Ashtabula Wind Energy Center
Ashtabula Wind, LLC
Barnes County, North Dakota

Application to the North Dakota Public Service Commission for a Certificate of Site Compatibility

Prepared for:
Ashtabula Wind, LLC
700 Universe Boulevard
Juno Beach, Florida 33408

Prepared by:
Tetra Tech EC, Inc.
133 Federal Street
Boston, MA 02110

TETRA TECH EC, INC.

STATE OF NORTH DAKOTA
PUBLIC SERVICE COMMISSION

Case No. PU-08-32

In the matter of the Application of Ashtabula Wind, LLC for a Certificate of Site Compatibility to Construct a 200 MW Wind Farm in Barnes County, North Dakota

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APPLICATION OF ASHTABULA WIND, LLC FOR CERTIFICATE OF SITE COMPATIBILITY FOR A 200 MW WIND FARM, AND FOR A WAIVER OR REDUCTION OF CERTAIN PROCEDURES AND TIME SCHEDULES

Ashtabula Wind, LLC ("Ashtabula Wind"), whose address for purposes of this Application is 700 Universe Boulevard, Juno Beach, FL 33408-2683, pursuant to the Energy Conversion and Transmission Facility Siting Act codified at North Dakota Century Code Chapter 49-22 ("Act"), hereby submits this Application for a Certificate of Site Compatibility and Waiver or Reduction of Certain Procedures and Time Schedules ("Application").

In Case No. PU-08-73, Ashtabula Wind has a separate corresponding Application for a Corridor Certificate and Route Permit for approximately 9.3 miles of 230 KV overhead electrical transmission line.

Ashtabula Wind requests that the Commission waive and/or reduce procedures and time schedules required in the Act and in the Commission's regulations set forth in Title 69-06 of the North Dakota Administrative Code to accomplish the purposes requested herein. These include, but are not limited to: (1) waive, pursuant to North Dakota Century Code §§ 49-22-07.2, 49-22-

13, and North Dakota Administrative Code § 69-06-01-02(3) and Chapter 06-06-06, provisions of North Dakota Century Code §§ 49-22-08(5), 49-22-08(1), 49-22-13 and North Dakota Administrative Code § 69-06-01-02 which require separate hearings on such applications and certain time schedules and procedures as set forth in said statutes and rules; (2) hold one consolidated hearing for the requested certificate of site compatibility to be held in conjunction with the hearing for the corridor certificate and route permit in Case No. PU-08-73; (3) find that the proposed facilities are of such design, location and purpose that they will produce minimal adverse affects; and (4) designate and approve the requested facilities as identified in this Application and in the Application of Case No. PU-08-73 and issue the appropriate corridor certificate, route permit and certificate of site compatibility.

The Commission's application guidelines for waiver of procedures and time schedules require the description of the facility, the need for the facility, the cost of the facility and separate justification for each provision of the Act which the applicant is requesting a waiver, together with evidence that the proposed project will produce minimal adverse effects. As demonstrated in this Application and in the Application for the corridor certificate and route permit for the transmission line, Ashtabula Wind's request for waivers or reduction of procedures and time schedules and the issuance of the corridor certificate, route permit and certificate of site compatibility are justified as the proposed facilities are of such design, location and purpose that they will produce minimal adverse effects.

DESCRIPTION

Ashtabula Wind proposes to construct a wind farm consisting of 133 1.5 MW wind turbines with associated access roads, electrical lines, electrical substation, wind monitoring

stations, and an operation and maintenance facility; along with 9.3 miles of 230 KV overhead electrical transmission line. There are no plans for future expansions of the proposed facility.

NEED

North Dakota offers tremendous renewable energy potential to the state and regional power system. Renewable energy has numerous benefits to the citizens of the region, including minimizing the emissions from conventional power plants. Wind energy also benefits local economies during construction and operation of the wind energy center. Energy generated at the wind energy facility and transmitted to the regional electric system will be supplied to regional power customers. In addition, the wind farm and associated transmission line must be operational by December 31, 2008, in order for the project to qualify for federal energy tax credits.

COST

The estimated cost of constructing both the wind farm and the electric transmission line is approximately $350,000,000.00.

JUSTIFICATION

The proposed project would contribute an additional 200 MW of renewable wind energy. As demonstrated in the Application, there will be minimal adverse effects by such construction.

For the foregoing reasons, Ashtabula Wind submits there is substantial justification for the requested waivers and/or reduction of procedures and time schedules, as this proposed wind farm will produce minimal adverse effects.

Ashtabula Wind respectfully requests the Commission to grant the aforementioned waivers and/or reduction of procedures and time schedules, and to render expeditious decisions approving the requested facilities and issuing a corridor certificate and route permit for the transmission line, and a certificate of site compatibility for the wind farm.

Dated this 24th day of March, 2008.

Respectfully submitted,

ASHTABULA WIND, LLC

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By: _____
BRIAN R. BJELLA, ND Bar ID #03549

STATE OF NORTH DAKOTA)
)SS.
COUNTY OF BURLEIGH)

Brian R. Bjella, being separately sworn, deposes and states that he has read the above and foregoing Application, that he knows the contents thereof, and that the same is true of his own personal knowledge.

_____
BRIAN R. BJELLA

Subscribed and sworn to this 18th day of March, 2008.

Beth Wald

Beth Wald, Notary Public
Burleigh County, North Dakota
My Commission Expires 11/28/08

(S E A L)

BETH WALD
Notary Public, State of North Dakota
My Commission Expires November 28, 2008

ASHTABULA WIND ENERGY CENTER

Case No.: PU-08-32

Application to the North Dakota Public Service Commission for a Certificate of Site Compatibility

March 2008

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Table of Contents

List of Tables

List of Figures

Appendices

1.0 INTRODUCTION

Ashtabula Wind, LLC (Ashtabula Wind) is submitting this application for a Certificate of Site Compatibility (certificate) to construct the Ashtabula Wind Energy Center (the Project). The Project is located in Barnes County, North Dakota, (Figures 1 through 3) and would be approximately 200 megawatts (MW) in size, consisting of up to 133 1.5 MW GE wind turbine generators. Additional facilities include up to five meteorological (MET) towers, one 230 kilovolt (kV) transmission line up to nine and one-half miles in length, one 69 kV transmission line up to 11 miles in length, one project substation, a construction laydown area, access roads up to 36 feet in width, and above and/or below ground electrical collection system(s) and cabling.

Ashtabula Wind is a wholly-owned subsidiary of FPL Energy, LLC (FPL Energy) headquartered in Juno Beach, Florida. FPL Energy companies develop environmentally responsible electric generation projects throughout the United States. FPL Energy entities collectively own and operate nearly 5,100 MW of renewable energy generation capacity, including 13 projects in Iowa, Wisconsin, Minnesota, North Dakota, and South Dakota with a combined energy generation of over 750 MW.

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

The North Dakota Energy Conversion and Transmission Facility Siting Act (the "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).

Exclusion and avoidance areas and selection and policy criteria set forth in the "Act" have been considered by Ashtabula Wind in the design of the Project and have been provided in this application to the extent available. In addition, sufficient project design, wind resource and technical information have been provided for a thorough evaluation of the proposed site. Table 1 outlines the information required to fulfill the requirements for a certificate with the Commission and where these requirements are addressed in this document.

The proposed nine and one-half mile, 230 kV transmission line requires the submission of an application for a Certificate of Corridor Compatibility (Corridor certificate) and a Route Permit application due to its size. These applications are being submitted to the North Dakota Public Services Commission (PSC) separately from this application. The 230 kV line will terminate at the Pillsbury 230 kV Substation in Section 13, Township 143 North, Range 57 West in the northeast portion of the project area. Ashtabula Wind will also submit applications for Conditional Use Permits from Barnes County for the project and transmission line.

Table 1
Certificate Completion Checklist

State Authority	Description	Section
Chapter 49-22	PSC Guidelines: Energy Conversion and Transmission Facility Siting	1.1
Section A	Description	1.0, 4.4, 6.0-6.6, 9.0
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, Figure 6 and 7
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	1.3.1, 4.3, 5.1
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
Section B	Studies	

State Authority	Description	Section
	Provide a copy of any evaluative studies or assessments of the environmental impact of the proposed facility submitted to any Local, State or Federal agency.	Appendix C
Section C	Need for Facility	2.0
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
Section D	Location	1.3.1
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, Figures 1-3
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.	Figures 2 and 3, 1.2, 3.0
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, Figure 4
b.	Avoidance areas;	3.2, Figure 4
c.	Selection criteria;	3.3
d.	Policy criteria;	3.4
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	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,

State Authority	Description	Section
	proposed facility.	7.11.3, 7.12.3, 7.13.3, 7.14.3, 7.15.3, 7.16.3, 7.17
7.	List the qualifications of the people in the various disciplines that contributed to the facility site location study	11.0
8.	Maps	Figures
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.	Figures
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.	Figures (PSC Staff supports not providing a Mylar map)
NDCC 49-22-09	Factors to be considered in evaluating applications and designation of sites, corridors, and routes.	10.0
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
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

1.2 Flexibility in Siting

Wind facility siting is a process through which input is considered from several different entities. When considering where to locate this wind farm in North Dakota, Ashtabula Wind identified the project area for further investigation. Ashtabula Wind subsequently conducted environmental desktop and field studies in the vicinity, the results of which are embodied in the appropriate sections of this application, and further assessed wind resource and transmission. The identified project area is considered optimal from a wind resource perspective.

Ashtabula Wind has started the process of entering into agreements with landowners that may be interested in having Ashtabula Wind place wind turbines and associated facilities on their property. Simultaneously, Ashtabula Wind will 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 the Barnes County Development Code, and communications with Local, State and Federal agencies. Preliminary site plans are the commonly accepted standard for applications in other jurisdictions. Ashtabula Wind is not seeking a permit for each wind turbine indicated on Figures 1 through 3. Instead, the preliminary layout indicates areas of the site with good wind resource and no known siting issues.

Ashtabula Wind suggests that the certificate define the site, number of turbines, and structures related to wind generation to be located within the site. Within the permitted site, Ashtabula Wind 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.

Once the Commission issues the certificate, Ashtabula Wind will complete any additional studies required by the certificate or Ashtabula Wind's siting process, including geotechnical studies and more detailed wetland, biological, and cultural resource surveys. Ashtabula Wind will also further evaluate the site based on efficient construction of the Project. In addition, Ashtabula Wind will seek further input from landowners regarding the location of wind facilities and associated facilities. Once these additional studies and communications are completed, preliminary turbine locations will be 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 facility 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 (Union of Concerned Scientists, 2006). The PTC is due to expire at the end of 2008.

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

1.3 Project Summary

Ashtabula Wind evaluated wind resources in North Dakota for siting a 199.5 MW wind generation facility. Based on this review, Ashtabula Wind selected a Project Area north of Valley City, North Dakota for additional study and preparation of a certificate to the Commission. No other areas were considered for development of the Project. The proposed 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.

1.3.1 Proposed Site

The Project Study Area is the location within which leases from landowners may be obtained for the Project. The Project Site was selected to include all areas within the Project Study Area so Ashtabula Wind can optimize the wind resource while avoiding and minimizing impacts to environmental resources. The Project is located in Barnes County within the following townships, ranges, and sections (Table 2):

Table 2
Project Site Location

Township Name	Township	Range	Sections
Baldwin	143N	57W	10-16, 19-22, 27-34
Grand Prairie	142N	57W	3-10, 15-24, 28, 32-35
Noltimier	141N	57W	2-6, 8-11
Minnie Lake	142N	56W	17-21, 28-30
Getchell	141N	58W	1

The Project Site encompasses 49,493 acres (77 square miles) and the south border of the site is located approximately three miles north of the City of Valley City, North Dakota. The turbines will be placed throughout the Project Site. However, the Project Site will generally occupy less than one percent of the total land area. The Project Area and preliminary layouts are shown on Figures 1 through 3.

1.3.2 Projected Output

The Project will have a nameplate (gross) capacity of up to 199.5 MW. Assuming net capacity factors of between 38 and 45 percent, the projected average annual output is estimated between 664,096 to 786,429 megawatt hours (MWhs). As with all wind projects, output is dependent upon wind resource, final design, site-specific features, and equipment.

1.4 Project Schedule

The commercial operation date is dependent upon permitting, equipment deliveries, and other development activities. Ashtabula Wind is targeting construction for June 2008 provided all pre-construction permits and approvals have been obtained.

1. Certificate of Site Compatibility: Ashtabula Wind anticipates the certificate will be approved in May 2008.
2. Land Acquisition: Ashtabula Wind anticipates completion of sufficient easements from landowners in May 2008.
3. Permits: Ashtabula Wind 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 Ashtabula Wind to move forward with other commitments on the Project including ordering long-lead time equipment.
4. Equipment Procurement, Manufacture and Delivery: Ashtabula Wind will order the wind turbine components as soon as practicable.
5. Construction: Construction is scheduled to begin in June 2008, 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 approximately seven months to complete.
6. Test and Operations: Ashtabula Wind anticipates testing and operations to begin September 2008.
7. Commercial Operation: Ashtabula Wind anticipates commercial operation of the Ashtabula Wind Energy Center to begin December 2008.

As discussed in Section 1.3.2, the capacity factor is dependent upon the final design, equipment and site-specific features. The capacity factor for typical wind farms in the area is approximately 38 to 45 percent.

1.5 Project Ownership

It is anticipated that Ashtabula Wind will manage the construction of all equipment and associated facilities related to the Project. Ashtabula Wind will own the entire Project. Ashtabula Wind will likely select a third-party contractor to perform the majority of the engineering and construction (E&C) of the wind farm. Ashtabula Wind will procure the turbine/tower package directly from a manufacturer.

2.0 NEED FOR FACILITY

2.1 Need Analysis

According to the Department of Energy, coal generation is the primary energy source in the State. Of the 3,525 MW of energy generated in 2006 in North Dakota, 93 percent was generated using coal-fired facilities (Energy Information Administration, 2006). According to a report prepared for the State of North Dakota Division of Community Services (PanAero Corporation, 1999), "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 Operations and Maintenance (O&M), and from the manufacturing of wind turbine components. In support of this effort, Ashtabula Wind is cooperating with regional utilities to add wind generation to their energy portfolios.

