply a precautionary approach widely to conservation and management of birds, bats, butterflies, other fauna, flora and affected habitats. This will protect the resources and preserve Wind Resource Areas by taking account of the best scientific evidence available.

**Reference Site:** an area of high wildlife value which is used to evaluate the suitability of other areas for wind energy development. Reference sites are selected by biologists familiar with the wildlife in the geographic area and habitat types where wind energy development is contemplated, and evaluated using the Ranking Protocol in Appendix 1. The reference site having the highest score, *i.e.*, the area where wind energy development would have the greatest negative impact on wildlife, is used as the standard against which potential wind energy development sites are ranked.

**Rookery:** the breeding place of a colony of gregarious birds (*e.g.*, herons) or mammals (*e.g.*, bats).

**Rotor-swept Area:** generally the vertical airspace within which the turbine blades (generally 3) rotate on a pivot point or drive train rotor. The Area will vary in location depending on the direction of the prevailing wind. While slower@ turbines may operate at speeds less than 30 revolutions per minute (RPMs), turbine speeds at blade tips can still exceed 220 mph in stiff

winds. Recent studies indicate that birds appear unable to recognize blade presence at rotor tips during high blade speed, referred to as the Asmeareffect.

**Staging Area:** a traditional site where migratory birds of one or more species congregate in spring and fall for varying periods of time to forage and build up fat reserves prior to launching migratory flights. The term may be used on both the breeding and wintering grounds, as well as at intermediate stopover sites used at any point along the migration route.

**Turbine-related Incident:** fatality or injury caused by an animal (bird, bat, butterfly, or other organism) coming into contact with any part of a wind turbine tower, rotor blade, or related electrical structure, usually the result of a turbine blade strike.

**Turbine Position within a Row/String:** the specific position of a turbine within a string or row of turbines. It may be designated as an end-row, mid-row, or lone row turbine (one not located within a row).

**Turbine Tower Type:** a turbine/tower configuration distinctly different from other configurations with respect to the availability of perches, type of turbine, tower structure, height, and manufacturer.

**Wind Resource Area (WRA):** the geographic area or footprint within which wind turbines are sited, placed and operated, such as the Altamont Pass WRA, or where turbine siting and placement are anticipated. The term may be used to describe an existing facility, or a general area in which development of a facility is proposed. Existing facilities are known variously as Awindfarms,” Awind parks, @ or Aenergy parks.@ WRAs are selected based primarily on the reliability and availability of sufficient wind. These areas are designated by the *United States Wind Resource Map*, published by the National Renewable Energy Laboratory, Dept. of Energy. The *Map* delineates wind power classifications from Amarginal@ to Asuperb@ based on a Weibull wind speed index.

### Appendix 3: Legal Mandates

**The Migratory Bird Treaty Act** (16 U.S.C. 703-712) (MBTA) is the cornerstone of migratory bird conservation and protection in the U.S. The MBTA implements a series of treaties that provide for international protection of migratory birds. It is a strict liability law wherein proof of intent to violate any provision is not required. Wording is clear in that most actions that result in Ataking@ or possession (permanent or temporary) of a protected species can be a violation. Specifically, MBTA states:

“Unless and except as permitted by regulations...it shall be unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, kill...possess, offer for sale, sell...purchase...ship, export, import...transport or cause to be transported... any migratory bird, any part, nest, or eggs of any such bird...(The Act) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior.” The word Atake@ is defined as meaning Ato pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect.”

A 1972 amendment to the MBTA resulted in inclusion of bald eagles and other birds of prey in the definition of a migratory bird. The MBTA provides criminal penalties for persons who, by any means or in any manner, pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, delivery for shipment, ship, export, import, cause to be shipped, exported, or imported, delivery for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird (including bald eagles), as well as possessing bald eagles, their parts, nests, or eggs without a permit. A violation of the MBTA can result in a fine of up to \$15,000, and/or imprisonment for up to 6 months, or both for an offense not involving a sale. Penalties increase greatly for offenses involving sale. The potential fines are doubled for companies or organizations.

Under authority of the Bald and Golden Eagle Protection Acts (16 U.S.C. 668-668d)(EPA) and Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531-1543), bald and golden eagles are afforded additional legal protection. Penalties for violations of these acts are up to \$100,000.00 for an individual or up to \$200,000.00 for a company or organization, plus up to one year in jail. While these statutes do not permit take without permit, *the Service recognizes that some birds may be killed at structures such as wind turbines even if all reasonable avoidance measures are implemented.* The U.S. Fish & Wildlife Service (FWS) Division of Law Enforcement pursues its mission to protect migratory birds not only through investigations and enforcement, but also through fostering relationships with individuals and industries that pro-actively seek to eliminate impacts on migratory birds. While it is not possible under the statutes to absolve individuals or companies from liability, *the Division of Law Enforcement and Department of Justice has used enforcement and prosecutorial discretion regarding individuals or companies who have made good faith efforts to avoid the take of migratory birds.* Good faith efforts include but are not limited to, permitting State and Federal agency personnel reasonable access to wind power sites for inspection and monitoring of site impacts on wildlife.

**The Endangered Species Act** was passed by Congress in 1973 in recognition that many of our Nation's native plants and animals were in danger of becoming extinct. The purposes of the Act are to protect these endangered and threatened species and to provide a means to conserve their ecosystems. To this end, Federal agencies are directed to utilize their authorities to conserve listed species and make sure that their actions do not jeopardize the continued existence of listed species. The law is administered by the Interior Department's Fish and Wildlife Service and the Commerce Department's National Marine Fisheries Service (NMFS). The FWS has primary responsibility for terrestrial and freshwater organisms, while the NMFS has responsibility for marine species such as whales and salmon. These two agencies work with other agencies to plan or modify Federal projects so that they will have minimal impact on listed species and their habitat. Protection of species is also achieved through partnerships with the States, with Federal financial assistance and a system of incentives available to attract State participation. The FWS also works with non-Federal landowners, providing financial and technical assistance for management actions on their lands to benefit both listed and non-listed species.

Section 9 of the ESA makes it unlawful for a person to "take" a listed species. The Act says, "The term take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." The Secretary of the Interior, through regulations, defined the term "harm" as "an act which actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering." However, permits for "incidental take" can be obtained from the FWS for take which would occur through an otherwise legal activity, such as construction of wind turbines, and which would not cause the species to become further imperiled.

Section 10 of the ESA allows for the development of "Habitat Conservation Plans" for endangered species on private lands. This provision is designed to relieve restrictions on private landowners who want to develop land inhabited by endangered species. Private landowners who develop and implement an approved habitat conservation plan providing for conservation of the species can receive an incidental take permit that allows their development to go forward.

**The National Environmental Policy Act** of 1969 (42 U.S.C. 4371 et seq.) (NEPA) requires that Federal agencies prepare environmental impact statements (EIS's) for Federal actions significantly affecting the quality of the human environment. These EIS's must describe the proposed action, conduct detailed analyses of the impacts of the proposed action and alternatives to that action, and include public involvement in the decision making process on how to proceed to accomplish the purpose of the action. The purpose of the NEPA is to allow better environmental decisions to be made. The Council on Environmental Quality, established by the NEPA, has promulgated regulations in 40 CFR 1500-1508 that include provisions for preparing EIS's and Environmental Assessments, considering categorical exclusions from NEPA documentation requirements for certain agency actions, and developing cooperating agency agreements between Federal agencies.

#### **Appendix 4: Research Needed**

Effects of inclement weather in attracting birds and bats to lighted turbines, or drawing birds and bats to within rotor-swept area of turbines, particularly for passerines during spring and fall migrations.

Localized effects of turbines on wildlife: habitat fragmentation and loss; effects of noise on both marine and terrestrial wildlife; habituation; effects of offshore turbine construction and placement on benthic biota (sea bottom dwelling invertebrate wildlife).

Effects of wind turbine string configuration on mortality: end of row turbine effect; turbines in dips or passes or draws; setbacks from rim/cliff edges.

Effectiveness of deterrents: alternating colors on blades (particularly black/white and UV gel coats on the Asmeare effect); lights (e.g., Austin moon lights; color, duration and intensity of pilot warning lights; lasers); infrasound (Brecka buoys, other noisemakers such as predator and distress calls if not irritating to humans or domestic animals); visual markers on guy wires.

Utility of acoustic, infrared and radar technologies to detect bird species, abundance, location, height, and movement.

Accuracy of mortality counts: estimate of the number of carcasses (especially of passerines) lost because they have been fragmented and lost to the wind; size and shape of dead bird search areas; possibility of recording collisions acoustically or with radar or infrared monitoring.

Annual variability (temporal and spatial) in migratory pathways ; what is the utility of GIS to assess migratory pathways and stopovers, particularly for passerines, bats, and butterflies.

Effectiveness of seasonal shutdowns at preventing mortalities.

Impacts of larger turbines versus smaller models.

**Appendix 5: Protocol for Monitoring the Impact of Seven Cellular Telecommunication Towers on Migratory Birds within the Coconino and Prescott National Forests, Arizona**  
March 12, 2002

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[Coconino NF Tower Proposal.wpd]

**STUDY NEED:**

The U.S. Fish and Wildlife Service's (FWS) Division of Migratory Bird Management (MBM) Region 9 headquarters office (Arlington, VA) proposes the following protocol for the monitoring and assessment of migratory songbirds, any avian species listed under the Endangered Species Act (ESA), and any bats listed under ESA. The study is to take place over a 3 year period on 7 proposed cellular telecommunication towers on the AI-17 Wireless Project<sup>1</sup> in the Coconino and Prescott National Forests, Arizona. The FWS understands that the results of this study will be valuable in evaluating future tower systems proposed along the I-40 corridor in Coconino and Kaibab National Forests. We strongly encourage this monitoring.