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 FPL Energy 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 region the opportunity to add to capacity, 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 region. The July 1, 2003, MAPP Load and Capability Report stated that, under the minimum reserve requirements, deficits were expected as soon as 2006. MAPP members were urged to build additional capacity in order to maintain reserve levels higher than the MAPP minimum. The most recent MAPP report, dated May 1, 2007, indicates that deficits are now expected by 2010. Table 3 outlines the MAPP surplus/deficit forecasts through 2016.

Table 3
MAPP Summer Season Surplus/Deficit*

Year	MW	Reserve Margin Percentage
2007	1754	4.9%
2008	725	2.0%
2009	82	0.2%
2010	-751	-1.9%
2011	-1392	-3.5%
2012	-1855	-4.6%
2013	-2436	-5.9%
2014	-3019	-7.2%
2015	-4625	-10.7%
2016	-5455	-12.4%

* From Pages III-3 and III-4 of the MAPP 2007 Load and Capability Report.

While the deficits have been identified, the new sources to fill these deficiencies have not. North Dakota has a unique opportunity to begin providing capacity to meet those forecasted deficits with clean, efficient, renewable energy. Once completed, the Ashtabula Wind Energy Center will be a significant source of energy for meeting the region's needs over the next 30 years. However, based on a review of the MAPP Load and Capacity Reports from 2003 to 2007, energy deficits are being forecasted earlier with each annual MAPP Report produced. The addition of the Ashtabula Wind Energy Center will serve to meet the region's increasing needs as shown in Table 3 above.

2.2 Alternatives

Feasible technology alternatives to wind include electricity generation using coal, natural gas, or biomass. None of these alternatives were considered because these technologies do not meet the state's goal of adding new wind energy.

2.3 Ten Year Plan

Ashtabula Wind will file a Ten-Year Plan with the Commission by July 2008.

3.0 SITE SELECTION CRITERIA

Ashtabula Wind is evaluating the proposed 49,493 acre (77 square miles) site to determine the best locations for up to 133 1.5 MW wind turbines. Siting turbines is a process through which input from several different entities is considered. The Project Area was singled out as an optimal site from environmental, wind resource, transmission, and economic perspectives. Cities are considered avoidance areas.

Ashtabula Wind is securing voluntary wind option agreements with landowners and identifying 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 Barnes County and state wind siting requirements, and communications with Local, State, and Federal agencies. FPL Energy has used this siting process in recent wind turbine projects, including projects in Minnesota and North Dakota. Through this process, Ashtabula Wind not only addresses environmental issues that commonly arise during project development, but also works within the parameters of State rules. North Dakota has several site selection criteria that are considered by the Commission to determine suitability of the site. Ashtabula Wind has reviewed the criteria in Chapter 69-06-08 and has considered these criteria in site design. These criteria are discussed in this section.

3.1 Exclusion Areas

In accordance with Section 69-06-08-01-1, the geographical areas listed in Table 4 shall be excluded in the consideration of a site for an energy conversion facility. The area of exclusion 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 Figure 4.

3.2 Avoidance Areas

In accordance with Section 69-06-08-01-2, the geographical areas listed in Table 5 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. Avoidance areas are also mapped for the Project Area on Figure 4.

Table 4
Exclusion Areas

Exclusion Area	Present within Project Site?	Proposed Buffer	Section Addressed
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	Ashtabula Wind is consulting with the USFWS. Ashtabula Wind recommends establishing a buffer of 0.25 miles from Waterfowl Production Areas (WPAs).	7.7, 7.9, 7.13, 7.14, 7.15, Figures 4 and 8
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.	Present	Ashtabula Wind is consulting with the USFWS. Ashtabula Wind recommends establishing a buffer of 0.25 miles from WPAs.	7.7, 7.8, 7.9, 7.15, 7.17, Figures 4 and 8
County parks and recreational areas; municipal parks; parks owned or administered by other governmental subdivisions; hardwood draws; and enrolled woodlands.	None		7.8
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 are expected to be up to 14 acres, which is a negligible percentage of the Project Area.	7.9, 7.10, Figures 13, 14, and 15
Irrigated land	None		7.9
Areas critical to threatened or endangered animal or plant species	None	No areas critical to threatened and endangered species have been identified in the Project Site.	7.16
Areas where animal or plant species that are unique or rare to this state would be irreversibly damaged.	None	According to a review of the USFWS database, there are no federally listed plant species or state plant species of conservation priority within Barnes County.	7.13, 7.14, 7.15, 7.16

Table 5
Avoidance Areas

Avoidance Areas	Present within Project Site?	Proposed Buffer	Section Addressed
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 any identified resources.	7.7, Appendix C
Areas within the city limits of a city or the boundaries of a military installation	City limits-None Military-None		7.3, Figures 1-3
Areas within known floodplains as defined by the geographical boundaries of the 100-year flood	None		7.12
Areas that are geologically unstable	None		7.11
Woodlands and wetlands	Present	Ashtabula Wind recommends a buffer of 0.25 miles around waterfowl production areas. All other wetland resources will be avoided to the extent practicable. Woodland impacts are not anticipated.	7.13, 7.14, Figures 4, 13 and 16
Areas of recreational significance which are not designated as exclusion areas	Present	Lake Ashtabula is located one mile west of the nearest wind farm infrastructure and provides recreation for residents and visitors. Impacts to recreation will be visual in nature.	7.8

3.3 Selection Criteria

In accordance with 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 any significant adverse effects resulting from the location, construction, and operation of the facility in that area, as they relate to the criteria listed in Table 6, will be at an acceptable minimum, or that those effects will be managed and maintained at an acceptable minimum.

3.4 Policy Criteria

In accordance with 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 7, and in a proper case may require the adoption of such policies and practices.

Table 6
Selection Criteria

Selection Criteria	Potential Adverse Effects	Section Addressed
The impact upon agriculture:		
Agricultural production	Assuming 133 1.5 MW turbines, approximately 15 acres of land will be impacted due to turbine placement and an additional 127 acres due to access roads. An additional 10 acres will be permanently impacted due to the O&M facility and project substation. Wind turbine configuration will not result in significant impacts to agricultural production.	7.3, 7.9
Family farms and ranches	No turbines will be placed within 1,400 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, 7.10, Figure 4
Land which the owner demonstrates has 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.	7.9, 7.10, Figures 14 and 15
Surface drainage patterns and ground water flow patterns	No impacts to surface drainage patterns or groundwater flow patterns will occur.	7.11, 7.12, 7.13, Figure 16
The agricultural quality of the cropland	No impacts to the agricultural quality of the cropland are anticipated. If compaction of soils occurs during construction, Ashtabula Wind will work with the landowners to alleviate the compaction.	7.9, 7.10
The impact upon the availability and adequacy of:		
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

Table 6 (Continued)

Selection Criteria	Potential Adverse Effects	Section Addressed
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, Figure 9
Retail service facilities	No adverse impacts anticipated.	7.4
Utility services	Ashtabula Wind will utilize station service from Nodak Power Cooperative. MAPP will suggest appropriate configurations for the electrical system, and Ashtabula Wind will abide by the recommendations to prevent impacts to the transmission system.	2.0, 6.0, 7.4
The impact upon		
Local institutions	No impacts are anticipated.	7.4
Noise sensitive land uses	The noise sensitive land uses within the Project Site are the residences near turbine locations. As stated in the Barnes County noise standard, sustained noise of over 75 dB during the day and 65 dB at night is not allowed. As long as no turbines are sited within 1,400 feet of a sensitive land use, noise levels will not exceed the generally accepted 50 dBA standard.	7.6, Figure 10
Rural residences and businesses	No turbines will be placed within 1,400 feet of family homes.	7.2, 7.3, 7.10, Figure 4
Aquifers	No impacts will occur.	7.11
The impact upon:		
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.	6.3, 6.5.2, 6.5.3, 7.5
Animal health and safety	No impacts to livestock are anticipated from operation of the facility. The impact of the project on wildlife is thought to be minimal (TtEC 2007). Ashtabula Wind will implement measures to avoid and minimize effects to wildlife at the proposed site by siting facilities away from wetlands and woodlands. In addition, Ashtabula Wind will implement a post-construction Wildlife Response and Reporting System (WRRS) for the Project in order to monitor avian/turbine interaction.	7.10, 7.16, 7.15, Appendix C
Plant life	Assuming 133 l.5 MW turbines, approximately 142 acres of land will be used for the turbines and access roads. Land where the turbines will be sited is primarily agricultural.	7.9, 7.14, Figure 13
Temporary and permanent housing	Temporary housing will be utilized during construction. No adverse impacts are anticipated.	7.2

Table 7
Policy Criteria

Policy Criteria	Suitable Policy or Practice of Applicant	Section Addressed
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.	7.3
Recycling of the conversion byproducts and effluents	None	N/A
Energy conservation through location, process, and design	Ashtabula Wind is developing the site to maximize energy output. Ashtabula Wind will develop a site layout that optimizes wind resources while minimizing the impact on land resources and any 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	Ashtabula Wind 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.	6.5, 7.2, 7.3, 7.9
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, 7.8, 7.9, 7.15, Figures 4 and 8
Economies of construction and operation	Ashtabula Wind 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	Ashtabula Wind 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 the Pillsbury 230 kV Substation to regional utilities.	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
Monitoring of impacts	Ashtabula Wind and EPC will employ best management practices (BMPs) during construction to monitor soil impacts and segregate topsoil. All disturbance sites exceeding appropriate size criteria will prepare storm water prevention plans (NDDOH, 2001).	7.11, 7.15, 7.16

3.5 Design and Construction Limitations

In general, there are two design and construction limitations when building any wind farm: wind resources and landowner easements. The wind resource is essential to selecting and designing a wind farm. Ashtabula Wind has conducted an analysis of the proposed Project Area to ensure that the site has ample wind energy to generate revenue for the wind farm. Easements allowing construction of turbine towers and transmission facilities are also critical to the Project. Ashtabula Wind is securing voluntary land agreements with landowners necessary to develop the Project.

Specific to the Project, there are several additional items that are limiting factors when designing and constructing the Project. Barnes County has regulations for siting wind farms as contained in a document titled Development Code, Zoning – Subdivision Regulations (Barnes County, ND, 2001). Section 6.17.3 of the Development Code states that, "all new utility lines and pipelines are considered conditional uses and shall conform to the provisions of the Conditional Use Permit requirements of these regulations." Additionally, section 6.17.6 of the Development Code states that, "all wind generators shall be set back one thousand (1,000) feet from residences other than that of the owner/operator." Ashtabula Wind proposes setbacks of at least 1,400 feet from residences.

The U.S. Fish and Wildlife Service (USFWS) administers fee title Waterfowl Production 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. Ashtabula Wind proposes setbacks from WPAs and plans to avoid all wetlands within wetland easements (there are no USFWS grassland easements in the Project Area). Any direct impacts to wetlands within USFWS wetland 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. Figures 4 and 8 identify the USFWS WPAs and wetland easements 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. The proposed Project Area takes advantage of the wind resource in the area. Information on the wind resource at the site is discussed in Sections 5.2 and 5.3.

Another economic factor considered is the availability of a transmission system in the vicinity of the Project Site. Furthermore, having permission to interconnect into an existing transmission system is essential. If no transmission system is present, the cost of interconnection increases due to the need of constructing a lengthy transmission line and large substation to an existing electricity service provider. Power generated from the Project will be distributed via a nine and one-half mile 230 kV transmission

line that will terminate at the Pillsbury 230 kV Substation located northwest of the city of Pillsbury. Ashtabula Wind has filed an interconnect request with MAPP that will allow a connection into the Pillsbury Substation.

A 69 kV line will also be built and will be approximately 11 miles in length. Minnkota will construct and own this transmission line upon Ashtabula Wind securing the land and completion of environmental surveys. This transmission line is a mitigation plan in the event that the 230kV transmission line construction is not complete at the time of commission.

One of the most important economic considerations related to the Project is the need to qualify for the Federal production tax credit (PTC). The PTC is approximately 1.8 cents per kilowatt hour (kWh) for 10 years. The Project will not be viable without receiving the PTC, which has been extended through 2008. Approval of permits will help ensure Ashtabula Wind is operational before the 2008 expiration date of the PTC.

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. Ashtabula Wind is proposing to install up to 133 1.5 MW turbines. This application uses General Electric (GE) 1.5 SLE MW machine as a representative turbine for the 1.5 MW class.

The GE 1.5 SLE MW utility-grade wind turbine has a nominal nameplate rating of 1,500 kW. Each turbine will have an 80-meter (262 ft) hub height and a 77 m (254 ft) rotor diameter (RD) (Figure 6). The GE 1.5 MW turbine begins operation in wind speeds of 3.5 meters per second (m/s), or 7.8 mph, and reaches its rated capacity (1.5 MW) at a wind speed of 14.5 m/s (32.4 mph). The turbine is designed to operate in wind speeds of up to 25 m/s (45 mph) and can withstand sustained wind speeds of over 45 m/s (100 mph).

Each tower will be secured by a concrete foundation that can vary in design depending on 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. Turbines feature variable-speed control and independent blade pitch 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 and/or overhead power collection lines within the Project Site. Both power collection lines and communication cables will be direct-buried or may be constructed as overhead lines on private property or public ROW. Typically, this infrastructure is run adjacent to the Project access roads or along public ROW 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, Ashtabula Wind will obtain easements for the necessary property.

Each wind turbine will be accessible via all-weather, aggregate-surfaced roads up to 36 feet in width which will connect with public roads. At the point where the access and public roads meet, the communication and power lines will either rise from underground to overhead lines or continue as underground feeder lines. The feeder system distributes power to the Project substation. Figure 6 is a diagram of the path of energy from the wind farm to energy users and Figure 7 shows a typical wind farm facility layout. At the Project substation, the power will be transformed to 230 kV and transmitted via overhead 230 kV transmission lines, interconnecting at the Pillsbury 230 kV Substation located in Section 13, Township 143 North, Range 57 West. The Project substation and 230 kV interconnection into the Pillsbury 230 kV Substation, along with any upgrades to the Pillsbury 230 kV Substation are associated facilities of the transmission system and will conform to MAPP standards.

4.1.1 Wind Energy Center Layout

Ashtabula Wind will develop a wind farm layout that optimizes wind resource while minimizing the impact on land resources and any 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 west to east and from east-northeast to west-southwest. Design of the turbine array and collection system will minimize energy loss due to wind turbine wakes and turbulence, and electrical line losses.

Barnes County has established a setback of 1,000 feet for wind towers from occupied residences. However, Barnes County has not established setbacks from property boundaries or road ROWs, nor has it established ordinances limiting turbine height. Based on experience with other wind farms, Ashtabula Wind proposes setbacks of 0.25 mile from USFWS WPAs, 420 feet from transmission lines, roads, and railroads, and will maintain a setback of 1,400 feet from occupied residences, consistent with their policy at other wind energy centers. Table 8 identifies the minimum setbacks applicable to the Project. Ashtabula Wind will request a Conditional Use Permit that will allow turbine heights up to 80 meters with turbine rotor diameters up to 96 meters for a maximum turbine height of 176 meters.

Table 8
Setback Distances for Wind Turbines

Setback Type	Distance
Property Boundary	130 feet
Occupied Residence	1,400 feet
USFWS Waterfowl Production Area (WPA)	0.25 miles
Overhead Transmission and Distribution Lines	420 feet

4.2 Associated Facilities

An Operations and Maintenance (O&M) building will be constructed within the Project Site. See Section 6.5.4 for a description of the O&M building.

The electricity generated by each turbine is stepped up to a power collection line voltage of 34.5 kV via a pad-mounted transformer at the base of each turbine. The electricity generated at each turbine is collected by a system of underground and/or overhead power collection lines within the Project Site and brought to the Project substation.

It is anticipated that Ashtabula Wind will construct up to two permanent and three development meteorological towers within the Project Site boundary.

4.3 Land Rights

Ashtabula Wind is obtaining easements for the proposed 199.5 MW project. Land rights will encompass the proposed wind farm and all associated facilities, including but not limited to wind and buffer

easements, wind turbines, access roads, 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

The Project Site was selected based on its wind resource. Land-use patterns and environmentally sensitive features were considered in the site selection criteria. The site boundary encompasses an area of approximately 49,493 acres. However, the land occupied by turbines and other wind farm infrastructure will be less than one percent of this area. It is anticipated that the area of direct land use will be: approximately 15 acres for the turbines; 127 acres for aggregate-surfaced access roads up to 36 feet wide; and an additional 10 acres for the permanent disturbance of land due to the O&M building and Project Substation. Total permanent land disturbance for the wind farm and infrastructure is expected to be up to 152 acres. See Section 7.0 for a detailed description of the Project Site impacts. Figures 1 through 3 show proposed turbine locations, which are subject to change during micrositing.

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 wind resources within the Project vicinity consist of Class 4 winds or greater. Class 4 winds have an average annual wind speed of 13 miles per hour.

Ashtabula Wind has reviewed and analyzed meteorological information for Barnes County and the Project Site. This information is described in Section 5.3.

5.3 Wind Characteristics in Project Site

Ashtabula Wind utilized wind data from two 50-meter meteorological towers on the Project Site and one 60-meter tower adjacent to the Project Site, which have been collecting data since the middle of 2007. Up to two additional meteorological towers are planned for the site. The data from the Project Site were supplemented using NDAWN and NOAA. Ashtabula Wind has secured information from other long-term references to aid in correlating the wind data on-site, including 40-year re-analysis data processed by WindLogics. WindPRO and WAsP software were used to analyze the available wind data and make corrections for site effects (topography, surface roughness, and obstacles) to produce a site independent characterization of the local wind climate. The resulting local wind climate was applied in conjunction with the Project Site effects to predict the spatial wind variations at the Project Site. Various site layouts and wind turbine generator parameters can be tested to predict energy production and array efficiency in order to optimize the site layout and turbine selection. Project site data have been compared to regional wind measurements using a parallel time period. There is good correlation between the long-term wind measurements and the short-term Project Site wind measurements

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 design components addressed in this section are Project construction, schedule, operation, and decommissioning of the site. There are other turbines that are feasible choices for the Ashtabula site that are available from various manufacturers and Ashtabula Wind wishes to reserve the right to select alternative turbines representative of the 1.5 MW class of machines. Turbine type may affect the number and configuration of the turbine array. Details for the GE 1.5 SLE MW machine are presented below.

6.1 Ashtabula Project Layout and Associated Facilities

The Project will consist of an array of wind turbines and transformers. The turbines will be interconnected by fiber optic communication cables and 34.5kV power collection cables within the wind farm.

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.

Electrical system design and interconnection details will be determined as a result of studies and discussions with MAPP. 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. Ashtabula Wind will be responsible for project operation and maintenance for the life of the Project and will contract with the most appropriate supplier of operations and maintenance services at the time of operation, to assure timely and efficient operations.

6.2 Description of Wind Turbines

Ashtabula Wind seeks the flexibility to select the most appropriate technology for the Project at the time of construction to ensure optimization of wind and land resources and cost efficiency. Ashtabula Wind 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

The Project consists of up to 133 GE 1.5 SLE MW turbines. The turbine begins operation in wind speeds of 3.5 m/s (7.8 mph) and reaches its rated capacity (1.5 MW) at a wind speed of approximately 14.5 m/s (32.4 mph). The turbine is designed to operate in wind speeds of up to 25 m/s (45 mph) and can withstand sustained wind speeds of over 45 m/s (100 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 SCADA communication technology to allow control and monitoring of the wind farm. The SCADA communications system permits automatic, independent operation and remote supervision,

thus allowing the simultaneous control of many wind turbines. Operations, maintenance and service for Ashtabula Wind 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. Ashtabula Wind will maintain a computer program and database for tracking each wind turbine's operational history.

Other specifications of the turbines include:

1. Rotor blade pitch regulation.
2. Gearbox with three-step planetary spur gear system.
3. Double fed three-phase asynchronous generator and an asynchronous 4-pole generator with a wound rotor.
4. A braking system for each blade (three self contained systems) and a hydraulic parking brake (disc brake).
5. 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 preliminary turbine design identifies a 77 m (253 feet) rotor diameter, with a swept area of 4,657 m^2 (50,128 ft^2) and a rotor speed of 10.1 to 20.4 revolutions per minute (rpm).

6.2.3 Tower

The towers are conical tubular steel with a hub height of up to 80 meters (262 feet). The turbine towers, on which the nacelle is mounted, consist of three to four sections manufactured from certified steel plates. All welds are made by automatically controlled power welding machines and ultrasonically inspected during manufacturing per ANSI specifications. All 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 the power collection line voltage of 34.5 kV. The power from these transformers will be run through an underground collection system consisting of various sized direct-buried cables that are generally located alongside the Project access roads. At the point where the access and public roads meet, the collection system will either be transitioned from underground cables to overhead bare conductors, or continue as

underground lines. Eventually, all the collection system cables will terminate at an on-site collector substation, which raises the Project voltage to 230 kV and provides the necessary protection and control for interconnection to the transmission grid. An interconnection study for the Project is underway with MAPP. The electrical system design and interconnection details will be determined as a result of studies and discussions with MAPP.

A 69 kV line will also be built and will be approximately 11 miles in length. This transmission line is a mitigation plan in the event that the 230kV transmission line construction is not complete at the time of commission.

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

6.4 Ashtabula Wind Energy Center 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 schedule of activities necessary to develop the Project. Pre-construction, construction, and post-construction activities for the Project include:

- Ordering of all 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 and aboveground cables and transmission lines;
- Tower placement and wind turbine setting;
- Acceptance testing of facility; and
- Commencement of commercial production date.

Private turbine access roads will be built adjacent to the towers, allowing access to the turbines during and after construction. These roads may be up to 36 feet wide and will have an aggregate surface as cover, and will be adequate to support the size and weight of maintenance vehicles. 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. Ashtabula Wind estimates that there will be approximately 150 additional 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 this equipment will be removed from the site or reduced in number.

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; and
- 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 an 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;
- All electrical and communications installation;
- Tower assembly and machine erection; and
- 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 all aspects of construction.

Throughout the construction phase, ongoing coordination will occur between the Project development and the construction teams. The on-site Project construction manager will help to coordinate all 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 will 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 80 meter (262 feet) tubular towers will be connected by anchor bolts to an underground concrete foundation. Geotechnical surveys, turbine tower load specifications and cost considerations will dictate final design parameters of the foundations. Foundations for similar sized

turbines are generally octagonal, approximately 40 to 60 feet across at the base, and extend seven to 10 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;
- Installation of 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 any site fencing and security; and
- Restoration and re-vegetation of disturbed land when construction activities are completed.

Any improvements to existing public access roads will consist of re-grading and filling of the surface to allow access 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 intersect 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. All roads will include appropriate drainage and culverts while still allowing for the crossing of farm equipment. The roads may be up to 36 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. 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 will occur 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

Ashtabula Wind 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 operation of the entire wind farm, including discrete

settings for individual turbines, is managed by the centralized SCADA system. The Project will be operated and maintained by FPL Energy Operating Services.

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

Ashtabula Wind 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:

A) First service inspection
B) Semi-annual service inspection
C) Annual service inspection
D) Two years service inspection
E) 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 tightening all 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 annual 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 any bolts are found to be loose, all 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

O&M field duties include performing all scheduled and unscheduled maintenance, including periodic operational checks and tests, regular preventive maintenance on all 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 all routine inspections.
- Maintenance of all oil levels and changing oil filters.
- Maintenance of the control systems, all Project structures, access roads, drainage systems and other facilities necessary for the operation.
- Maintenance of all O&M field maintenance manuals, service bulletins, revisions, and documentation for the Project.
- Maintenance of all parts, price lists, and computer software.
- Maintenance and operation of Project substation.
- Provide all 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 as 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 all 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 in size and house all 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

Ashtabula Wind has a contractual obligation to the landowners to remove the wind facilities, including foundations to a depth of four feet, when the wind easement expires. Ashtabula Wind 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.

7.0 ENVIRONMENTAL ANALYSIS

This section provides a description of the environmental conditions that exist within the project area. Consistent with the North Dakota Energy Conversion and Transmission Facility Siting Act, exclusion and avoidance criteria, as well as selection and policy criteria, were considered 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. Ashtabula Wind's safety and environmental policy is included in Appendix A.

7.1 Description of Environmental Setting (Introduction)

The project area is located in Barnes County in North Dakota, a primarily rural agricultural area located north of Valley City, North Dakota. The economic base of Barnes County consists primarily of employment in management, professional, service, sales, and office occupations. In 2006, Barnes County had a population of 10,955, a decline of 8.2 percent from the 2000 census level. Cities and small unincorporated towns near the project area include Pillsbury (population 22), Sibley (population 43), Luverne in Steele County (population 38), and Valley City (population 6,388), located approximately three miles south of the project area (U.S. Census Bureau, 2000).

7.2 Demographics

7.2.1 Description of Resources

The project is located within a lightly populated rural area in southeast North Dakota. There is no indication of any new residential construction on the site. Information on demographics and housing for this section was taken from the 2000 U.S. Census, with the exception of population statistics for Barnes County, which were updated in 2006.

The site is located in portions of Noltimier, Grand Prairie, and Baldwin townships in Barnes County, North Dakota. The population of Barnes County is 10,955 and populations of the townships within the Project Area are listed in Table 9. The per capita income and poverty levels in these townships vary in comparison to the county average. According to the 2000 U.S. Census, residents of Barnes County are primarily engaged in management, professional, service, sales, and office occupations (U.S. Census Bureau, 2000).

Table 9
Population and Economic Characteristics

Location	Population	Per Capita Income	Percentage of Population Below Poverty Level
Barnes County (entire)	10,955	$16,566	10.8%
Noltimier Township	89	$18,522	9.1%
Grand Prairie Township	49	$14,760	10.8%
Baldwin Township	34	$12,393	14.8%

7.2.2 Impacts

Short-term impacts to socioeconomic resources will be relatively minor. Up to 152 acres of the total project area will be permanently impacted due to conversion to turbine sites, access roads, and an O&M facility and project substation. 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 any 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 any 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 Barnes County will contribute to the total personal income of the region. Additional personal income will be generated for residents in the county 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 will benefit businesses in the county and the state.

It is likely that general skilled labor is available either in the county or the state to serve the basic infrastructure and site development needs of the project. Specialized labor will be required for certain components of 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 any labor relations issues.

No effects on permanent housing are anticipated. During construction, out-of-town laborers will likely use lodging facilities in and around the city of Valley City. 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 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 southeast North Dakota. In addition, establishing the southeast region of North Dakota as an important producer of renewable energy, such as wind, may spur the development of wind-related businesses in the area and in turn contribute to the economic growth in the region.

7.2.3 Mitigative Measures

Socioeconomic impacts associated with the project will be primarily positive, with an influx of wages and expenditures made at local businesses during the project construction and an increase in the county's tax base due to 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 land from agricultural production.

7.3 Land Use

7.3.1 Description of Resources

The land in Barnes County within the project area boundary is primarily agricultural with scattered farmstead residences. According to the County's Tax Auditor, Barnes County has retained zoning rights.

The project will be located in northeast Barnes County, north of Valley City. The project proposes to install approximately 199.5 MW of wind power, consisting of up to 133 wind turbines within a 77 square mile (49,493 acre) project area. Current land use within the project area is rural agricultural, supporting both crops and livestock grazing. The project area is not within any city limits or within an area of any known military installation. The development of the Ashtabula Wind Energy Center will not displace any residents or existing or planned industrial facilities. Wind turbines will be sited a minimum of 1,400 feet from occupied residences.

Based on a review of aerial photographs, land use database information, general database information, and visits to the project site, it was determined that the majority of the land at the site is agricultural. Table 10 identifies current land use in the project area based on the USFWS database. Approximately 81 percent of the project area is used for agricultural purposes, including pasture land. Within the project area, 1,487 acres are enrolled in the Conservation Reserve Program (CRP). Grasslands comprise over five percent of the project area and are primarily used for grazing livestock. Wetlands and open water account for over 10 percent of the project area.