The monitoring is important because virtually no studies on the impacts of communication towers have been conducted west of the Rocky Mountains. We do not believe any monitoring of the impacts of short towers<sup>2</sup> has been conducted on migratory birds. The FWS-chaired (Manville) Communication Tower Working Group agreed at its June 2000 meeting that assessing the impacts of short towers was a nationwide priority because the question about cumulative impacts of short towers needed to be answered. A protocol for a pilot study to begin testing this potential impact was prepared by Drs. Michael Avery (Project Leader, USDA National Wildlife Research Center) and Robert Beason (Biology Department Chair, University Louisiana, Monroe) and was peer-reviewed by professional ornithologists from the Ornithological Council in 2001. The study was to be implemented on a gas pipeline right-of-way at short towers owned and operated by Enron Gas Pipeline Group. The Enron corporate bankruptcy has precluded this study.

The FWS commends the FS and the staff of the Coconino and Prescott National Forests (NFs) in particular for requiring the industry to fund and implement this 3-year study. We also applaud the FS for encouraging the communication tower industry to use our voluntary Service tower

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<sup>1</sup> hereafter, generally < 200 feet (61m) above ground level (AGL), unguyed, and unlit.

<sup>2</sup> hereafter, to include towers, monopoles and lattice structures.

siting guidelines in the placement and construction of these proposed towers.

## TIME LINE AND REPORTING:

The study should take place for a minimum of **3 years** B each year consisting of a **spring** and **fall** assessment that coincides with the songbird migrations and an abbreviated **summer** assessment to monitor tower impacts (including guy wires if there are any) on resident migratory birds, including any ESA-listed species that may be present during this time, as well as resident and migratory ESA-listed bats. Monitoring data from each of the spring, summer and fall seasons and an annual monitoring summary should be provided to FS and MBM/FWS. A report from the completed study, along with annual monitoring summaries, should be submitted to FS and to MBM/FWS in Arlington, VA. MBM staff can distribute these to Service staff and the 50+ members of the Communication Tower Working Group on a timely basis. Data records are to be made available for FS and FWS review at any time they may be requested.

## JUSTIFICATION FOR MONITORING PROTOCOL AND STUDY DESIGN:

Studies on the mortality of birds that strike tall<sup>3</sup> communication towers conducted by Avery *et al.* (1978) and others indicate that most dead birds were found within 197 ft. (60m) of the central communication tower structure. While this and numerous other studies have focused almost exclusively on tall towers, the monitoring protocols used for these previous studies are applicable for studying short towers as well, with some slight modifications (see beyond).

Avery *et al.* (1978) successfully used this technique to assess songbird mortality at a 1,210-ft. (369-m) Omega tower in North Dakota. Based on daily monitoring during 3 fall and 2 spring migration seasons, 63% of the birds they found dead or injured at this tower were within 300 ft. (92 m) of the tower. The proposed study for towers in Coconino and Prescott NFs, however, is dealing with much shorter communication towers, so dead birds will likely be found at distances less than discovered by Avery *et al.* (1978). Unlike the Avery *et al.* study, tagged bird carcasses (*e.g.*, House Sparrows and European Starlings) will **not** be placed in nets to assess persistence and scavenging/predation loss, unless staff of the Coconino and Prescott NFs feel this is necessary. Placing tagged carcasses in random search plots, which are then found or not found and/or removed or not removed, helps determine biases (Erickson *et al.* 1999). However, there are inherent problems associated with using tagged bird carcasses, including the attraction of predators, cost, availability, and adequate sample size (Dr. Dale Strickland, WEST Inc., 2002 personal communications).

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<sup>3</sup> hereafter, towers greater than 199 feet (61m) AGL, guyed, and lit.

Avery *et al.* (1978) completely examined the inner 150-ft.-radius (46m) of a tower in North Dakota for bird carcasses. We recommend this procedure for the Coconino and Prescott studies. The ground area underneath the North Dakota tower and outside the 150-ft.-radius (46m) interior concentric circle was then divided into 3 additional strata consisting of concentric circles (Figure 1), and north-south and east-west compass lines were drawn, dividing these strata into 12 substrata beyond the inner concentric circle. Two square sampling plots B 40 ft. (12.4m) on a side B were then randomly selected within each substratum. At these sampling plots, 0.75-inch (1.9-cm) mesh nylon netting was suspended above the ground on 5-ft.-high (1.5m) steel poles, net centers were anchored to the ground, and a wooden railing around the top perimeter of each net was constructed to prevent birds from being blown out. In the Avery *et al.* (1978) study, dead bird searches were made daily at **dawn** from March 30-June 4 and August 8-November 15. Dates of daily monitoring at towers in Arizona would need to be altered to coincide with songbird migrations through the Coconino and Prescott NFs. The searches also should be conducted **daily at first light**.

### ***Dealing with Biases:***

Many researchers have attempted to address the need to obtain unbiased estimates of the number of birds that collide with structures, including communication towers (Harness 2001, Faanes 1987, Hartman *et al.* 1993, APLIC 1994). Biases that must be addressed include **searcher efficiency** (birds within the search areas missed by the researcher), **removal** (birds removed by scavengers or predators before the search begins), **habitat** (birds missed because the area within a designated search area is physically or otherwise not searchable), and **crippling bias** (birds that collide with towers or their guy wires but do not fall within the search area). These biases can cause counts that are lower than actual numbers of birds killed (Harness 2001).

To assess removal of tower-killed birds by scavengers and predators (*e.g.*, birds of prey, jays and magpies, foxes, cats, weasels, skunks, badgers, mink, and others), Avery *et al.* (1978) placed tagged, dead birds in some of the sampling sites. Marked birds not taken overnight by scavengers were usually picked up the following morning during the search for tower casualties.

**Sampling nets** were demonstrated to be highly effective in preventing losses to scavengers and predators; none of 33 of the test birds placed in nets during the study were taken during the first night, while 12 of 69 test birds placed on non-netted gravel sampling plots were taken during the study (Avery *et al.* 1978). In a study at a Tallahassee, Florida, television tower B where sampling nets were not used B scavenging was considerably higher; only 10 of 157 birds were left undisturbed after one night (Crawford 1971). Based on the sampling efficiency shown in the Avery *et al.* (1978) study, and a proposed double sampling technique discussed below, MBM/FWS does **not** recommend using tagged bird carcasses in Arizona.

### ***Double Sampling:***

Based on suggestions from Dr. Dale Strickland (WEST Inc., 2002 personal communication; after Erickson *et al.* 1999), MBM/FWS suggests applying a **double sampling regime** to the Arizona tower studies. This involves **net sampling** (after Avery *et al.* [1978], and Avery and Beason [2000] with slight modifications) which allows for an estimate of the number of carcasses that fall beneath each tower that are relatively unbiased for searcher efficiency and carcass removal and **ground sampling**. For the short towers to be studied, we suggest that the **entire area the radius of the tower height** be completely searched (including under the nets) each day during spring and fall migrations, and searched at least once a week during summer months. The specifics for both protocols follow.

**Net sampling** allows for adjustment of the **ground sampling** estimates that would correct for carcass removal and searcher efficiency bias based on the relative difference of the number of carcasses found using the 2 sampling methods at each communication tower studied. Using the nets, we assume negligible carcass scavenging. Nets also allow adjustment for these biases without the inherent problems associated with using tagged bird carcasses, as previously discussed (Strickland 2002 personal communication). The use of the 2 methods should increase the statistical power of comparison studies between each of the 7 towers being examined.

### ***Using Transects to Determine Sampling Area and Develop Correction Factors:***

It is likely that the probability of catching a bird in a net will change with distance from the tower (*i.e.*, birds may fly or be carried by the wind for a distance before dying). This factor should be included in the sampling design of this study. For example, if there is a bias because birds tend to die greater than 100 ft. (30m) from the short towers, probabilities can be determined by searching **strip transects** that radiate from the tower. This would help estimate the area that should be sampled by nets, develop a correction factor if one is needed for the area outside the radius of the area sampled by the nets, and improve the correction factor for ground surveys (through double sampling) when total mortalities are being estimated for towers that will not be sampled with nets elsewhere (Strickland 2002 personal communication). Several strip census/transect methods are available (*e.g.*, Haine, Hahn, Kelker, and others). A biometrician should be consulted for a specific recommendation for transect use and size for each site. A suggestion is presented.

### ***Randomized Block Design:***

Experiments can be “blocked” allowing each “treatment” to be randomly assigned within each block. **Blocking** can be based on a number of factors, which could potentially affect experimental variation. This can include animal abundance, vegetation, and topographical features. In studies such as this, it is common to block on habitat and time periods, a grouping called **local control** (Mead *et al.* 1993). Randomized block designs are usually statistically analyzed by analysis of variance.

In these Arizona studies, Strickland (2002 personal communication) recommends using a randomized block design where **4 treatments** are randomly assigned to the towers within a block (at least 6 blocks of 4 towers are needed; the FS has 7 towers available for study). A block of at least 4 towers would be located in very **similar habitat** relative to potential **bird use** (e.g., anticipated songbird flight corridors) and other factors that may influence the likelihood of bird mortalities (e.g., any history of **fog** or inclement weather, **funneling** effects, or bird **attractions**).

MBM/FWS suggests that the specific statistical design of this study be worked out with Strickland, a biometrician, or others. MBM/FWS recommends the tower company or their consultant also contact Dr. Graham Smith, Chief of the Branch of Population and Habitat Assessment, MBM/FWS, Laurel, Maryland (301/497-5860; fax. 301/497-5871) for further assistance.

### **RECOMMENDED MONITORING PROTOCOL:**

Using the study design of Avery *et al.* (1978), taking the modified design of the peer-reviewed pilot study proposed by Avery and Beason (2000), and using the suggestions presented by Strickland (2002 personal communication), MBM/FWS recommends the following:

– Before the monitoring actually begins, **identify** each tower according to location, type, height, elevation, topography, lighting, guys, and other distinguishing characteristics.