Table 10
Land Cover within the Project Area

Habitat	Acreage	Percent of Project Area
Grassland/herbaceous	2,583.15	5.22%
Cropland	36,965.41	74.69%
Forest	236.14	0.48%
Wetlands (isolated and potentially jurisdictional)	2,910.54	5.88%
Open water	2,186.13	4.42%
Other developed land	1,701.55	6.86%
Pasture/hay	2,909.80	5.88%
*Conservation Reserve Program (CRP)**	*1,486.63*	*3.00%*

*Represents the amount of CRP land within the project area.

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. 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 36 feet wide and low profile, so they are easily crossed while farming. Ashtabula Wind will work closely with 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 areas 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 vegetation.

While the permanent site layout has not yet been determined, it is estimated that installation of up to 133 turbines will result in the conversion of up to 15 acres of land. It is further estimated that 127 acres of land will be converted due to aggregate-surfaced access roads and 10 acres of land due to the O&M facility and project substation. Ashtabula Wind is seeking to obtain an easement of approximately 40 acres for laydown and contractor staging areas in the event that turbines are not constructed immediately. However, if turbines are constructed upon receipt, only 25 acres of land will be temporarily impacted for laydown and contractor staging areas.

At other wind farms, the public has expressed concerns over potential devaluation of property in and adjacent to proposed wind projects. A study published in October 2002, *"Economic Impacts of Wind Power in Kittitas County, Final Report,"* conducted by Dr. Stephen Grover of ECONorthwest of Portland, OR, summarized survey results as follows:

> "Views of wind turbines will not negatively impact property values. Based on a nation-wide survey conducted of tax assessors in other areas with wind power projects, we found no evidence supporting the claim that views of wind farms decrease property values." (Grover, 2002.)

7.3.3 Mitigative Measures

Ashtabula Wind is working closely with 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 any 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 lightly populated, rural area in southeast 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 closest town to the project site is the city of Sibley. Valley City, located three miles south of the project area, is the seat of Barnes County. Valley City is the largest city near the project site and provides sanitary sewer, water, utility services, educational facilities, and recreational facilities such as arenas, theaters, and parks to its residents and visitors.

Additionally, Valley 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
Electrical service is provided to the region by Nodak Electric Cooperative.

Roads
County and township (section line) roads characterize the existing roadway infrastructure in and around the project site. Additionally, State Highway 26 runs east to west through the northern portion of the project site, and State Highway 32 is located east of the project site, running north to south.

Traffic
Existing traffic volumes on the area's county highways are documented in Table 11 and Figure 9. Determining the specific capacity of any highway is a complex process. However, general estimates are used for planning purposes. For purposes of comparison, the functional capacity of a two-lane paved rural highway is approximately 5,000 vehicles per day, or Average Daily Traffic (ADT). In general, the state highways in and near the project site carry higher levels of traffic than are typical for rural North Dakota but represent only a fraction of the capacity of the roadway.

Additional county and township roads run through the project site, but no vehicle count data are available for them. In general, the North Dakota Department of Transportation (NDDOT) indicated that roads with vehicle counts under 100 ADT are rarely counted. As indicated in Table 11, all non-state routes have vehicle counts less than 100 ADT. According to NDDOT, vehicle counts on routes with no count data are likely lower than those with count data.

Table 11
Existing Daily Traffic Levels

Roadway Segment	Existing Average Annual Daily Traffic (ADT)/Commercial Truck Traffic
Highway 26 through north portion of project area	210/80
Highway 32 through east portion of project area	230/80

Source: 2006 Traffic Volumes from NDDOT, Bismarck (NDDOT, 2006).

Water Supply
Townships have limited public infrastructure services. Homes typically utilize septic systems and water wells for their household needs.

Telephone, Fiber Optic and Microwave Communications
Potential impacts of the proposed construction and operation of the transmission line on existing telecommunications infrastructure within Barnes County were assessed (Comsearch, 2007). The assessment identified 20 microwave paths within and near the Project Area, the closest of which is located one mile south of the nearest wind farm infrastructure. Comsearch calculated a Worst Case Fresnel Zone (WCFZ) for each microwave path in the Project Area. The mid-point of a full microwave path is the location where the widest (or worst case) Fresnel Zone occurs. The calculated WCFZ radius represents the area where planned wind turbines should be avoided, if possible. The microwave

interference study and worst case Fresnel Zone calculations from Comsearch are attached as Appendix C.

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 construction and operation of the project.

Local Services
No impact is expected to local services.

Electrical Service
The project will require station service from the local electric provider when the wind project is not generating electricity.

Roads
Construction of the project will require up to 66.5 miles of aggregate-surfaced access roads. 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 of turbines. The permanent access roads will be up to 36 feet wide and low profile to allow cross-travel by farm equipment.

Traffic
The maximum construction workforce is expected to generate approximately 150 additional vehicle trips per day. Using any combination of state and county highways and other township roads throughout the project site, the traffic impacts are considered negligible. Because many of the area roadways have minimal ADT currently, the addition of 150 vehicle trips represents a large percentage increase, and likely will be perceptible. The capacity of any route and level-of-service to the traveling public will not be impacted.

Truck access to the project site is provided by I-94 at Oriska, then Highway 32 north, and Highway 26 west. Specific additional truck routes will be dictated by delivery location. Additional operating permits will be issued by the state, county and/or township for over-sized truck movements.

Water Supply
Construction and operation of the project will not significantly impact the water supply. The abandonment of any wells is not required for the project. The project will not require appropriation of surface water or permanent dewatering. Temporary dewatering of groundwater may be required during construction of turbine foundations. It is likely that the project will require a single domestic-sized well for the O&M facility.

Telephone, Fiber Optic and Microwave Communications
Construction and operation of the Project will not impact telephone and/or fiber optic service to the Project Area. The closest beam path is located one mile south of the nearest wind farm infrastructure. Land mobile telecom system impacts are not anticipated.

7.4.3 Mitigative Measures

Construction and operation of the wind farm project will be in accordance with all associated Local, Federal and State permits and laws, as well as industry construction and operation standards. Due to the minor impacts expected on the existing infrastructure during project construction and operation, extensive mitigation measures are not anticipated.

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

Electrical Service
Ashtabula Wind will purchase station service from Nodak Electrical Cooperative. MAPP will suggest appropriate configurations for the electrical system and Ashtabula Wind will abide by the recommendations to prevent impacts to the transmission system. Ashtabula Wind has established a setback of 420 feet from existing transmission lines. No additional mitigation is necessary.

Roads
Ashtabula Wind is working closely with the landowners to locate access roads in order to minimize land-use disruptions to the extent possible. A map depicting the preliminary layout of the turbines and access roads is shown in Figures 1 through 3.

Traffic
The capacity of any route and level-of-service to the traveling public will not be impacted and as such, no mitigation is 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
An underground utilities locator company 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, Ashtabula Wind will enter into agreements with service providers so as to avoid interference with their facilities.

WCFZ identified by Comsearch are not located within the Project Area.

7.5 Human Health and Safety

7.5.1 Description of Resources

Air Traffic
Barnes County Municipal Airport is located approximately 14 miles southwest of the project site and Gage Flying Farmer, a privately owned, un-paved airstrip, is located approximately eight miles southeast of the project site. Barnes County Municipal contains one asphalt runway oriented in a northwest-southeast direction at an elevation of approximately 1,381 feet above mean sea level. This small airport

supports local single-engine airplanes. The nearest airport certified for commercial carrier operations is Jamestown Municipal Airport located approximately 39 miles southwest of the project site.

Electromagnetic Fields
The term electromagnetic fields (EMF) refers to electric and magnetic fields that are present around any electrical device. Electric fields arise from voltage, or electrical charges, and magnetic fields arise from current, or the flow of electricity, 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 1,400 feet to occupied residences, where EMF will be at background levels.

Hazardous Materials / Hazardous Waste
The site is located in a relatively rural area of North Dakota. Hazardous wastes from large industrial or commercial activities are not likely. Potential hazards may exist in rural areas from old gasoline facilities, landfill sites, and private activities. A Phase I Environmental Site Assessment (ESA) of the project site will be conducted to identify any recognized environmental conditions that may exist.

Potentially hazardous materials associated with the project include fluids found in association with turbines and substation/transformer equipment. There will be three types of fluids used in the operation of the wind turbines, all of which are petroleum products. These fluids are necessary for the operation of each turbine and include gear box oil, hydraulic fluid, and gear grease. 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 will have minimal impacts on the security and safety of the local populace.

7.5.2 Impacts

Air Traffic
The installation of wind turbines creates a potential for air traffic collision. However, power collection lines are expected to be similar to distribution lines that are already present (located along the edges of fields and roadways), and the wind turbines and meteorological towers themselves 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 included evaluation of any potential interference with air traffic. FAA responded with a Determination of No Hazard (Appendix D).

Electromagnetic Fields
While the general consensus is that electric fields pose no risk to humans, the question of whether exposure to magnetic fields can cause biological responses or health effects continues to be the subject of research and debate. Based on the most current research on electromagnetic fields, and the distance between any turbines or collector lines and houses, the project will have no impact to public health and safety due to EMF (National Institute of Environmental Health Sciences EMF-RAPID Program Staff, 1999).

Hazardous Materials / Hazardous Waste
The Phase I ESA will be used to minimize risk associated with potential recognized environmental conditions, as defined by the American Society for Testing and Materials (ASTM) standard, that may pose a threat to human health and safety. Significant findings are not anticipated due to the known historic uses of the property. The Applicant does not anticipate generating any hazardous wastes.

Security
Project construction and operation will have minimal impacts to the security and safety of the local community.

7.5.3 Mitigative Measures

Air Traffic
Ashtabula Wind coordinated with FAA on the project layout and lighting. FAA responded with a Determination of No Hazard. Wind turbines and meteorological towers will have lighting and markings according to FAA requirements that minimize any potential for air traffic impacts.

Electromagnetic Fields
Ashtabula Wind will follow "prudent avoidance" methods to EMF exposure, such as encouraging conservation and distributed generation, and will continue to monitor EMF research.

Hazardous Materials / Hazardous Waste
Since no significant findings are anticipated, no mitigation is proposed at this time. All petroleum fluids will be contained within the wind turbines and electrical equipment. Any petroleum wastes generated will be handled and disposed of in accordance with Local, State and Federal regulations.

Security
The following security measures will be taken to reduce the chance of physical and property damage, as well as personal injury, at the site:

- The towers will be placed 420 feet from road ROW and 1,400 feet from occupied homesteads. These distances are considered to be safe based on developer experience, and are consistent with the required local setbacks. They also serve to reduce noise.
- Security measures will be taken during the construction and operation of the project, including temporary and permanent (safety) fencing, warning signs, and locks on equipment and wind power facilities.
- Turbines will sit on solid steel enclosed tubular towers in which all electrical equipment will be located, except for the pad-mounted transformer. Access to the tower is only through a solid steel door that will be locked when not in use.
- Where necessary or requested by landowners, Ashtabula Wind will construct gates or fences such as those around the project substation.

7.6 Noise

7.6.1 Description of Resources

The project area is rural, with isolated residences and no significant sources of noise other than farming equipment and traffic on local roads. As such, the background noise levels are relatively low, at about 35

dB(A), except during periods of high wind when the turbines would be operating (Figure 11). During these times, the background would be about 10 dB(A) higher, at 45 dB(A), due to noises created by the wind. These are primarily the rustling of grass and tree leaves.

7.6.2 Impacts

The GE 1.5 SLE turbine is guaranteed to produce a maximum noise level of 106 dB(A) at wind speeds ranging from six to 10 m/s, with two dB(A) uncertainty. The GE expected mean noise level is less than 104 dB(A), at wind speeds between nine and 55 m/s with a two dB(A) uncertainty. The primary source of noise from turbines is due to 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 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 of less significance than the swishing sound from the rotor blades.

Noise standards for Barnes County state that "sustained noise of over 75 dB during the day and 65 dB at night is not allowed" (Barnes County, North Dakota, 2001). Ashtabula Wind will use the generally accepted average noise impact level for wind turbines of less than 50 dBA at any residence, day or night. The setback distance to achieve 50 dBA or less is 1,400 feet for multiple turbines under worst-case ground absorption conditions.

7.6.3 Mitigative Measures

The primary mitigation measure used for wind turbines is setback distance. Ashtabula Wind is committed to the 1,400-ft setback distance. This setback distance has proven sufficient and acceptable to the communities in North Dakota where FPL Energy has installed wind farms currently in operation.

Special conditions can occur which are difficult to predict, such as high wind shear events where there is little masking wind noise at surface level but at hub-height there is sufficient wind for energy generation. Residents in homes which are poorly insulated or highly exposed without any vegetation nearby may perceive a higher indoor noise level than those in a typical well-insulated home. If a complaint is registered and sound is measured above the 50 dBA level on more than a rare occasion, Ashtabula Wind can provide improved insulation or landscaping to mitigate these unusual situations. It should be noted that the noise model predicts outdoor noise levels only and assumes no shielding by trees or other vegetation.

7.7 Cultural and Archaeological Impacts

7.7.1 Description of Resources

A Class I Cultural Resources Inventory (file search/literature review) was conducted by Beaver Creek Archaeology, Inc. (BCA) on September 6, 2007 at the State Historical Society of North Dakota. Based on results of the file search, seven manuscripts, nine archaeological site leads, one architectural site, and one architectural site lead were found within the records. Once weather permits, BCA will be performing a

Class II/III Pedestrian survey to identify cultural resources that could be affected by project facilities within the Project Area. Refer to the protocol in Appendix E.

7.7.2 Impacts

According to the results of the Class I Inventory, the project area contains relatively few archaeological, historic, and architectural sites. However, this is likely due to the lack of cultural resource inventories performed in the project area. In addition, the rolling prairie landscape with hills, knolls, and bluffs combined with an abundance of water indicate that the project area may contain archaeological sites (BCA, 2007). Results of the Class II/III Pedestrian survey will also be used to microsite turbines to avoid resources. This survey will be conducted when weather permits.

7.7.3 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 will be followed to ensure that the appropriate authorities become involved quickly and in accordance with local and state guidelines.

Although there are no reservations or Bureau of Indian Affairs trust lands in Barnes County, the following Tribal Historic Preservation Officers (THPO) or Tribal Cultural Preservation Officers (TCPO) may be contacted if archaeological resources or other properties of Tribal interest are identified prior to or during construction:

Tim Mentz, THPO Standing Rock Sioux Tribe Phone: 701.854.2120	Elgin Crows Breast, TCPO Three Affiliated Tribes – Spirit Lake Tribe Phone: 701.996.4477	Ambrose Littleghost, THPO Mandan – Hidatsa & Arikara Nation Phone: 701.627.4781

The Native American Graves Protection and Repatriation Act of 1990 allows tribes to protect American Indian graves and to repatriate human remains. 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 Reinterment Committee and the State Historical Society of North Dakota.

The North Dakota Intertribal Reinterment Committee (NDIRC) Ms. Jane Martin Turtle Mountain Housing Authority P.O. Box 620 Belcourt, ND 58301	State Historical Society North Dakota Mr. Paul Picha, Chief Archeologist North Dakota Heritage Center 612 East Boulevard Avenue Bismarck, ND 58505-0830 ppicha@state.nd.us

7.8 Recreational Resources

7.8.1 Description of Resources

Recreational opportunities in Barnes County include boating, fishing, hiking, hunting, and nature observation. Review of state and federal databases indicates that no registered national wildlife refuges, state wildlife management areas, state game refuges, game management areas, nature preserves, county parks, or formal recreational areas are present within the project site. Lake Ashtabula is located approximately one mile west of the nearest wind farm infrastructure.

7.8.2 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. WPAs are within the project area boundary.

7.8.3 Mitigative Measures

Since it is not anticipated that any 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. Turbines or other windfarm infrastructure will not be placed within 0.25 miles of any WPA.

7.9 Effects on Land-Based Economies

7.9.1 Description of Resources

Agriculture/Farming
The majority of the site is cultivated farmland, pasture, and grasslands as shown in the USFWS Land Use Map, Figure 13. Cultivated land comprises approximately 36,965 acres of the project site and approximately 81 percent of the land in the project site is utilized for agricultural purposes. Grasslands comprise 2,583 acres of the land.

According to the 2002 Census of Agriculture, wheat is the most widely grown crop within Barnes County, followed closely by soybeans (USDA, 2002). Barley, corn, sunflowers, hay, oats, and dry edible beans are additional crops harvested in Barnes County. Barnes County has approximately 838 farms, for which the primary commodities are cultivated crops, primarily wheat for grain and soybeans. Cattle are the primary livestock in the county. According to the 2002 Census of Agriculture, the amount of land in farms decreased by 25,234 acres between 1997 and 2002 in Barnes County (USDA, 2002). The market value of agricultural products from Barnes County in 2002 was approximately $94,215,000. Crop sales account for approximately 92 percent of the total value of agricultural products sold.

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 a yield as high as prime farmland if conditions are favorable. Table 12 lists the soils considered prime farmland and soils of statewide or local importance within the project site. Figure 14 shows the prime farmland soil distribution in the project site.

Table 12
Prime Farmlands Barnes County

Map Symbol	Soil Unit	Prime Farmland	Prime Farmland Only When Drained
12	Lismore-Kranzburg silty clay loams, 0-2 percent slopes	X	
13B	Kranzburg-Lismore silty clay loams, 2-6 percent slopes	X	
14B	Barnes-Buse loams, 3-6 percent slopes	X	
15	Swenoda-Lanona fine sandy loams, 0-3 percent slopes	X	
17B	Barnes-Svea loams, 3-6 percent slopes	X	
18	Bearden silty clay loam, 0-2 percent slopes	X	
2	Tonka silt loam, 0-1 percent slopes		X
26	Colvin silty clay loam, 0-1 percent slopes		X
27	Divide loam, 0-2 percent slopes	X	
31B	Egeland fine sandy loam, 2-6 percent slopes	X	
40B	Gardena-Zell silt loams, 2-6 percent slopes	X	
43	Gardena silt loam, 0-2 percent slopes	X	
46	Gardena-Glyndon silt loams, 0-2 percent slopes	X	
48	Glyndon silt loam, 0-2 percent slopes	X	
50	Hamerly-Tonka complex, 0-3 percent slopes		X
62	Overly-Bearden silty clay loams, 0-2 percent slopes	X	
65	Svea-Barnes loams, 0-3 percent slopes	X	
66	Hamerly-Wyard loams, 0-3 percent slopes		X
66B	Balaton loam, 3-6 percent slopes	X	
80	Marysland loam, 0-1 percent slopes		X
89	Fordville loam, 0-2 percent slopes	X	
91	Arveson loam, 0-1 percent slopes		X

According to the North Dakota State Water Commission, Water Permit Retrieval System, there is one property with an irrigation permit in the north portion of the project area (NDSWC, 2008a). According to the permit, approximately 80 acre-feet of water are diverted from the Maple River to irrigate 160 acres of land. The exact location of the point of diversion was not provided in the permit. However, the general

area is Sections 10 and 11 of Township 143 North, Range 57 West and is approximately one mile north of the nearest wind farm infrastructure. Within the project area, there are 40 active farmsteads, seven abandoned farmsteads, six active bin sites, and one active public building. These structures are identified on Figure 4.

Woodlands

Economically important forestry resources are not found in the project area. According to the 2002 Census of Agriculture, only one farm specializing in cut Christmas trees and short-rotation woody crops is located in Barnes County (USDA, 2002). A number of small to large patches of trees occur between agricultural fields and serve as shelterbelts around residential and agricultural buildings or along wetlands. Species within the tree patches observed during a site visit include green ash (*Fraxinus pennsylvanica*), cottonwoods, elms, blue spruce (*Picea pungen*), pines, and Russian olive (*Elaeagnus angustifolia*). Woody vegetation within the project area is depicted on Figure 13.

7.9.2 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, all the land surrounding the facility will be available for grazing.

Actual impacts to agricultural production will be determined once turbine and road locations are finalized. Exact impact acreages will not be known until turbine siting is finalized, but expected permanent impacts will be approximately 0.11 acres per turbine, for a total permanent land disturbance of 15 acres, with an additional 127 acres due to access roads and 10 acres due to the O&M facility and project substation. It is possible that some of this land is not used for agricultural purposes, thus the actual impacts to agricultural production cannot be determined until turbine and road locations are finalized.

Approximately 47 percent of the site is comprised of prime farmland, and an additional 11 percent is prime farmland if drained (Figure 14). The final layout will site only a limited number of turbines and facilities in prime farmlands. The preliminary layout includes up to 80 turbines in prime farmland and prime farmland if drained resulting in a disturbance of 8.8 acres of the project area. Using a scenario with all turbines located in prime farmland, disturbance would be just over 14 acres which is a small percentage of prime lands in the project area and would be a negligible impact to agricultural production. When considering the impact on production of the top five crops in Barnes County, less than 0.1 percent of the yearly production for those commodities (based on yields reported in 2006) would be lost if all the turbines and access roads impacted prime farmland. 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 Barnes County.

No turbines will be placed within 1,400 feet of family homes. Other impacts to homes are discussed throughout Section 7.0. Family farms will be impacted due to the loss of land associated with the construction of the turbines and access roads. The extent of impacts will not be known until final turbine locations are determined in conjunction with the landowners.

Woodlands
No significant impacts are anticipated to woodlands. Because 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.

7.9.3 Mitigative Measures

Agriculture/Farming
The wind turbines and access roads will be located so that the most productive farmland (prime farmland) will be avoided as much as possible. Only land for the turbine and access roads will be unavailable for crop production. Ashtabula Wind will work with landowners to minimize impacts to their land. Once the wind turbines are constructed, all land surrounding the turbines can still be farmed or grazed. All construction areas will be separated from grazing animals by temporary or permanent fencing.

Woodlands
No significant impacts are anticipated to woodlands.

7.10 Soils

7.10.1 Description of Resources

Forty nine soil map units are currently mapped at the NRCS Order III level in the project area (Figure 16). Of these only 19 map units comprise more than one percent of the land area. Soils in the project area are generally comprised of very deep loams with a wide range of drainage capabilities. The soils are generally derived from continental glacial till deposits.

The Barnes-Buse loams and Barnes-Svea loams make up 42 and 12 percent, respectively. The next most common soil types are the Hamerly-Tonka Complex (seven percent) and Barnes-Sioux loams (six percent). The remainder of the mapped soils comprises less than four percent of the area. All percentages are approximate.

The Barnes series consists of very deep, well drained, moderately or moderately slowly permeable soils that formed in loamy till. These soils are on till plains and moraines and have slopes ranging from zero to 25 percent. The Buse series consists of very deep, well drained soils that formed in loamy glacial till on moraines. These soils have moderate and moderately slow permeability. They have slopes of three to 60 percent. Mean annual precipitation is about 22 inches. The Barnes and Svea loams are considered prime farmland soils. The Svea series also consists of very deep, well or moderately well drained soils formed in calcareous till and local alluvium from the till. Permeability is moderate in the solum and moderate or moderately slow in the C horizon. These soils are on concave positions on till plains and have slopes ranging from zero to 25 percent. The Sioux series consists of excessively drained soils formed in sand and gravel. These soils are located on nearly level to undulating outwash plains and terraces, slopes range from zero to 40 percent.

The Hamerly series consists of very deep, somewhat poorly drained soils that formed in calcareous loamy till. Permeability is moderate in the upper horizons and moderate or moderately slow in the lower horizons. These soils are on flats on lake plains and on convex slopes surrounding shallow depressions and on slight rises on till plains. They have slopes ranging from zero to three percent. The Tonka series consists of very deep, poorly drained, slowly permeable soils that formed in local alluvium over till or

glaciolacustrine deposits. These soils are in closed basins and depressions on till and glacial lake plains and have slopes of zero to one percent.

7.10.2 Impacts

The impact to soils within the Project Area will be limited to areas removed from agricultural production and road construction and will be relatively minor. Turbine foundations are comparatively small and access roads will be 36-foot wide aggregate-surfaced roadways. In isolated cases, grading may be required for roadway construction. Estimated impacts include up to 152 acres of permanent disturbance due to turbine placement, access road construction, an O&M facility, and a project substation.

7.10.3 Mitigative Measures

Wind and water erosion are potential hazards for the soils found in the Project Area. To minimize erosion during and after construction, BMPs for erosion and sediment control will be utilized. Construction sites will maintain sediment control practices in accordance with the Stormwater Pollution Prevention Plan (SWPPP). Since towers will not be located on significant slopes, only non-structural practices should be required. These practices include temporary seeding, permanent seeding, mulching, filter strips, erosion blankets, and sod stabilization. Top soil will be segregated if cuts are made during construction and reapplied after final contours have been graded if cuts are made during construction.

7.11 Geologic and Groundwater Resources

7.11.1 Description of Resources

Barnes County is primarily covered by glacial drift deposits of Pleistocene age. The surficial deposits are generally ground moraine comprised of drift material from seven different periods of glacial advance involving the Des Moines lobe of the continental ice sheet (Kelly and Block, 1967).

The project area is located on a north-south trending topographic ridge known locally as Alta Ridge (Kelly and Block, 1967), which is the expression of the Lucerne end moraine (till). The project area also includes ground moraine and minor sand and gravel outwash deposits. Isolated sand and gravel deposits associated with kames and eskers are also present within the project area. The thickness of glacial material averages 130 feet in the project area, thickening to an average of 200 feet under the Lucerne end moraine of Alta Ridge.

The uppermost bedrock unit in the project area is the Pierre Shale, which is underlain by the Niobrara Formation. Both of these formations are marine shales of Cretaceous age. The project area generally overlies an area in which the Niobrara-Pierre formational contact subcrops beneath the glacial sediments (Kelly and Block, 1967). Bedrock topography in the project area slopes toward the east at a rate of approximately 28 feet per mile. No areas of geologic instability (e.g., fault zones, karst topography) were identified.

Geologic-related mineral resources in the project area include minor sand and gravel deposits, generally associated with glacial kames and eskers. Preliminary field review did not identify any commercial gravel pits within the vicinity of proposed turbine locations.

Groundwater resources in the vicinity of the project area are generally derived from buried glacial outwash deposits of sand and gravel. Review of the North Dakota State Water Commission database indicates that well drilling depths in the project area range from approximately 150 to 350 feet (NDSWC, 2008a). Static water level data were not available for the 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 suggests that more domestic wells are present in the project area 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 apparently dependent on the relative occurrences of sand and gravel aquifers at any given area.

The Alta Ridge represents a groundwater divide, with groundwater flowing east or west from the north-south trending ridge. Groundwater quality varies, with total dissolved solids (TDS) ranging from 400 to 4,000 parts per million.

7.11.2 Impacts

Impacts to groundwater resources are not anticipated as water supply needs will be limited. It is probable that operations and maintenance 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.

7.11.3 Mitigative Measures

Wind turbine locations will not impact the use of existing water wells because the turbines will not be sited within 1,400 feet of occupied structures. Wind turbines will be sited so as to avoid sand and gravel resources identified in the project area. Where sand and gravel resources cannot be avoided, Ashtabula Wind will coordinate with landowners regarding impacts and any necessary mitigation. No other mitigation is anticipated to be necessary.

7.12 Surface Water and Floodplain Resources

7.12.1 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 Sheyenne River is a major river that flows into the Red River of the North which is bordered by North Dakota and Minnesota. The project site is located on the Drift Prairie within the Prairie Pothole Region, with rolling hills, lakes and wetlands. The major surface waters located within the site include the Sheyenne River, Lake Ashtabula, various lakes and wetlands (discussed in detail in Section 7.13), and several intermittent streams. These water resources are shown in Figure 16.

Review of FEMA floodplain maps indicate that the Sheyenne River, located approximately one mile west of the project site, is within a major floodplain (FEMA, 2007). However, the project site is not located within any major floodplains.