^ Each day a tower is examined, note day and nighttime **weather** conditions (including temperature, wind, cloud cover, barometric pressure, rainfall, fog, obscuration, and other pertinent weather conditions) at the immediate tower site. When dead birds are located during the summertime and time of death can only be estimated, record general weather conditions back to the time the site was last monitored. Cloud cover should be designated as clear (< 10% cloud cover), partly cloudy (10-90% cover) or overcast (> 90% cover) for all searches. Make special note of inclement weather conditions, particularly during times of songbird migrations. During weekly summertime searches, attempt where possible to conduct carcass counts when weather ceilings are low and visibility is poor.

∨ In addition to the 7 “**experimental**” towers to be examined, select at least 1 ungued, unlit tower B preferably nearby and perhaps shorter B as a “**control**” for these studies. The control(s) may not necessarily be within the NFs. If the habitat varies for each or several of the 7 experimental towers, more than one control will likely be needed. Consult a biometrician when selecting a control tower(s) and incorporating the control within the study design.

⇔ Install elevated **catchment nets** at both the experimental and control towers. Nets should consist of 0.75-inch (1.9-cm) mesh knitted polyethylene, 50 x 50 ft. (15 x 15m) in size. Suspend each sampling net 5 ft. (1.5m) above ground. Attach 8-gauge monofilament nylon line around the periphery of the entire net. Be careful to avoid killing passerines, raptors or other birds that may become entangled in the catchment nets. Support the monofilament line with 6.5-ft.-long (2m) steel angle posts driven into the ground and spaced every 7-10 feet (2-3m) apart. Pull the center of each net close to the ground and secure with monofilament to a cinder block, creating a downslope gradient from the edge of the net to its center so a carcass landing in the net will tend not to be blown from the netting by a strong wind. Attaching a wooden lip around the periphery of each net (Avery *et al.* 1978) is probably unnecessary. Materials for each net installation are estimated to cost \$320 (Avery and Beason 2000). The use of elevated catchment nets should make finding dead birds by tower or guy wire strikes more reliable, especially under variable habitat conditions (*e.g.*, unsuitable substrate for searching, tall grass, shrubs, roots, boulders, or trees).

⇐ At each of the 7 experimental and the control(s) towers to be studied, place **3 nets in each of 2 separate concentric circles** (tiers or arcs; Figure 2). The first tier to be monitored consists of a concentric circle with a radius 100 ft. (30m) from the center of the tower. Within **each 120<sup>o</sup> sector** of this circle, randomly locate **1 net**. The area sampled by these 3 nets represents approximately 24% of the total area within the 100-ft. (30-m) radius circle of the tower. Within the second stratum at a distance of 100-197 ft. (30-60m) radius from the tower, randomly place **1 additional net** within each of the 120<sup>o</sup> sectors of this circle (representing approximately 8% of the total area within this stratum). Nets are to be inspected at **first light** each day during migration seasons (those to be determined by FS in coordination with MBM/FWS Region 2 Office, Albuquerque [Bill Howe; see below]). Nets should also be inspected at least once a week at **first light** during the summertime. All bird and any bat carcasses are to be collected, dated, exact location noted, numbered, speciated, and saved for later study. For carcasses collected during the summertime, time of death should be estimated based on decomposition and carcass condition, where practical. A FWS scientific collection permit will be required. Contact Bill Howe, [FWS] Regional Nongame Migratory Bird Coordinator (505/248-6875; fax 505/248-6674) or Kamile McKeever, [FWS] Migratory Bird Permit Coordinator (505/248-7884; fax 505/248-7885) for a permit application.

↑ **Completely search** a concentric circle representing the **entire area** the radius of the height of the communication tower for dead birds and bats (Figure 3). Do this each day at **first light** during **migrations** and at least once a week at first light during the **summertime**. After each daily tower search, compare carcass data from the entire area searched to net catchment data. Extrapolate net catchment data (representing 32% of the area out to 197 feet [60m] radius from the tower) so that carcass collection represents 100% of the entire 197-ft.-radius search area and compare data sets to develop any correction factors.

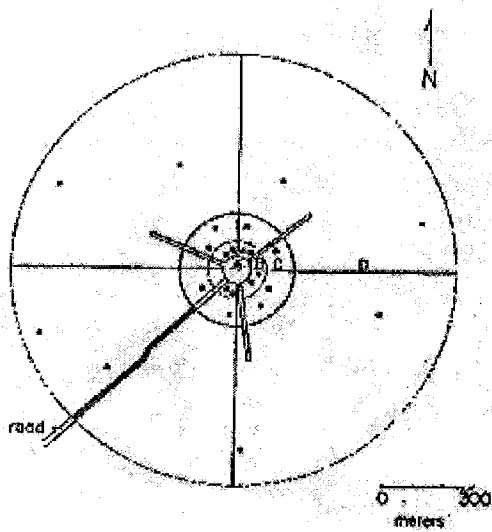
⇒ In consultation with a biometrician, determine the width and location of at least **1 strip census/transect** on a random compass line out from the tower's center to a distance 1.5-2 times the height of the tower (Figure 3; suggested width 50 ft. [15m]). This should be conducted at least **once per week**, preferably in early morning hours, during migrations, and several times during the summer. Doing this should better enable researchers to determine the probability of

catching a bird in a net as the distance from the tower increases. Transects should help in estimating the area that should be sampled by nets (more area further from the tower may be needed) and developing correction factors if necessary.

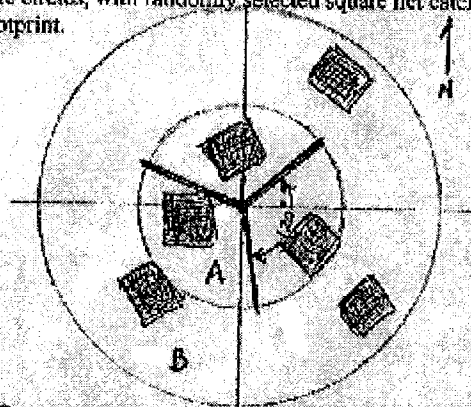
⇓ Electrical wiring on and around the tower should be examined for any electrocutions and bird strikes. Any mortalities should be noted, carcasses collected and numbered, dated, exact locations determined, birds speciated, and carcasses saved.

◇ After the initial 3-year monitoring study, results will be reviewed by the FS, with concurrence from MBM/FWS, to determine if monitoring should be continued, modified, or discontinued. Monitoring data should be provided to FS, MBM/FWS, and any other interested parties at least twice yearly during the 3-year study and from any follow-up monitoring thereafter.

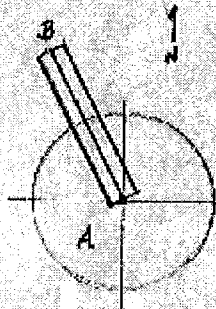
This protocol is subject to modification and design change. It may not be possible to implement all facets of this protocol based on habitat conditions, topography, and physiography. As changes are made, please notify FS and MBM/FWS staff of any suggested improvements and refinements B including any immediate suggestions or alterations.



**Figure 1.** 1,200+-foot (369-m) North Dakota communication tower and study site showing sampling plan utilized by Avery *et al.* (1978). A= area completely sampled (150-foot [46m] radius from tower). B, C and D represent concentric circles, with randomly selected square net catchment study plots situated within each 120° sector of the tower footprint.



**Figure 2.** Schematic showing random placement of catchment nets for research towers. Radius of concentric circle A = 100 ft. (30m) from tower center, radius of concentric circle B = 100-197 ft. (30-60m). Sampling nets located in A cover 24% of total habitat of that area; B cover 8% of the total habitat of that area. Nets are each 50x50 ft. (15x15m) in size.



**Figure 3.** Schematic showing study tower. A= concentric circle whose radius equals height of tower. B= suggested transect (1.5-2 times the height of the tower, 50 ft. [15m] wide) placed on randomly selected compass line.

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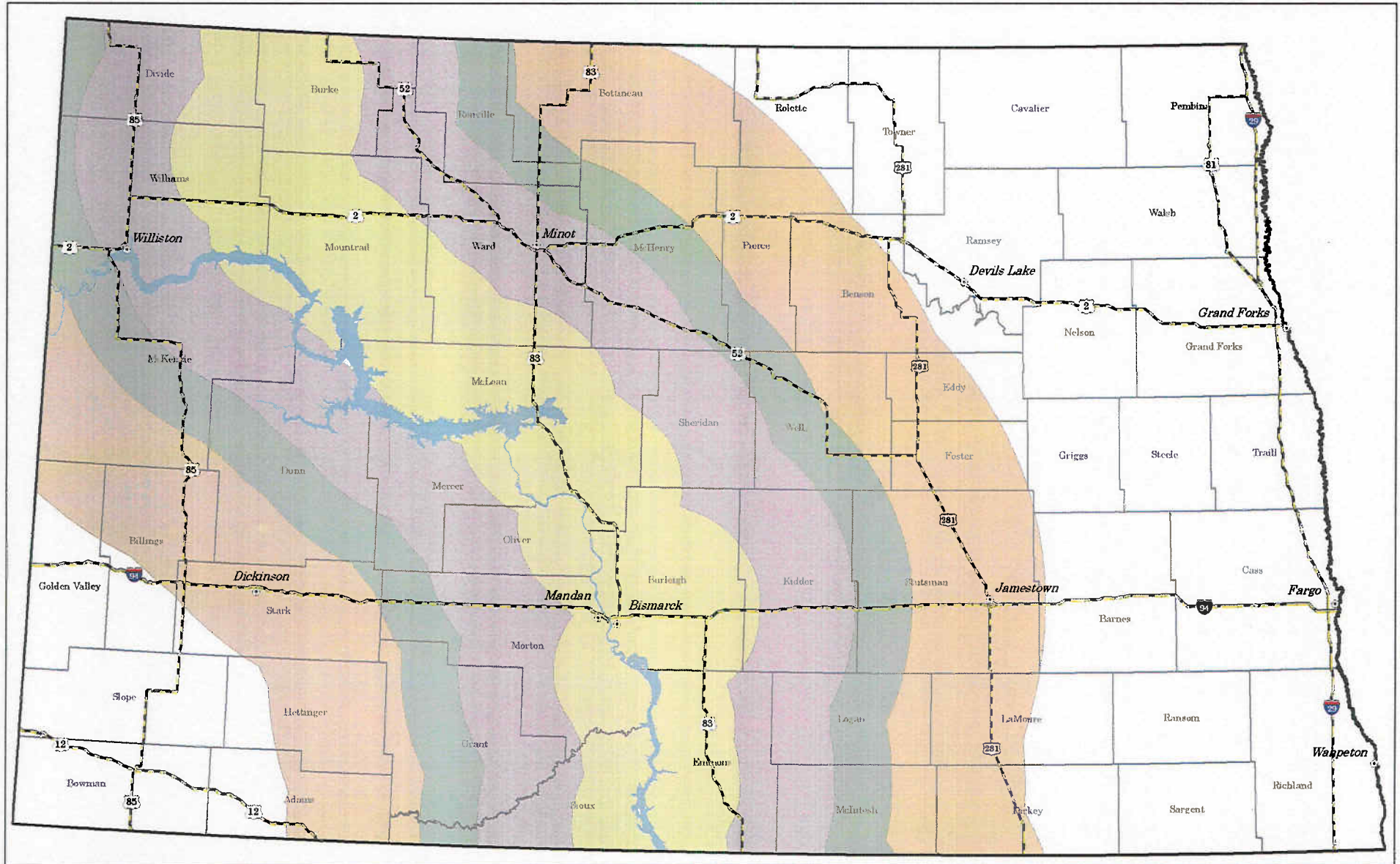
Mead, R., R.N. Curnow, and A.M. Hasted. 1993. Statistical methods in agriculture and experimental biology, 2<sup>nd</sup> edtn. Chapman and Hall, London.