7.12.2 Impacts

Construction of the wind turbines, transformer pads, and access roads will disturb land within the project site. The wind turbines will be built on uplands in order to avoid intermittent streams located in the lower elevations of the landscape. Access roads to the turbines will be built to avoid impacts to surface waters.

The project will not impact floodplain areas.

7.12.3 Mitigative Measures

Access roads constructed adjacent to intermittent streams and drainageways will be designed in such a manner that 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 DOH prior to construction of the project.

7.13 Wetlands

7.13.1 Description of Resources

Wetlands and riparian areas are important resources because they provide habitat utilized by 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.

Approximately 4,408 acres of wetlands are present within the project area. Based on data from the National Wetlands Inventory (NWI) obtained from the USFWS, wetlands which make up the highest percentage within the project area are identified as palustrine emergent, seasonally-flooded (PEMC), palustrine emergent, semi-permanently flooded (PEMF), palustrine emergent, aquatic bed, semi-permanently flooded (PABF), and palustrine emergent, temporarily-flooded (PEMA) wetlands. Each of these types of wetlands comprise between one and 3.59 percent of the project area. The USFWS also identified four other wetland types which are considerably less prevalent in the project area. These included wetland areas identified as palustrine, aquatic bed, emergent, semi-permanently flooded (PAB/EMF), palustrine emergent, temporarily-flooded, partially drained/ditched (PEMAd), palustrine emergent, seasonally flooded, partially drained/ditched (PEMCd), and palustrine aquatic bed, semi-permanently flooded (PABF) wetlands. Each of these types comprises between 0.25 and 0.55 percent of the project area. Wetland types comprising less than 0.25 percent of the project account for 208 acres of the project area. Table 13 presents wetland types, acreages and percentages within the project area and locations of potential wetlands within the project area are shown on Figure 16.

Table 13
Wetland Types within the Project Area

Wetland Type	Acres	% of Project Area
PEMC (palustrine emergent, seasonally-flooded)	1,778.94	3.59%
PEMF (palustrine emergent, semi-permanently flooded)	645.10	1.30%
PEM/ABF (palustrine emergent, aquatic bed, semi-permanently flooded	584.85	1.18%
PEMA (palustrine emergent, temporarily-flooded)	539.77	1.09%
PAB/EMF (palustrine, aquatic bed, emergent, semi-permanently flooded)	270.95	0.55%
PEMAd (palustrine emergent, temporarily-flooded, partially drained/ditched)	132.45	0.27%
PEMCd (palustrine emergent, seasonally flooded, partially drained/ditched)	127.02	0.26%
PABF (palustrine aquatic bed, semi-permanently flooded)	121.34	0.25%
Wetland types comprising less than 0.25% (per wetland type) of the project area	207.98	0.42%
Totals	**4,408.40**	**8.91%**

7.13.2 Impacts

The proposed turbine layout takes advantage of higher elevations and avoids low-lying areas which are more likely to contain wetland areas. Additionally, impacts resulting from project construction will likely be temporary and therefore permanent impacts to wetland areas will be minimal. Based on review of available cartographic information, impacts to wetlands in the project area are largely avoidable through minor modifications to the project layout and avoidance of wetland habitats during construction. Final turbine placement prior to construction will likely avoid the majority of potential wetland sites.

Wetland Permitting

The Department of the Army (DA), acting through the USACE has the authority to permit the placement or discharge of dredged or fill materials in waters of the United States (WUS) under Section 404 of the Clean Water Act (CWA). The USACE also has authority for the day-to-day administration of the individual and Nationwide Permit (NWP) program, to conduct and verify jurisdictional determination, to develop and interpret policy and guidance, and to enforce Section 404 provisions. The CWA also established responsibilities of the United State Environmental Protection Agency (USEPA) which include:

- development and interpretation of policy, guidance and environmental criteria used in evaluating permit decisions,
- determination of scope of geographic jurisdiction;
- authority to prohibit, deny or restrict the use of any defined area as a disposal site;
- review and comment on individual permit applications; and,
- enforcement authority of Section 404 provisions.

The USFWS was given the authority to evaluate impacts of any proposed action on fish and wildlife resulting from federally permitted projects under the Fish and Wildlife Coordination Act and to evaluate specific cases or policy issues pursuant to the requirements of Section 404(q).

Individual states were also granted authority in Section 404 permit decisions through State Water Quality Certifications (CWA, Section 401), State Program general permits, or program assumption.

The Valley City Wetlands Management District, under the jurisdiction of the USFWS, manages four waterfowl production areas (WPAs) and multiple wetland easements within the vicinity of the Corridor. WPAs include the Breske, Grotberg, Henderson, and Getchell WPAs. These WPAs and USFWS easements are shown on Figure 4. The easements provide the USFWS perpetual rights which restrict or prohibit draining, burning, leveling or filling of any wetland basin depicted on the wetland easement maps without a permit issued by the USFWS.

On-site delineation of these features prior to construction will identify wetland resources which are considered federal waters subject to the requirements of Section 404 of the CWA. The wetland inventory protocol that Ashtabula Wind will follow is contained in Appendix E.

Based on information from the USACE-Omaha District, no Traditional Navigable Waters are present within the Corridor, therefore no CWA Section 9 or 10 permits will be required. Areas which are determined to be jurisdictional based on the CWA will be avoided where practicable. However, only impacts to wetlands determined to be WUS or under perpetual easement by the USFWS will require issuance of permits or letters of permission prior to initiation of construction activities. Under the CWA, only the USACE can make a jurisdictional determination and such determinations are generally not made until a permit application is filed or a potential compliance issue exists.

7.13.3 Mitigative Measures

Wetlands will be avoided to the extent practicable during the construction phase of the project. If impacts to CWA jurisdictional waters are unavoidable and less than one-half acre, Ashtabula Wind will seek project authorization under a Section 404 USACE NWP. Permanent impacts to jurisdictional waters will be mitigated according to USACE requirements.

Wetlands within USFWS easements on private property are under USFWS jurisdiction. If wetland impacts in USFWS easements cannot be avoided, Ashtabula Wind will work with the USFWS to obtain permits or letters of authorization and will conduct mitigation if required. The USFWS requires a compatibility assessment for any wetland impacts on easement land (see Section 10.11.2).

Ashtabula Wind will use NWP specific General and/or Regional Conditions prescribed for projects in North Dakota as set forth by the USACE and other BMPs required by the USFWS during construction and operation of the transmission line to protect topsoil, minimize soil erosion and protect adjacent wetland resources from direct and indirect impacts. Practices may include containing excavated material, use of silt fences, protecting exposed soil, stabilizing restored material, and revegetating disturbed areas with native species.

7.14 Vegetation

7.14.1 Description of Resources

The project area and vicinity are located in the Northern Glaciated Plains ecoregion and are characterized by a flat to gently rolling landscape composed of glacial drift. The subhumid conditions foster grassland transitional between the tall and shortgrass prairies. High concentrations of temporary and seasonal wetlands create favorable conditions for duck nesting and migration. Though the till soil is very fertile, agricultural success is subject to annual climatic fluctuation. On the Drift Plains, the retreating Wisconsinian glaciers left a subtle undulating topography and a thick mantle of glacial till. Because of the productive soil and level topography, this ecoregion is almost entirely cultivated, with many wetlands drained or simply tilled and planted. However, valuable waterfowl habitat still remains, concentrated in State and Federally sponsored duck production areas. Historic grassland on the Drift Plains was a transitional mix of tallgrass and shortgrass prairies. The prairie grasses have been largely replaced by fields of spring wheat, barley, sunflowers, and alfalfa (NPWRC, 2006).

Plant communities within the vicinity of the project area are typical of former grassland prairies that have been converted to agricultural lands. Historically, the plant communities consisted of mixed bluestem-needlegrass-wheatgrass prairie with patches of shrubland and green ash (*Fraxinus pennsylvanica*), burr oak (*Quercus macrocarpa*), and other deciduous woodlands. However, the vast majority of the native vegetation within the project area has been replaced with croplands.

7.14.2 Impacts

The project area contains significant amounts of agriculture. Within the project area, potential impacts to plant communities due to construction activities were analyzed during the site visit. Proposed turbine locations, collector and transmission line routes, and access roads were visually inspected during the site visit.

Access road construction will result in the greatest effects to native vegetation resulting in permanent loss of these habitats where they occur along selected routes. Installation of the proposed buried and overhead collector system will result in some temporary effects to native and non-native grasslands. Where disturbance is significant, effects can be mitigated by reseeding the trenched areas with native grasses and legumes following completion of construction activities.

7.14.3 Mitigative Measures

Ashtabula Wind will work closely with the USFWS and NDGFD during micrositing to minimize impacts to vegetation within the project area. Ashtabula Wind will conduct a pre-construction inventory of existing wetlands. The pre-construction inventory report will be filed with the PSC and applicable agencies prior to construction. Ashtabula Wind will avoid impacts to USFWS WPAs and work with the USFWS to avoid or minimize impacts to wetlands and native grasslands within USFWS easements. Ashtabula Wind will work to avoid and to minimize impacts to existing trees and shrubs.

If impacts 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). Ashtabula Wind will follow permit conditions for site restoration and replacement. When boring

underground collection beneath wetlands within USFWS wetland easements, Ashtabula Wind will request a letter of authorization from the USFWS.

Ashtabula Wind will use BMPs during construction and operation of the project to protect topsoil and adjacent resources and to minimize soil erosion (NDDOH, 2001). Practices may include containing excavated material, protecting exposed soil, stabilizing restored material, and revegetating rangelands with native species.

7.15 Wildlife

7.15.1 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 Game and Fish Department (NDGFD), North Dakota Parks and Recreation Department (NDPRD), North Dakota Natural Heritage Inventory (NDNHI), University of North Dakota (UND) Extension Office and 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 (*Procyon lotor*), mink (*Mustela vison*), spotted skunk (*Spilogale putorius*), weasel (*Mustela nivalis*), white-tailed deer (*Odocoileus virginianus*), moose (*Alces alces*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), badger (*Taxidea taxus*), porcupine (*Erethizon dorsatum*), and cottontail rabbit (*Sylvigagus floridanus*). Table 14 presents a list of the avian species observed in the project area during a site visit in August 2007.

Table 14
Wildlife Species Observed in the Project Area – August 2007

Common Name	Scientific Name
American coot	*Fulica americana*
American goldfinch	*Carduelis tristis*
barn swallow	*Hirundo rustica*
belted kingfisher	*Ceryle alcyon*
blue-winged teal	*Anas discors*
common grackle	*Quiscalus quiscula*
double-crested cormorant	*Phalacrocorax auritus*
Franklin's gull	*Larus pipixcan*
gadwall	*Anas strepera*
great blue heron	*Ardea herodias*
mallard	*Anas platyrhynchos*
mourning dove	*Zenaida macroura*
northern flicker	*Colaptes auratus*
northern harrier	*Circus cyaneus*

northern shoveler	*Anas clypeata*
pied-billed grebe	*Podilymbus podiceps*
red-tailed hawk	*Buteo jamaicensis*
red-winged blackbird	*Agelaius phoeniceus*
Swainson's hawk	*Buteo swainsoni*
tree swallow	*Tachycineta bicolor*
unknown sandpiper	
vesper sparrow	*Pooecetes gramineus*
white pelican	*Pelecanus erythrorhynchos*
yellow-headed blackbird	*Xanthocephalus xanthocephalus*

Raptors

Raptors are killed by impacts with wind turbines proportionately more often than other types of birds, and are therefore a concern at wind farm sites (Lowitz and Cleveland, 2007). The mosaic of tree patches throughout the project area could provide good roosting and perching habitat for raptors. Based on the available cover present within the project area, prey densities are expected to be the highest in un-fragmented areas of native grassland and large wetland areas. However, cropland areas may also be attractive to rodent prey species utilizing waste grain as a food resource. Raptors observed during the site visit include red-tailed hawks, Swainson's hawks, and northern harriers. Swainson's hawk and northern harriers are a conservation priority at the North Dakota state level.

Bats

Based on a desktop study, of the 46 bat species in the United States, 10 occur in North Dakota (ASM 2007), of which, three species, the western small-footed myotis (Myotis ciliolabrum), long-eared myotis (Myotis evotis), and long-legged myotis (Myotis volans) are listed by the North Dakota Game and Fish Department as sensitive species (Hagen et al. 2005). The distribution of these species is primarily restricted to the western half of North Dakota (USFWS 1995). While winter hibernacula consists of mines and caves within barren badlands and conifer forests, these species may roost in a variety of substrates in the summer including under peeling tree bark (Hagen et al. 2005). Based on species' distribution maps and the habitat present in the WRA, it is highly unlikely these sensitive species would regularly occur at the project area during the winter or summer seasons. Of the remaining 7 species, six are restricted to the eastern half of North Dakota including areas along the Missouri River (USFWS 1995, Swier 2006, USGS 2007). Threats to these seven species include impacts to woodland roosting habitat and wetlands used for foraging.

According to the agency response letters and information available on their websites, there are no federally listed bat species or State listed bat Species of Conservation Priority within Barnes County, North Dakota (Dyke, 2004).

Because the point count survey site visits were conducted during daylight hours, no bats were observed. However, bats are likely present within the vicinity of the project area. Depending on the species, bats typically utilize various structures for roosting such as rock formations, caves, human-made structures, and/or dead and dying trees with cavities and loose bark (Neuweiler, 2000). Such habitat features are scattered throughout the project area. Many bat species use riparian corridors and wetlands as feeding

habitats due to the higher nocturnal insect densities within these areas (Hill and Smith, 1984). These habitats are present in the vicinity of the proposed turbine locations, thereby increasing the risk for associated interactions.

Avian Migration and Potential Occurrence in the Project Area

Many species of waterfowl, raptors, shorebirds, and grassland birds are known to migrate through the vicinity of the project area, as North Dakota lies within the Central Flyway. Some of the species observed during a fall 2007 site visit include Canada geese, red-winged blackbirds, tree swallows, double-crested cormorants, barn swallows, and rock pigeons. The likelihood of bird/turbine interactions is determined by a number of factors including visibility and weather, with increased bird/turbine interactions occurring at night and in inclement weather. Inclement weather and low cloud ceilings force migrating birds to fly at lower altitudes, thereby putting them at greater risk for adverse interactions with turbines and support infrastructure (NWCC, 2004).

Based on the number and diversity of wetlands present, the project area could serve as a breeding habitat for large numbers of waterfowl or shorebirds. In addition, hay and grain crops are often utilized by migrating waterfowl and upland bird species as food resources (Cleary, 1994). The plentiful wetland habitat and agricultural fields within the project area are an attractant to waterfowl and other migrating birds and may increase the potential for collision with turbines.

7.15.2 Impacts

Activities such as road construction can destroy or disrupt wildlife habitat and allow for the introduction of unwanted plant species. Installation of the transmission lines would result in a temporary loss of wildlife habitat. Displaced wildlife would likely relocate to nearby unaffected areas within the project area until construction activities have been completed. In areas where disturbance is significant and natural regeneration of onsite plant propagules would not occur, the temporary loss of habitat may be mitigated by reseeding of the affected areas with native prairie plant species.

7.15.3 Mitigative Measures

In order to reduce the potential for adverse effects to raptors within the project area, collection and transmission lines should be buried to the extent practicable. Where overhead lines are constructed, the USFWS recommends that the potential for bird strikes and electrocutions be reduced through implementation of certain established measures (USFWS, 2007). For example, use of guy wires on meteorological towers should be avoided whenever possible. Timing of road construction should be made with consideration given to the nesting of migratory birds. Avoiding construction during sensitive times will reduce the risks associated with violating the Migratory Bird Act.

Spring surveys will be conducted prior to project development to better document the use of the project area and surrounding areas by breeding species, including raptors, bats, and waterfowl, and will document pre-construction species' presence and density, and possibly assist in identifying sites with elevated potential for avian/turbine interactions.

A spring survey for raptor nests will identify sites of elevated bird-turbine collision risk. Such surveys are best conducted prior to project development so that results may be used to modify construction plans, if necessary.

Based on a desktop study, of the 46 bat species in the United States, 10 occur in North Dakota (ASM 2007), of which, three species, the western small-footed myotis (Myotis ciliolabrum), long-eared myotis (Myotis evotis), and long-legged myotis (Myotis volans) are listed by the North Dakota Game and Fish Department as sensitive species (Hagen et al. 2005). The distribution of these species is primarily restricted to the western half of North Dakota (USFWS 1995). While winter hibernacula consists of mines and caves within barren badlands and conifer forests, these species may roost in a variety of substrates in the summer including under peeling tree bark (Hagen et al. 2005). Based on species' distribution maps and the habitat present in the Project Area, it is highly unlikely these sensitive species would regularly occur at the Project Area during the winter or summer seasons. Of the remaining 7 species, six are restricted to the eastern half of North Dakota including areas along the Missouri River (USFWS 1995, Swier 2006, USGS 2007). Threats to these seven species include impacts to woodland roosting habitat and wetlands used for foraging. Based on bat turbine collision studies at other wind farms, there are similar species present at the Project Area that have the potential for collisions with turbines and meteorological towers (Kunz et al. 2007). Ashtabula Wind will implement measures to avoid and minimize effects to bats at the proposed site by siting facilities away from wetlands and woodlands and burying overhead power lines, to the extent possible.

Ashtabula Wind has conducted environmental studies of the project site to aid in the initial placement of turbines, roads, and associated facilities to avoid or minimize impacts to wildlife and habitat. Also, Ashtabula Wind is coordinating with USFWS and NDGFD regarding avian monitoring and minimization of impacts to WPAs and easement areas. The following measures will be used, to the extent practicable, to help avoid potential impacts to wildlife in the project area during selection of the turbine locations and subsequent development and operation:

- Ashtabula Wind proposes buffers of 0.25 miles around USFWS WPAs and avoidance of wetlands within wetland easements.
- Conduct additional pre-construction avian monitoring at the site. Spring pre-construction avian monitoring protocols are contained in Appendix E.
- Ashtabula Wind will 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 to assess the construction zone once turbine siting is completed. These inventory reports will be filed with the PSC and applicable agencies prior to project construction.
- Ashtabula Wind will implement a Wildlife Response Reporting System (WRRS) once turbine construction is completed. The WRRS will include protocols for field technicians to report and document avian mortalities during routine maintenance operations.
- Ashtabula Wind will construct wind turbines using tubular monopole towers and turbines will be minimally lit according to FAA requirements.
- Ashtabula Wind proposes to place the electrical collection system connecting the turbines to the project substation underground, if site conditions are favorable.

- Ashtabula Wind will avoid or minimize disturbance of individual wetlands or drainage systems during construction and operation of the project.
- Ashtabula Wind will protect existing trees and shrubs where practicable. If impacts are unavoidable, Ashtabula Wind will replace existing trees and shrubs unless directed otherwise by the landowner.
- Ashtabula Wind will maintain sound water and soil conservation practices during construction and operation of the project in order to protect topsoil and adjacent resources and to minimize soil erosion. To minimize erosion during and after construction, BMPs for erosion and sediment control will be utilized (NDDOH, 2001). These practices include, temporary seeding, permanent seeding, mulching, filter strips, erosion blankets, grassed waterways, and sod stabilization.
- Ashtabula Wind will revegetate non-cropland and pasture areas with a seeding mix as recommended by USFWS and NRCS.
- Ashtabula Wind will 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.

Ashtabula Wind is committed to minimizing wildlife impacts within the project area. Ashtabula Wind 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.

7.16 Rare and Unique Natural Resources

7.16.1 Description of Resources

Federally Listed Species

The Endangered Species Act requires the protection of species which are federally listed as threatened or endangered. Significant changes to the habitats of these species, or projects that have the potential to result in "take," would require special permitting from the USFWS. Whooping cranes (Grus americana), spring and fall migrants in North Dakota, were first federally listed as Threatened in 1967 and federally listed as Endangered in 1970 (Canadian Wildlife Service and USFWS 2005). The primary threats to this species include loss of roosting and foraging habitat and collisions with power lines and fences. In North Dakota, whooping cranes have the potential to occur anywhere suitable feeding and roosting habitat is found; however 94% of all documented whooping crane occurrences have been within 200 mile corridor adjacent to the Missouri River (Austin and Richerts 2001). The Ashtabula Project Area is located outside of the 200 mile corridor, thus whooping cranes are thought to have a low likelihood to occur at the Project Area. The attractiveness of an area to migrating whooping cranes will likely be influenced by the amount and configuration of feeding and roosting sites on the landscape. There is a historic observation within 10 miles of the Project Area; however, due to only 6% of observations occurring outside the 200-mile corridor, individuals regularly occurring in this area are highly unlikely.

According to the agency response letter from the USFWS, of the federally listed species known to occur within North Dakota, only the whooping crane is known to occur in Barnes County.

The bald eagle is no longer listed as a threatened species. However, it is discussed in this section because it is still protected by the Bald and Golden Eagle Protection Act. The USFWS indicates that bald eagles could be present within Barnes County, and their conservation is still emphasized by wildlife agencies.

The Bald eagle (*Haliaeetus leucocephalus*) is no longer a federally threatened species but is still protected under the Bald and Golden Eagle Protection Act. It is listed by the state as a Level II priority, which indicates a moderate to high conservation priority (Dyke, 2004; Gomes, no date). Bald eagles have been documented to nest in North Dakota in western Burleigh and southern McLean Counties, along the Missouri River (USFWS, 1995). For breeding, they build large nests in tall trees or other sturdy structures, and are most often found in forested habitats close to water (USFWS, 1995).

Native Prairie Habitats

According to a response letter received from the NDPRD, three plant species occurring within the project area are considered state plant species of concern and are listed in Table 15.

Table 15
North Dakota State Plant Species of Concern

Scientific Name	Common Name	State Rank*	Last Observation
Pascopyrum smithii – Stipa comata prairie	central mixed prairie	S2	8/28-9/24/1998
Andropogon gerardii – Schizachyrium scoparium transition tallgrass prairie	central mesic tallgrass prairie	S1	8/28/1998
Schizachyrium scoparium – Bouteloua curtipendula – Stipa spartea prairie	dry mesic tallgrass prairie	S1	8/28/1998

7.16.2 Impacts

Impacts to Rare and Unique Resources are unlikely. The whooping crane listed by the USFWS although outside of the 200 mile corridor and the bald eagle, protected under the Bald and Golden Eagle Protection Act, may be occasional visitors to the area and will not likely be affected by this proposed action.

7.16.3 Mitigative Measures

No impacts are anticipated to Rare and Unique Resources. Ashtabula Wind will avoid the resources identified to the extent practicable.

7.17 Summary of Impacts

Table 16 summarizes the resources that will be impacted as a result of the Project and the appropriate mitigation.

Table 16
Summary of Impacts and Mitigation

Resource	Impact	Mitigation
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.
Land Use	Assuming all turbines are 1.5 MW, approximately 15 acres of land will be impacted for turbine placement and 127 acres for aggregate-surfaced access roads up to 36 feet in width. An additional 10 acres of land will be permanently impacted for the O&M facility and substation. Temporary impacts for laydown and contractor staging could range from 25 to 40 acres.	Ashtabula Wind will work with landowners and regulatory agencies to minimize impacts of the Project.
Public Services	No impacts are anticipated.	Ashtabula Wind will utilize station service from the local electrical utility. MAPP will suggest appropriate configurations for the electrical system and Ashtabula Wind will abide by the recommendations to prevent impacts to the transmission system.
Human Health and Safety	No impacts are anticipated.	Turbines will be lighted to comply with FAA requirements. Ashtabula Wind 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.	Ashtabula Wind 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.	Ashtabula Wind 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.
Cultural and Archaeological	No impacts to previously identified cultural resources are anticipated.	Ashtabula Wind has completed a Class I Cultural Resources Inventory for the Project. Ashtabula Wind will conduct a Class II/III inventory of a 200-foot wide corridor along the proposed collection lines and between the proposed turbine locations and any other linear portions of the Project prior to construction.
Recreational Resources	Visual impacts will likely occur.	Visual impacts 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 all turbines are 1.5 MW, approximately 15 acres of land will be impacted for turbine placement and 127 acres for aggregate-surfaced access roads up to 36 feet in width. An additional 10 acres of land will be permanently impacted for the O&M facility and substation. Temporary impacts for laydown and contractor staging could range from 25 to 40 acres. Approximately 81 percent of the site is agricultural land.	Ashtabula Wind will work with landowners to minimize impact to their land.
Soils	Assuming all turbines are 1.5 MW, approximately 15 acres of land will be impacted for turbine placement and 127 acres for aggregate-surfaced access roads up to 36 feet in width. An additional 10 acres of land will be permanently impacted for the O&M facility and substation. Temporary impacts for laydown and contractor staging could range from 25 to 40 acres.	BMPs for erosion and sediment control will be utilized to minimize wind and water erosion at the site (NDDOH, 2001). 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. It is possible that sand and gravel resources could be made unavailable.	Wind turbines will be sited to avoid known sand and gravel resources to the extent practicable.
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. Ashtabula Wind will implement BMPs to minimize erosion and sedimentation at the site (NDDOH, 2001).
Wetlands	Minor impacts are anticipated.	Attempts will be made to keep impacts to a minimum. Wetlands will be avoided and Ashtabula Wind will observe a setback of 0.25 miles from WPAs. If impacts cannot be avoided once micrositing is complete, Ashtabula Wind will work with the USACE, USFWS, to obtain permits.
Vegetation	Assuming all turbines are 1.5 MW, approximately 15 acres of land will be impacted for turbine placement and 127 acres for aggregate-surfaced access roads up to 36 feet in width. An additional 10 acres of land will be permanently impacted for the O&M facility and substation. Temporary impacts for laydown and contractor staging could range from 25 to 40 acres.	Ashtabula Wind will work with the USFWS to minimize impacts. Ashtabula Wind will avoid existing trees and shrubs as practicable. Ashtabula Wind will use BMPs during construction and operation to minimize impacts (NDDOH, 2001). If impacts to trees or shrubs cannot be avoided, the individual trees or shrubs will be replaced. Temporarily disturbed areas will be reseeded per USFWS and NRCS recommendations.
Wildlife	The impact of the project on wildlife is 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, as discussed in Section 7.15.3. These include designing the facility to specifically minimize avian impacts. Additional pre-construction monitoring will be completed for avian species. Ashtabula Wind's WRRS will be implemented after construction of the Project as described in Section 7.15.3.

Rare and Unique Natural Resources	Impacts to rare and unique natural resources are not anticipated.	No additional mitigative measures are necessary.

8.0 PUBLIC COORDINATION

Keeping the public informed on the status of the Project is a key component to its success. Principal stakeholders in the Project are landowners that have entered or will be entering into agreements with Ashtabula Wind to provide wind rights for the Project. Ashtabula Wind will continue to meet with County officials as the Project moves forward and Ashtabula Wind seeks a conditional use permit from the County.

Ashtabula Wind and their representatives have been working with key state and federal agencies including the Department of Commerce, the USFWS and the NDGFD to inform them of the Project and to address areas of interest particular to each department.

Ashtabula Wind 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 required for the construction and operation of the Project are shown in Table 17. Permits dependent on the final site layout will be applied for after receiving PSC approval, but prior to construction.