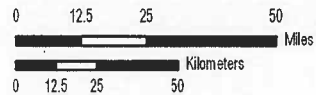
U.S. Fish & Wildlife Service

# Selected Percentages Of Whooping Crane Sightings

North Dakota



PRODUCED BY ECOLOGICAL SERVICES  
 BISMARK, NORTH DAKOTA  
 MAP DATE: 03/18/08  
 SIGHTINGS THROUGH SPRING 2007  
 FILE: TOWERS\_NOLOCATIONS.MXD



**Map Features**

	Major Roads	<b>Percent Whooping Crane Sightings</b>
	County Boundaries	
	Missouri/Yellowstone River System	





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John Hoeven, Governor • Maren L. Daley, Executive Director

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October 3, 2008

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PROFESSIONAL SERVICES

Ms. Amy Linnerooth  
Environmental Scientist  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, Minnesota 55344

RE: Proposed Border Winds Wind Energy Project  
Rolette and Towner Counties, North Dakota

Dear Ms. Linnerooth:

Job Service North Dakota administers the employment service and unemployment insurance programs.

We have no comments regarding the proposed project and have no applicable permits that are required from Job Service North Dakota.

Sincerely,

A handwritten signature in black ink that reads "Maren Daley".

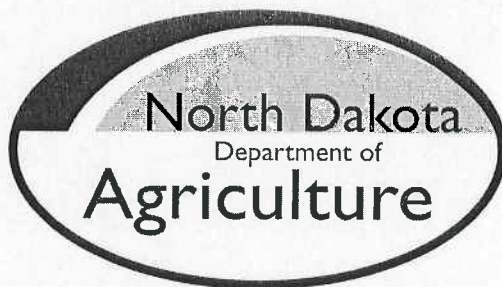
Maren Daley  
Executive Director

701.328.2825 (Voice) • 800.366.6888 (TTY Users - Relay ND) • 701.328.4000 (FAX)

Job Service North Dakota is an equal opportunity employer/program provider.  
Auxiliary aids and services are available upon request to individuals with disabilities.

Roger Johnson  
Agriculture Commissioner  
www.agdepartment.com

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OCT 10 2008  
WESTWOOD  
PROFESSIONAL SERVICES

October 7, 2008

Amy Linnerooth  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344

Dear Ms. Linnerooth:

Thank you for the opportunity to comment on the proposed Boarder Winds Wind Energy Project. My comments are confined to the control of noxious weeds within the construction zone.

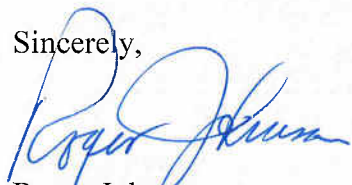
According to North Dakota Century Code (NDCC) 63-01.1-01, every person in charge of or in possession of land in this state, whether as landowner, lessee, renter, or tenant, shall control or eradicate noxious weeds on those lands. Your September 24 letter does not indicate the amount of acres that will be disturbed during the construction process. As this project recovers the vegetation in the disturbed areas, please pay special attention to noxious weed control.

The primary jurisdiction regarding noxious weed law resides with counties. The jurisdiction of each county weed board extends to all lands within the county, but it does not include any land within the corporate limits of a city if that city has its own noxious weed control program (NDCC Ch. 63-01.1-03.2). Enclosed you will find a list of county weed board contact information. Please contact these weed control officials to discuss weed control issues that may be unique to each county.

Weed boards must conduct at least one annual inspection to determine the progress of noxious weed control activities within the county (NDCC Ch. 63-01.1-04.1(4)). I encourage you to contact each county weed control officer and schedule a time for inspection of the land proposed for the wind energy park locations. Restoration and management of cover vegetation will require an active management plan. Cooperation with county weed control boards will ensure that the disturbed land does not create a future noxious weed control concern.

I am also enclosing a copy of North Dakota's noxious weed law and regulations. If you have any questions, please contact Ken Junkert of my staff at 701-328-4756. Thank you.

Sincerely,



Roger Johnson  
Agriculture Commissioner

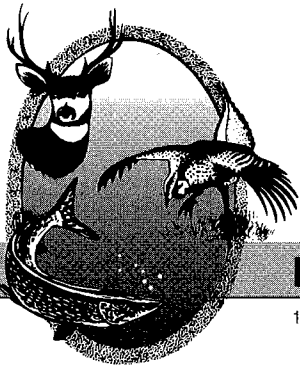
RJ:kj

Enc.

# 2008 NORTH DAKOTA COUNTY/CITY WEED CONTROL OFFICERS

<b>ADAMS</b>	Howard Nelson	405 16th Ave NE Hettinger 58639	567-4153	hownel@ndsupernet.com
<b>BARNES</b>	James McAllister	1525 12th St NW Valley City 58072	840-1473 (C), 845-0240	jmcallister@co.barnes.nd.us.
<b>BENSON</b>	Tim Finley	3495 58th Ave NE Oberon 58357	740-0801 (C), 798-2776	dakotabow@gondtc.com
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<b>MOUNTRAIL</b>	Jim Hennessy	PO Box 40 Stanley 58784-0040	628-2835, 628-2768 (H)	jhenness@ndsuxt.nodak.edu
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SLOPE	Joan Lorge	6503 150th Ave SW Amidon 58620-8912	879-6316, 523-6675 (C)	jolorge@nd.gov
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FARGO CITY	Mike Stulz	402 23rd St N Fargo 58102	241-1453, 361-8852	Mstulz@cityoffargo.com
	Randy Schmidt	402 23rd St N Fargo 58102	241-1453	
GRAND FORKS CITY	Wallace Helland	151 S 4th St #301 Grand Forks 58201-4735	787-8100	whelland@grandforksgov.com
MANDAN CITY	Robert King	110 Collins Ave Mandan 58554	667-3288, ext. 21	ffemtking@yahoo.com



"VARIETY IN HUNTING AND FISHING"

## NORTH DAKOTA GAME AND FISH DEPARTMENT

100 NORTH BISMARCK EXPRESSWAY BISMARCK, NORTH DAKOTA 58501-5095 PHONE 701-328-6300 FAX 701-328-6352

October 21, 2008

Amy Linnerooth  
Environmental Scientist  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344

RECEIVED  
OCT 24 2008  
WESTWOOD  
PROFESSIONAL SERVICES

Dear Ms. Linnerooth:

RE: Proposed Border Winds Wind Energy Project  
Rolette & Towner Counties, North Dakota

North Dakota's Wildlife Action Plan identifies 100 Species of Conservation Priority in the state. While many of these species can be found within the proposed project area, the plan is habitat based rather than species based. The key to ensuring the long term survival of these species is to maintain diverse grasslands, wetlands, woodlands, rivers and streams. This cannot be reduced to certain isolated areas, but must occur over a broad landscape.

Our primary concern with wind power development is the disturbance of native prairie associated with construction of turbines, access roads, transmission lines, etc. We ask that work within native prairie be avoided to the extent possible.

The National Wetland Inventory indicates a variety of wetlands within the project area. We recommend that above-ground appurtenances not be placed in wetland areas, no alterations be made to existing drainage patterns, and any unavoidable wetland impacts be replaced in kind. We also ask that every effort be made to prevent destruction of woody vegetation.

We would appreciate being kept informed as this project progresses, and as other wind power projects are developed in North Dakota. If possible, we would also like the GPS coordinates for each turbine after the site has been established.

Sincerely,

(for) Michael G. McKenna  
Chief  
Conservation & Communication Division

js



October 13, 2008

Ms. Amy Linnerooth  
Environmental Scientist  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344

RECEIVED  
OCT 16 2008  
WESTWOOD  
PROFESSIONAL SERVICES

Re: Border Winds Wind Energy Project  
Rolette and Towner Counties

Dear Ms. Linnerooth:

This department has reviewed the information concerning the above-referenced project submitted under date of September 24, 2008, with respect to possible environmental impacts.

This department believes that environmental impacts from the proposed construction will be minor and can be controlled by proper construction methods. With respect to construction, we have the following comments:

1. All necessary measures must be taken to minimize fugitive dust emissions created during construction activities. Any complaints that may arise are to be dealt with in an efficient and effective manner.
2. Care is to be taken during construction activity near any water of the state to minimize adverse effects on a water body. This includes minimal disturbance of stream beds and banks to prevent excess siltation, and the replacement and revegetation of any disturbed area as soon as possible after work has been completed. Caution must also be taken to prevent spills of oil and grease that may reach the receiving water from equipment maintenance, and/or the handling of fuels on the site. Guidelines for minimizing degradation to waterways during construction are attached.
3. Projects disturbing one or more acres are required to have a permit to discharge storm water runoff until the site is stabilized by the reestablishment of vegetation or other permanent cover. Further information on the storm water permit may be obtained from the Department's website or by calling the Division of Water Quality (701-328-5210). Also, cities or counties may impose additional requirements and/or specific best management practices for construction affecting their storm drainage system. Check with the local officials to be sure any local storm water management considerations are addressed.

4. Noise from construction activities may have adverse effects on persons who live near the construction area. Noise levels can be minimized by ensuring that construction equipment is equipped with a recommended muffler in good working order. Noise effects can also be minimized by ensuring that construction activities are not conducted during early morning or late evening hours.

The department owns no land in or adjacent to the proposed improvements, nor does it have any projects scheduled in the area. In addition, we believe the proposed activities are consistent with the State Implementation Plan for the Control of Air Pollution for the State of North Dakota.

These comments are based on the information provided about the project in the above-referenced submittal. The U.S. Army Corps of Engineers may require a water quality certification from this department for the project if the project is subject to their Section 404 permitting process. Any additional information which may be required by the U.S. Army Corps of Engineers under the process will be considered by this department in our determination regarding the issuance of such a certification.

If you have any questions regarding our comments, please feel free to contact this office.

Sincerely,

A handwritten signature in blue ink, appearing to read "L. David Glatt".

L. David Glatt, P.E., Chief  
Environmental Health Section

LDG:cc  
Attach.



**Construction and Environmental Disturbance Requirements**

These represent the minimum requirements of the North Dakota Department of Health. They ensure that minimal environmental degradation occurs as a result of construction or related work which has the potential to affect the waters of the State of North Dakota. All projects will be designed and implemented to restrict the losses or disturbances of soil, vegetative cover, and pollutants (chemical or biological) from a site.

**Soils**

Prevent the erosion of exposed soil surfaces and trapping sediments being transported. Examples include, but are not restricted to, sediment dams or berms, diversion dikes, hay bales as erosion checks, riprap, mesh or burlap blankets to hold soil during construction, and immediately establishing vegetative cover on disturbed areas after construction is completed. Fragile and sensitive areas such as wetlands, riparian zones, delicate flora, or land resources will be protected against compaction, vegetation loss, and unnecessary damage.

**Surface Waters**

All construction which directly or indirectly impacts aquatic systems will be managed to minimize impacts. All attempts will be made to prevent the contamination of water at construction sites from fuel spillage, lubricants, and chemicals, by following safe storage and handling procedures. Stream bank and stream bed disturbances will be controlled to minimize and/or prevent silt movement, nutrient upsurges, plant dislocation, and any physical, chemical, or biological disruption. The use of pesticides or herbicides in or near these systems is forbidden without approval from this Department.

**Fill Material**

Any fill material placed below the high water mark must be free of top soils, decomposable materials, and persistent synthetic organic compounds (in toxic concentrations). This includes, but is not limited to, asphalt, tires, treated lumber, and construction debris. The Department may require testing of fill materials. All temporary fills must be removed. Debris and solid wastes will be removed from the site and the impacted areas restored as nearly as possible to the original condition.

## **Amy Linnerooth**

---

**From:** Kulas, Cheryl M. [ckulas@nd.gov]  
**Sent:** Wednesday, September 24, 2008 3:57 PM  
**To:** Amy Linnerooth  
**Cc:** Anita Blue  
**Subject:** RE: Border Winds

Dear Ms. Linnerooth: Thank you for sending us the copies of the enclosed proposed project. I am forwarding a copy to the Tribal Historic Preservation Officer, and Tribal Planner for the Turtle Mountain Band of Chippewa. They will review the potential impacts and respond to you directly with their comments.

Anita: will you see that Brady gets a copy of the information as well. Thanks, Cheryl

**Cheryl M. Kulas, Executive Director**  
**North Dakota Indian Affairs Commission**  
**600 E. Boulevard Avenue, 1st Floor, Judicial Wing**  
**Bismarck, North Dakota 58505-0300**  
**Phone: 701.328.2432**  
**Fax: 701. 328.1537**  
**Email: [ckulas@nd.gov](mailto:ckulas@nd.gov)**  
**Homepage: [www.health.state.nd.us/ndiac](http://www.health.state.nd.us/ndiac)**

---

**From:** Amy Linnerooth [mailto:[Amy.Linnerooth@westwoodps.com](mailto:Amy.Linnerooth@westwoodps.com)]  
**Sent:** Wednesday, September 24, 2008 2:42 PM  
**To:** Kulas, Cheryl M.  
**Subject:** Border Winds

Please find attached a request for review of the Border Winds project and a site map. If you have any questions regarding these materials, please do not hesitate to contact me.

Sincerely,

Amy Linnerooth  
Environmental Scientist 1

**Westwood Professional Services**  
7699 Anagram Drive  
Eden Prairie, MN 55344-7310

DIRECT 952-906-7423  
EMAIL [amy.linnerooth@westwoodps.com](mailto:amy.linnerooth@westwoodps.com)  
MAIN 952-937-5150  
FAX 952-937-5822  
WEB [www.westwoodps.com](http://www.westwoodps.com)

John Hoeven  
Governor of North Dakota

July 14, 2008

North Dakota  
State Historical Board

Mr. Dean Sather  
Cultural Resources Principal Investigator  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344-7310

Albert I. Berger  
Grand Forks - President

Chester E. Nelson, Jr.  
Bismarck - Vice President

Gereld Gerntholz  
Valley City - Secretary

A. Ruric Todd III  
Jamestown

Diane K. Larson  
Bismarck

Marvin L. Kaiser  
Williston

Richard Kloubec  
Fargo

Sara Otte Coleman  
Director  
Tourism Division

Kelly Schmidt  
State Treasurer

Alvin A. Jaeger  
Secretary of State

Douglass Prchal  
Director  
Parks and Recreation  
Department

Francis Ziegler  
Director  
Department of Transportation

Merlan E. Paaverud, Jr.  
Director

ND SHPO Ref.:08-1046 Border Winds Wind Farm Sequoia Energy Inc.  
Rolette and Towner Counties, North Dakota

Dear Mr. Sather,

We reviewed your Class I report on ND SHPO Ref.:08-1046 Border Winds Wind Farm Sequoia Energy Inc. Rolette and Towner Counties, North Dakota. We concur with the recommendation of a Class III Pedestrian survey of the APE (Area of Potential Effect), including any potential visual effects of the proposed wind turbine towers on historic or prehistoric properties. If project is within boundaries of the Turtle Mountain Band of Chippewa Indian Reservation, please contact Mr. Brady Grant, THPO. Additionally, any borrow fill must come from an approved source, that is, one surveyed by an archaeologist and found to contain no significant cultural resources. If federal agencies are involved, please also consult with them regarding cultural resources.

We look forward to further review of the Class III survey, and consultation with the federal agencies that may be involved. Please include the ND SHPO Reference number listed above in any further correspondence for this specific project. If you have any questions please contact Susan Quinnell, Review and Compliance Coordinator at (701) 328-3576 or [squinnell@nd.gov](mailto:squinnell@nd.gov), or Paul Picha, Chief Archaeologist (701) 328-3574.

Sincerely,

Merlan E. Paaverud, Jr.  
State Historic Preservation Officer (North Dakota)

Accredited by the  
American Association  
of Museums

c: Ms. Susan Wefald, North Dakota Public Service Commission



John Hoeven, Governor  
Douglass A. Prchal, Director

1600 East Century Avenue, Suite 3  
Bismarck, ND 58503-0649  
Phone 701-328-5357  
Fax 701-328-5363  
E-mail [parkrec@nd.gov](mailto:parkrec@nd.gov)  
[www.parkrec.nd.gov](http://www.parkrec.nd.gov)

RECEIVED  
OCT 10 2008  
WESTWOOD  
PROFESSIONAL SERVICES

October 7, 2008

Amy Linnerooth  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344

Re: Border Winds Wind Energy Project

Dear Ms. Linnerooth:

The North Dakota Parks and Recreation Department (the Department) has reviewed the above referenced project proposal to construct the Border Winds Wind Energy Project located near the City of Rolla in Rolette and Towner Counties.

Our agency scope of authority and expertise covers recreation and biological resources (in particular rare plants and ecological communities). The project as defined does not affect state park lands that we manage. We do have some concerns regarding Land and Water Conservation Fund sites possibly within or adjacent to the project area. Projects in Rolla (project numbers 38-00018 and 38-00388) and Towner County (project number 38-00070) have received assistance from the federal Land and Water Conservation Funds and are under protection of section 6(f) of the LWCF Act. Any property taken from within the 6f boundaries of these areas must be replaced with property of equal market value. Should any public or private utilities need to be added or relocated on the LWCF recreational lands, the NDPRD must be consulted prior to any action taken. Please contact Michelle Vetter (701-328-5364 or [mvetter@nd.gov](mailto:mvetter@nd.gov)) if additional LWCF information is needed.

The North Dakota Natural Heritage biological conservation database has been reviewed to determine if any plant or animal species of concern or other significant ecological communities are known to occur within an approximate one-mile radius of the project area. Based on this review, several historical occurrences have been identified within or adjacent to the project area including: *Populus tremuloides/Prunus virginiana* woodland (aspen woodland), *Carex spp. - Triglochin maritime - Eleocharis pauciflora fen* (calcareous fen), *Eleocharis pauciflora* (few-flowered spikerush), *Andropogon gerardii - Schizachyrium scoparium transition tallgrass prairie* (Central mesic tallgrass prairie), *Momotropa uniflora* (indianpipe), *Potamogeton vaginatus* (sheathed pondweed), and *Dendroica pensylvanica* (chestnut-sided warbler). Historical occurrences indicate that habitat may still exist for these species and communities or other rare, threatened, sensitive or endangered species. Please see attached spreadsheet and map for more specific information on these species. We defer further comments regarding animal species to the North Dakota Game and Fish Department and the United States Fish and Wildlife Service.

Because this information is not based on a comprehensive inventory, there may be species of concern or otherwise significant ecological communities in the area that are not represented in the database. The lack of data for any project area cannot be construed to mean that no significant features are present. The absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks natural heritage resources.

Given the potential for not only habitat disturbance and disruption but threat to nesting, feeding and migratory bird and bats in the area we suggest that all efforts be made to avoid impacts to wildlife species and their habitats. In an effort to avoid or minimize impacts to wildlife and their habitats we encourage proper evaluation of all potential wind energy sites. To identify and assess adverse impacts to wildlife we suggest pre and post construction avian and bat monitoring studies be conducted.

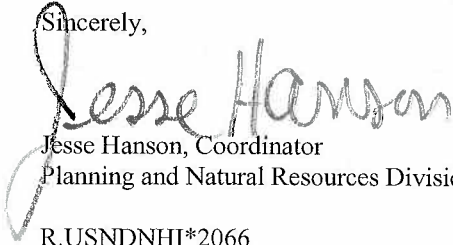
The Department recommends that the project be accomplished with minimal impacts and that all efforts be made to ensure that critical habitats not be disturbed in the project area to help secure rare species conservation in North Dakota. Regarding any reclamation efforts, we recommend that any impacted areas be revegetated with species native to the project area.

.....  
*Play in our backyard!*

It is our policy to charge out-of-state requests for data services including data retrieval, data analysis, manual and computer searches, packaging and collection of data. An invoice for services provided has been enclosed.

Thank you for the opportunity to comment on this project. Please contact Kathy Duttonhefner (701-328-5370 or [kgduttonhefner@nd.gov](mailto:kgduttonhefner@nd.gov)) of our staff if additional information is needed.

Sincerely,

A handwritten signature in cursive script that reads "Jesse Hanson". The signature is written in dark ink and is positioned above the typed name and title.

Jesse Hanson, Coordinator  
Planning and Natural Resources Division

R.USNDNHI\*2066

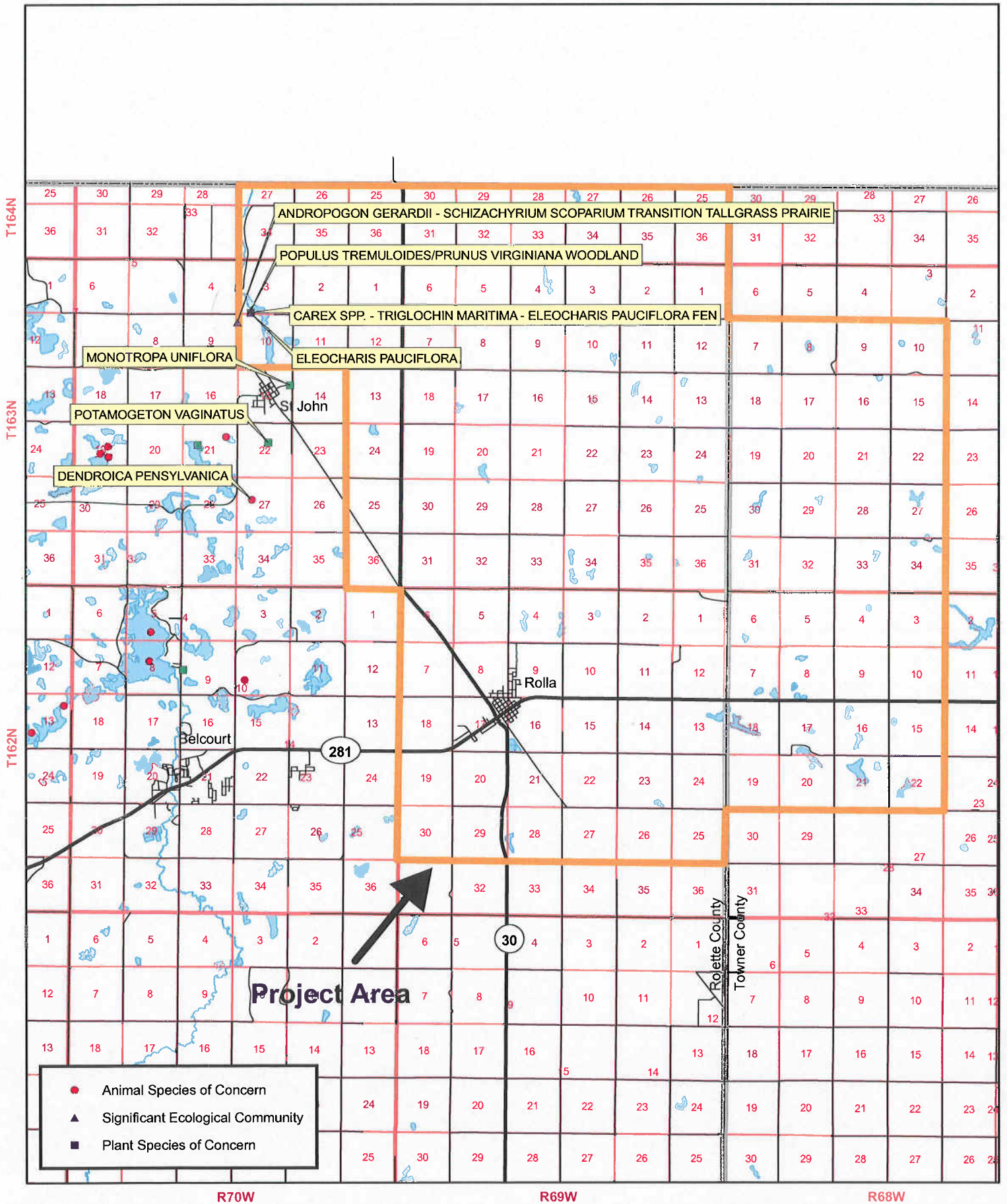
North Dakota Natural Heritage Inventory  
Species of Concern and Significant Ecological Communities

State Scientific Name	State Common Name	Township & Range	Section	TRS Notes	State Rank	Global Rank	Federal Status	Last Observation
POPULUS TREMULOIDES/PRUNUS VIRGINIANA WOODLAND	ASPEN WOODLAND	163N070W	3	SW4	S3			1987-08-18
CAREX SPP. - TRIGLOCHIN MARITIMA - ELEOCHARIS PAUCIFLORA FEN	CALCAREOUS FEN	163N070W	3	SW4	S1			1987-08-18
ELEOCHARIS PAUCIFLORA	FEW-FLOWERED SPIKERUSH	163N070W	3	SW4	S2S3	G5		1987-08-18
ANDROPOGON GERARDII - SCHIZACHYRIUM SCOPARIUM TRANSITION TALLGRASS PRAIRIE	CENTRAL MESIC TALLGRASS PRAIRIE	163N070W	9	NE4NE4	S1			1987-08-18
MONOTROPA UNIFLORA	INDIANPIPE	163N070W	15		S3	G5		1902-08-24
POTAMOGETON VAGINATUS	SHEATHED PONDWEED	163N070W	22		S3	G5		1902-08-24
DENDROICA PENNSYLVANICA	CHESTNUT-SIDED WARBLER	163N070W	27		S3	G5		

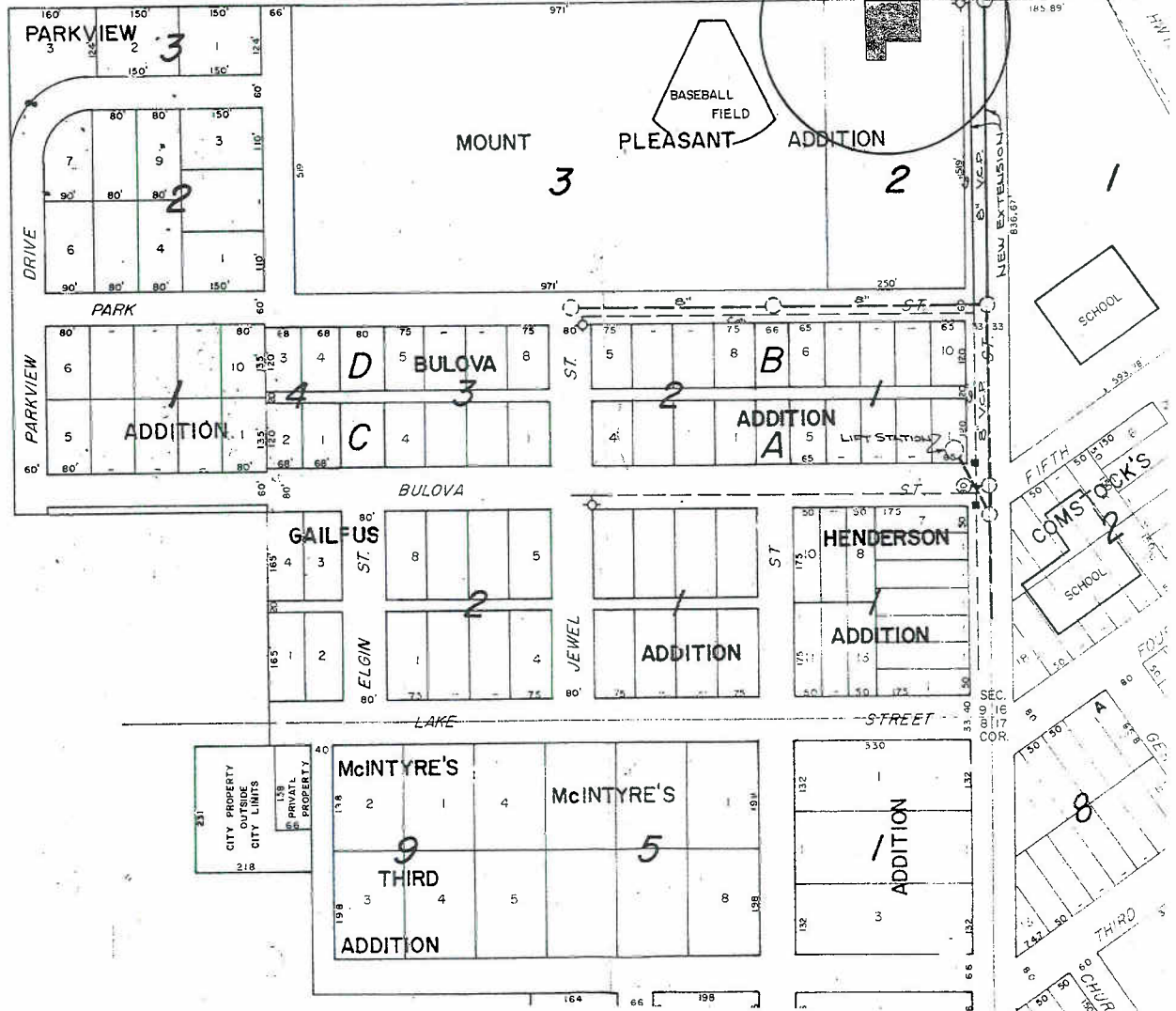
**North Dakota Natural Heritage Inventory Biological and Conservation Data Disclaimer**

The quantity and quality of data collected by the North Dakota Natural Heritage Inventory are dependent on the research and observations of many individuals and organizations. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in North Dakota have never been thoroughly surveyed, and new species are still being discovered. For these reasons, the Natural Heritage Inventory cannot provide a definite statement on the presence, absence, or condition of biological elements in any part of North Dakota. Natural Heritage data summarize the existing information known at the time of the request. Our data are continually upgraded and information is continually being added to the database. This data should never be regarded as final statements on the elements or areas that are being considered, nor should they be substituted for on-site surveys.

# North Dakota Natural Heritage Inventory Species of Concern and Significant Ecological Communities



SEE DETAIL A



PARKVIEW

DRIVE

PARKVIEW

PARK

MOUNT

PLEASANT

ADDITION

ADDITION

GAILUS

BULOVA

LAKE

McINTYRE'S

McINTYRE'S

THIRD

ADDITION

HENDERSON

ADDITION

ADDITION

ADDITION

SCHOOL

SCHOOL

THIRD

CHUR.

SEC. 16  
17  
COR.

FIFTH  
COMSTOCKS

SCHOOL

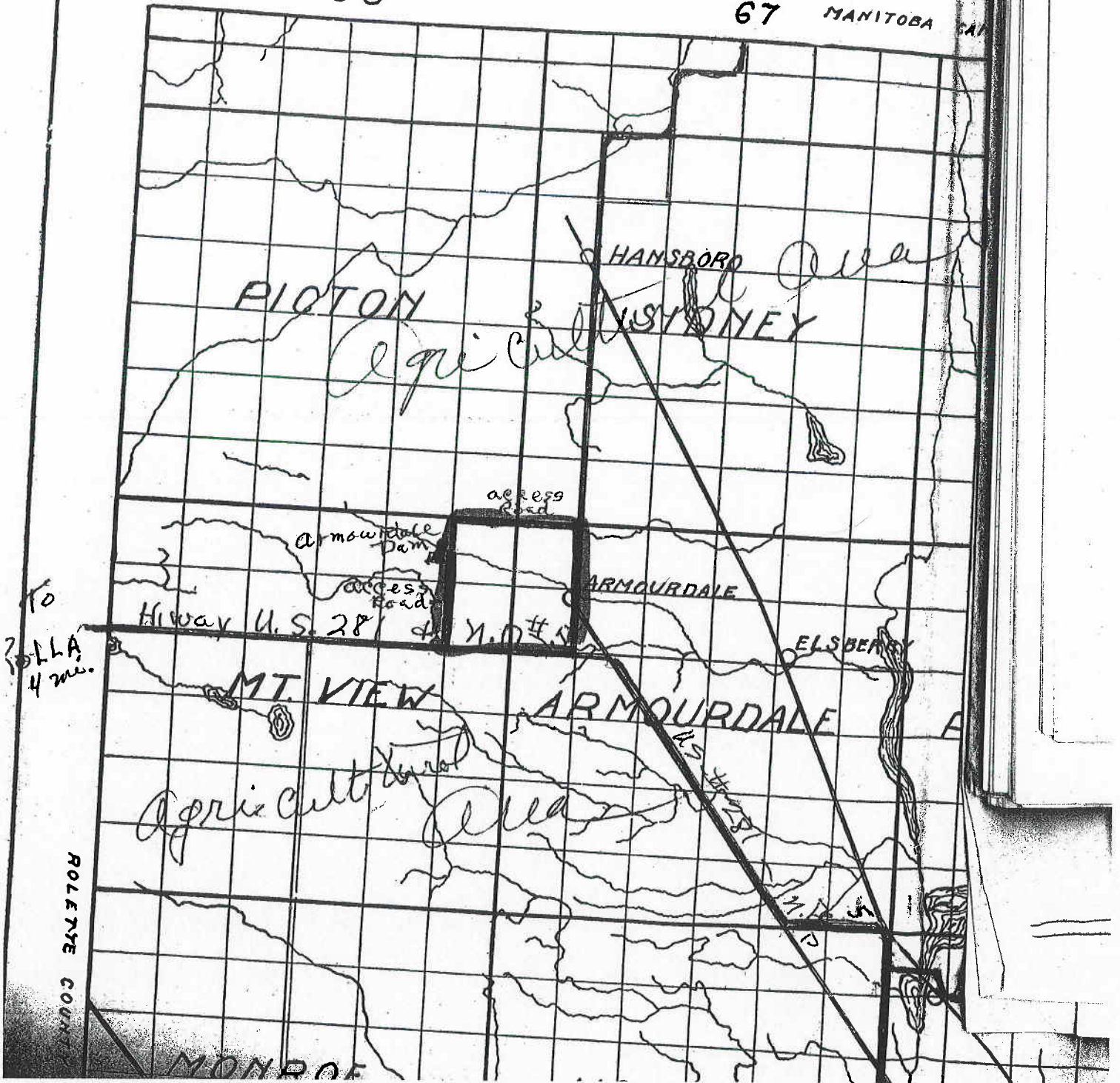
THIRD

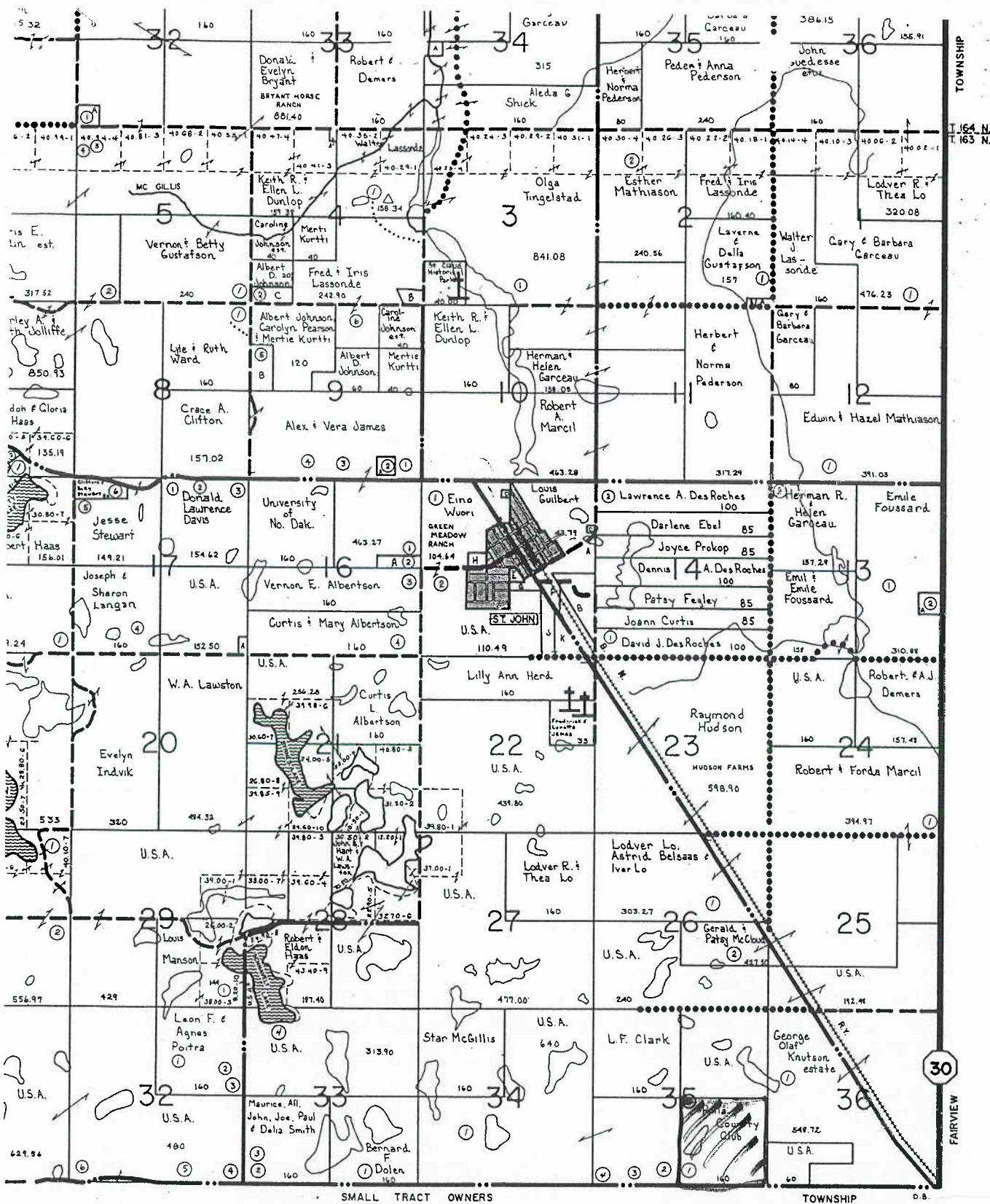
CHUR.

38-00070 (131.18 acres)

68

67 MANITOBA CAN





SEE SMALL TRACT SECTION FOLLOWING TOWNSHIP MAPS

38 - 00388




# North Dakota Department of Transportation

Francis G. Ziegler, P.E.  
*Director*

John Hoeven  
*Governor*

September 30, 2008

Amy Linnerooth  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344

RECEIVED  
OCT 03 2008  
WESTWOOD  
PROFESSIONAL SERVICES

Re: Proposed Border Winds Wind Energy Project  
Rollete and Towner Counties, North Dakota

Dear Amy:

Thank you for the opportunity to make comments on the proposed project. In past dealings with wind tower sites, there was a need to construct new driveways and improve existing driveways on state highways. Just a reminder that if work of that nature will be done on this project that a driveway application and permit will need to be submitted and approved before work can begin on highway right of way. In order for the permit to be approved, the driveway sites will need to have wetland and cultural surveys done. The contact person in the district for driveway permits for the Devils Lake District is Leon Martinson. He will be able to help out with the application process.

If you have any questions, please call me at 701-665-5100.

Thanks,

A handwritten signature in blue ink that reads "Wayde Swenson".

Wayde Swenson, PE  
Devils Lake District Engineer



Wayne Stenehjem  
ATTORNEY GENERAL

STATE OF NORTH DAKOTA  
**OFFICE OF ATTORNEY GENERAL**

STATE CAPITOL  
600 E BOULEVARD AVE DEPT 125  
BISMARCK, ND 58505-0040  
(701) 328-2210 FAX (701) 328-2226  
www.ag.nd.gov

September 26, 2008

Amy Linnerooth  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie MN 55344-7310

RECEIVED  
SEP 29 2008  
WESTWOOD  
PROFESSIONAL SERVICES

Dear Ms. Linnerooth:

I am responding on behalf of the Attorney General to your letter, sent via e-mail, regarding the proposed construction of the Border Winds Energy Project in North Dakota. You ask that this office review the proposed project and provide comments and/or information about applicable permits.

The Attorney General and members of his staff are prohibited by statute from giving legal advice, opinions, or assistance to private businesses. We may only serve as legal advisors to state officials, state's attorneys, and certain city officials.

Accordingly, we cannot review your information or provide the assistance you requested. For legal assistance and to ensure compliance with all ND laws and permit requirements you should consult an attorney in private practice licensed in this state. If you need assistance finding an attorney, you can contact the State Bar Association at (701) 255-1404.

Sincerely,

A handwritten signature in blue ink that reads "Liz Brocker".

Liz Brocker  
Executive Assistant



Wayne Stenehjem  
ATTORNEY GENERAL

STATE OF NORTH DAKOTA  
**OFFICE OF ATTORNEY GENERAL**

STATE CAPITOL  
600 E BOULEVARD AVE DEPT 125  
BISMARCK, ND 58505-0040  
(701) 328-2210 FAX (701) 328-2226  
www.ag.nd.gov

October 13, 2008

Amy Linnerooth  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie MN 55344-7310

RECEIVED  
OCT 16 2008  
WESTWOOD  
PROFESSIONAL SERVICES

Dear Ms. Linnerooth:

I am responding on behalf of the Attorney General to your letter, sent via e-mail, regarding the proposed construction of the Border Winds Energy Project in North Dakota. You ask that this office review the proposed project and provide comments and/or information about applicable permits.

The Attorney General and members of his staff are prohibited by statute from giving legal advice, opinions, or assistance to private businesses. We may only serve as legal advisors to state officials, state's attorneys, and certain city officials.

Accordingly, we cannot review your information or provide the assistance you requested. For legal assistance and to ensure compliance with all ND laws and permit requirements you should consult an attorney in private practice licensed in this state. If you need assistance finding an attorney, you can contact the State Bar Association at (701) 255-1404.

To avoid unnecessary work on future projects, you may wish to note this response for future reference.

Sincerely,

A handwritten signature in blue ink that reads "Liz Brocker".

Liz Brocker  
Executive Assistant

## Amy Linnerooth

---

**From:** Val McCloud [vmcccloud@nd.gov]  
**Sent:** Thursday, September 25, 2008 11:38 AM  
**To:** Amy Linnerooth  
**Subject:** RE: Border Winds  
**Attachments:** Rolette CountyZoning Request Application.doc; Revised Zoning Resolution.txt

Hi Amy,

I will forward the information on the Border Winds project on the County Commissioners. I am enclosing an application form and the Zoning resolution for Rolette County. The application should be submitted to the county along with a fee of \$50. At that point I will schedule a hearing with the Planning Commission. You will need to send along Project plans, maps, exact locations of turbines, access roads, operations and maintenance facilities, etc.

Valerie McCloud  
Rolette County Auditor  
701-477-5665  
Fax 70-477-6339  
PO Box 939  
Rolla ND 58367-0939

---

**From:** Amy Linnerooth [mailto:[Amy.Linnerooth@westwoodps.com](mailto:Amy.Linnerooth@westwoodps.com)]  
**Sent:** Wednesday, September 24, 2008 4:19 PM  
**To:** vmcccloud@state.nd.us  
**Subject:** Border Winds

Dear Valerie,

Please find attached a request for review of the Border Winds project and a site map. Can you please forward this to the Commissioner's office? A hard copy of this material will also be submitted to the Commissioner's office for review. If you have any questions regarding these materials, please do not hesitate to contact me.

Sincerely,

Amy Linnerooth  
Environmental Scientist 1

**Westwood Professional Services**  
7699 Anagram Drive  
Eden Prairie, MN 55344-7310

DIRECT 952-906-7423  
EMAIL [amy.linnerooth@westwoodps.com](mailto:amy.linnerooth@westwoodps.com)  
MAIN 952-937-5150  
FAX 952-937-5822  
WEB [www.westwoodps.com](http://www.westwoodps.com)

Rolette County  
Zoning Request Application

Date \_\_\_\_\_

Applicant Name \_\_\_\_\_

Phone \_\_\_\_\_

Address \_\_\_\_\_

Type of Request    \_\_\_\_\_ Building Permit                      \_\_\_\_\_ Amendment                      \_\_\_\_\_ Variance  
                                 \_\_\_\_\_ Permitted Use                      \_\_\_\_\_ Text  
                                 \_\_\_\_\_ Conditional Use                      \_\_\_\_\_ Map

Description of Request \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Reason for Request \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Existing Use of Property \_\_\_\_\_

Lot Size \_\_\_\_\_                      Setbacks \_\_\_\_\_

Lot Width \_\_\_\_\_                      Sideyard \_\_\_\_\_

A Sketch showing all proposed structures and their location on the lot must be attached.

Signature of Applicant \_\_\_\_\_                      Date \_\_\_\_\_

Action Taken \_\_\_\_\_  
\_\_\_\_\_

**Signature for County** \_\_\_\_\_                      **Date** \_\_\_\_\_

**Rob Bouta**

---

**From:** Kent Haugen [kmhaugen@nd.gov]  
**Sent:** Tuesday, July 01, 2008 5:09 PM  
**To:** Rob Bouta  
**Subject:** RE: Request for Concurrence Regarding Turbine Noise in Towner County

The County Commission concurred with your information as presented and find no problem with you proceeding.

Kent Haugen  
Towner County Auditor/Treasurer

---

**From:** Rob Bouta [mailto:Rob.Bouta@westwoodps.com]  
**Sent:** Tuesday, June 17, 2008 2:00 PM  
**To:** Kent Haugen  
**Cc:** Ian Witherspoon  
**Subject:** RE: Request for Concurrence Regarding Turbine Noise in Towner County

Thanks Kent. We look forward to working with you and coordinating with the County on this.

Regards,

Rob Bouta  
Sr. Environmental Scientist

**Westwood Professional Services**  
7699 Anagram Drive  
Eden Prairie, MN 55344-7310

DIRECT 952-906-7436  
EMAIL [rob.bouta@westwoodps.com](mailto:rob.bouta@westwoodps.com)  
MAIN 952-937-5150  
FAX 952-937-5822  
WEB [www.westwoodps.com](http://www.westwoodps.com)

---

**From:** Kent Haugen [mailto:kmhaugen@nd.gov]  
**Sent:** Tuesday, June 17, 2008 1:07 PM  
**To:** Rob Bouta  
**Subject:** RE: Request for Concurrence Regarding Turbine Noise in Towner County

Thanks for your letter. It will be presented to the County Commission on July 1, 2008 for their review.

Kent Haugen  
Towner County Auditor/Treasurer

---

**From:** Rob Bouta [mailto:Rob.Bouta@westwoodps.com]  
**Sent:** Tuesday, June 17, 2008 11:54 AM  
**To:** kmhaugen@nd.gov  
**Cc:** Ian Witherspoon; gmack@gondtc.com  
**Subject:** Request for Concurrence Regarding Turbine Noise in Towner County

Kent,

This email follows up on a telephone conversation we had a few weeks ago concerning the 50 dBA noise limit set forth for wind turbines in the Towner County Zoning Ordinance. As we discussed on the phone, Westwood has reviewed the sound levels related to wind turbines and prepared an assessment, which is included in the attached letter. In that assessment, Westwood concludes that wind turbine sound levels will be acceptable, provided that wind turbines are setback at least 800 feet from the nearest occupied residence and the nearest non-participating landowner property boundary. The attached letter requests Towner County's concurrence with this conclusion. Please let me know whether you agree with our findings on this topic.

Regards,

**Rob Bouta**

Sr. Environmental Scientist

**Westwood Professional Services**

7699 Anagram Drive

Eden Prairie, MN 55344-7310

DIRECT	952-906-7436
EMAIL	<a href="mailto:rob.bouta@westwoodps.com">rob.bouta@westwoodps.com</a>
MAIN	952-937-5150
FAX	952-937-5822
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