Table 17
Potential Permits and Approvals Required for Construction and Operation of the Proposed Facility

Agency	Type of Approval	Status*	Need
Federal Approvals			
USFWS	Compatibility Analysis of Disturbed Easements	3	If constructing in wetlands within wetland easements or in WPAs, then compatibility analysis by USFWS is required.
	Right of Way Permit	3	If use is compatible, then a Right of Way Permit may be required for permanent disturbance in wetlands within wetland easements. When boring, a letter of authorization will be requested from USFWS.
	Special Use Permit	3	If use is compatible, then a Special Use Permit is required for temporary disturbance in wetlands within wetland easements.
USACE	Section 404 Permit (NWP)	3	Permit required for fill in jurisdictional waters of the US. Further investigation is required to determine USACE jurisdiction of wetlands within the Project area.
FAA	Form 7460-1, Notice of Proposed Construction	1	Notice and approval are required for structures over 200 feet in height. FAA approval of lighting and marking of turbines is required.
State of North Dakota			
Public Service Commission	Certificate of Site Compatibility	1	Required for construction of generation facility over 100 MW in size.
	Certificate of Corridor Compatibility	1	Required for construction of transmission line over 115 kV in size.
	Certificate of Route Compatibility	1	Required for construction of transmission line over 115 kV in size.
North Dakota Department of Health	NPDES Permit: General Construction Storm Water	2	Required for disturbance of over 1 acre of land. Must prepare a Storm Water Pollution Prevention Plan (SWPPP).
North Dakota Department of Health – Lake Region District Health Unit	Septic Tank and Drainfield Permit	2	Required for installation of septic system at O&M facility.

Agency	Type of Approval	Status*	Need
State of North Dakota			
North Dakota Highway Patrol	Overheight/Overweight Permit	2	Permit required for hauling construction equipment and materials on State Highways.
North Dakota Department of Transportation	Road Approach/Access Permit	2	Permit required for construction of access roads from State Highways.
	Utility Permit/Risk Management Documents	2	Permit required for utility crossings on State Highway ROW.
Local Permits			
Barnes County	Conditional Use Permit	1	Permit required for project construction.
	Haul Road Agreement	2	Permit required for hauling construction equipment and materials on County Roads.
	Utility Permit	2	Permit required for utility crossings on County road ROW

* Status Explanation: 1 Applied and/or Decision Pending
2 Will Apply Once Certificate is Received
3 Final Layout will Determine Whether Permit/Approval is Needed

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 7.17.

10.2 Technologies to Minimize Adverse Environmental Effects

Ashtabula Wind 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 142 acres of land. An additional 10 acres of land will be impacted due to the O&M facility and project substation. Between 25 and 40 acres of land will be temporarily impacted due to laydown and contractor staging areas.

10.5 Alternatives to the Proposed Site

No alternatives were considered for the development of the Project. Ashtabula Wind believes that the proposed site is the most viable alternative. Ashtabula Wind is committed to being flexible on the preliminary site layout and will work closely with landowners and regulatory agencies to examine all 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 these 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 7 to 10 feet

thick. 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

Economic impacts include impacts associated with the temporary conversion of up to 192 acres of land to turbine sites, associated access roads, and associated facilities. Permanent impacts will be lower, at 152 acres. In general, agricultural areas surrounding each turbine can still be farmed, and landowner compensation will be established by individual lease agreements

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 Barnes County 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 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 county and the state.

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 northeastern North Dakota. Additional revenues are expected from property and income taxes.

Continuing to establish the northeastern region of North Dakota as an important producer of alternative energy sources may spur the development of wind-related businesses in the area, in turn contributing 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 Cultural Resources Inventory (file search/literature review) was conducted by Beaver Creek Archaeology, Inc. (BCA) on September 6, 2007 at the State Historical Society of North Dakota. Based on the results of the file search, seven manuscripts, nine archaeological site leads, one architectural site, and one architectural site lead were found within the records. The project area contains relatively few archaeological, historic, and architectural sites. However, this is likely due to the lack of cultural resource inventories performed in the project area. In addition, the rolling prairie landscape with hills, knolls, and bluffs combined with an abundance of water indicate that the project area may contain archaeological sites (BCA, 2007). Once weather permits, BCA will be performing a Class II/III Pedestrian survey of the turbine locations and associated facilities to identify cultural resources per the protocol presented in Appendix E. Results will be used to microsite turbines and associated facilities.

Ashtabula Wind is committed to minimize impacts to these resources and will avoid these resources and any additional resources identified throughout the life of the Project. If avoidance is not possible, Ashtabula Wind will work with the North Dakota SHPO to mitigate potential impacts.

10.10 Effect of Site on Biological Resources

Ashtabula Wind will implement measures to avoid and minimize effects to biological resources at the proposed site. The impact of the Project on wildlife is expected to be minimal. There is potential for avian and bat collisions with facility turbines or meteorological towers. The site will be designed to minimize impacts to those species.

10.11 Agency Comments

Agencies were contacted to comment on the Project. The following summaries of comments received apply to the proposed Ashtabula Wind Energy Center.

10.11.1 North Dakota Game and Fish Department

The NDGFD manages the Valley City Wildlife Management Area located approximately two miles southeast of the Project Area boundary (NDGFD, 2008). The NDGFD had no data available regarding threatened or endangered species and sensitive habitats in the Project Area (Appendix C). The NDGFD stated that numerous wetlands within the Project Area warranted steps to protect any wetlands that cannot be avoided, aboveground appurtenances should not be placed in wetland areas, and no alterations be made to existing drainage patterns. The response letter received from the NDGFD is included in Appendix D.

10.11.2 U.S. Fish and Wildlife Service

The USFWS provided a list of threatened and endangered species potentially present within the Project Area. The list included the endangered whooping crane, which is described in a previous section of this application. Other concerns of the USFWS focus on migratory birds, wetlands, native grasslands, woodland resources, and threatened and endangered species. Waterfowl Production Areas (WPAs) and wetlands easements are recorded within the Project Area. The USFWS stated that a service permit and an environmental assessment could be required if wetland easements or WPAs are affected outside the existing ROW as a result of construction activities, stockpiling of material, or acquiring of borrow material. In relation to migratory birds, no collisions or electrocutions with overhead power lines are anticipated because most of the Project power collector system will be placed underground and any aboveground collector structures and lines will be constructed using ‘bird-safe designs” in accordance with the Avian Power Line Interaction Committee (APLIC) recommendations (APLIC, 1994 and 1996). Ashtabula Wind will conduct a pre-construction spring point count survey per the protocol presented in Appendix E.

10.11.3 North Dakota SHPO

The SHPO recommended that a Class I cultural resources inventory be completed for areas that may be impacted by the Project. Based on the results of the file search, seven manuscripts, nine archaeological site leads, one architectural site, and one architectural site lead were found within the records. The project area contains relatively few archaeological, historic, and architectural sites. However, this is likely due to the lack of cultural resource inventories performed in the project area. A copy of the SHPO response letter is included in Appendix D. In addition, BCA will conduct a Class II/III assessment under the protocol presented in Appendix E. Results will be used to microsite turbines. This report will be submitted to PSC and the SHPO when complete.

10.11.4 North Dakota Geological Survey

The North Dakota Geological Survey (NDGS) stated that no environmental properties of interest or related concerns or issues were identified. The NDGS does not currently require any specific permits for the proposed Ashtabula Wind Energy Center. A copy of their response letter is included in Appendix D.

10.11.5 North Dakota Parks and Recreation Department

The North Dakota Parks and Recreation Department (NDPRD) stated that their scope of authority and expertise covers recreation and biological resources (in particular rare plants and ecological communities). Based on the defined project boundary, the project does not affect state park lands that they manage or Land and Water Conservation Fund recreation projects that they coordinate. Based on NDPRD's review of the North Dakota Natural Heritage biological conservation database, several occurrences of state plant species of concern have been identified within the project area. These species are further discussed in Section 7.16. NDPRD 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, NDPRD recommends that any impacted areas be revegetated with species native to the project area. A copy of NDPRD's response letter is included in Appendix D.

10.11.6 North Dakota Office of Attorney General

The Attorney General's Office was asked to comment on the Project. The Attorney General and members of his staff are prohibited from giving legal advice, opinions, or assistance to private businesses (Appendix D).

10.11.7 North Dakota Department of Commerce

The North Dakota Department of Commerce stated that it supports the development of the Project and was unaware of any environmental property, concerns, or issues within the boundaries of the proposed Project. A copy of their response letter is included in Appendix D.

10.11.8 North Dakota Department of Health

The North Dakota Department of Health (NDDOH) sent a response letter stating that the department 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 activities. The NDDOH also stated that a permit to discharge storm water during construction is required. The NDDOH included with their response a document titled, Construction and Environmental Disturbance Requirements. This document, along with the response received from NDDOH, are included in Appendix D.

10.11.9 North Dakota Department of Transportation

Ashtabula Wind sent a letter to the North Dakota DOT dated January 21, 2008 (Appendix D). No response has been received.

10.11.10 North Dakota State Water Commission

The North Dakota State Water Commission (SWC) stated that the property is not located in an identified floodplain and it is believed that the project will not affect an identified floodplain; that all waste material associated with the project must be disposed of properly and not placed in identified floodway areas; and that no sole-source aquifers have been designated in North Dakota. A copy of SWC's response letter is included in Appendix D.

10.11.11 Natural Resources Conservation Service

Ashtabula Wind sent a letter to the Natural Resources Conservation Service dated January 21, 2008 (Appendix D). No response has been received.

10.11.12 North Dakota State Land Department

Ashtabula Wind sent a letter to the North Dakota State Land Department dated January 21, 2008 (Appendix D). No response has been received.

10.11.13 U.S. Army Corps of Engineers

Ashtabula Wind sent a letter to the U.S. Army Corps of Engineers dated January 21, 2008 (Appendix D). No response has been received.

10.11.14 Aeronautics Commission

Ashtabula Wind sent a letter to the Aeronautics Commission dated January 21, 2008 (Appendix D). No response has been received.

10.11.15 North Dakota Department of Agriculture

Ashtabula Wind sent a letter to the North Dakota Department of Agriculture dated January 21, 2008 (Appendix D). No response has been received.

10.11.16 North Dakota Department of Human Services

Ashtabula Wind sent a letter to the North Dakota Department of Human Services dated January 21, 2008 (Appendix D). No response has been received.

10.11.17 North Dakota Department of Labor

The North Dakota Department of Labor stated that they have no authority to issue any permits regarding land or environmental concerns. A copy of their response letter is included in Appendix D.

10.11.18 North Dakota Department of Career and Technical Education

Ashtabula Wind sent a letter to the North Dakota Parks Department of Career and Technical Education dated January 21, 2008 (Appendix D). No response has been received.

10.11.19 North Dakota Governor

Ashtabula Wind sent a letter to the North Dakota Governor dated January 21, 2008 (Appendix D). No response has been received.

10.11.20 North Dakota Job Service

The North Dakota Job Service stated that they have no information regarding the boundaries of the tracts within the Project Area. A copy of their response letter is included in Appendix D.

10.11.21 North Dakota Indian Affairs Commission

Ashtabula Wind sent a letter to the North Dakota Indian Affairs Commission dated January 21, 2008 (Appendix D). No response has been received.

10.11.22 North Dakota Office of Management and Budget

Ashtabula Wind sent a letter to the North Dakota Office of Management and Budget dated January 21, 2008 (Appendix D). No response has been received.

10.11.23 North Dakota Soil Conservation Committee

Ashtabula Wind sent a letter to the North Dakota Soil Conservation Commission dated January 21, 2008 (Appendix D). No response has been received.

10.11.24 Barnes County Soil Conservation District

Ashtabula Wind sent a letter to the Barnes County Soil Conservation District dated January 21, 2008 (Appendix D). No response has been received.

11.0 QUALIFICATIONS OF CONTRIBUTORS TO SITING STUDY

NAME PROJECT ROLE	EDUCATION AND PROFESSIONAL EXPERIENCE
JOHN DIDONATO Director, Project Development FPL Energy	Project developer representing FPL Energy in all commercial and regulatory aspects of the project. Bachelor's degree, Kent State University. Master's degree, Florida Atlantic University
SCOTT SCOVILL Director, Project Development FPL Energy	Project developer representing FPL Energy in all commercial and regulatory aspects of the project. Bachelor's degree, Kent State University. Master's degree, Florida Atlantic University
HOLLY STARLING Manager, Project Development FPL Energy	Project developer representing FPL Energy in all commercial and regulatory aspects of the project. Bachelor's degree, Kansas State University. Master's degree, Webster University
GEOFFREY WEST Environmental Specialist FPL Energy	Mr. West has over 8 years combined experience working in the energy industry as well as for the state water management district as an environmental scientist. Mr. West currently provides environmental support to FPL Energy Development. B.S., University of the South
DICK RAUSCH Construction Project Manager	Provided input on route from a "constructability" perspective.
TOM FACTOR Land Easement Specialist/ Route Mapping FPL Energy	Representing FPL Energy on wind resource, landowner discussions and selection of corridor.
TED WEISSMAN Land Easement Specialist FPL Energy	Representing FPL Energy on landowner discussions and selection of corridor.
BRIAN BJELLA Attorney for Applicants Fleck, Mather & Strutz, Ltd.	J.D. degree, University of North Dakota Applicant's counsel.
TRACEY MARTORANO Project Manager Tetra Tech EC, Inc.	Ms. Martorano has over nine years in the environmental consulting business. She has experience preparing and securing environmental permits for energy-related facilities, coordinating and managing biological and cultural field surveys, and contributing to National and State Environmental Policy Act (NEPA) documentation. Ms. Martorano manages siting studies, prepares environmental permits, and conducts consultation with local, state and federal stakeholders for wind energy.
JEFFREY RICE Environmental Group Manager Tetra Tech	Mr. Rice has over 25 years of environmental consulting experience and has managed environmental, natural resource, soil and regulatory projects. He also has a wide range of experience in National Environmental Policy Act (NEPA) and natural resource projects including preparation of environmental impact statements (EISs), environmental assessments (EAs), and critical issue evaluations for mining, power plants, wind energy and other large scale industrial developments. Association of Ground Water Scientists and Engineers B.S., Land Resources (Soil Science), Montana State University, 1982

NAME PROJECT ROLE	EDUCATION AND PROFESSIONAL EXPERIENCE
HAVEN WESTERMAN Environmental Scientist Tetra Tech	Ms. Westerman has over five years of experience performing natural resource investigations, including geographic information systems fieldwork, Phase I environmental site assessments (ESAs), permitting, and regulatory compliance. Tasks also include monitoring and sampling support for remediation sites. ASTM International Member B.S., Biology, Montana State University-Billings, 2002
LYNN PETERSON GIS Analyst Tetra Tech	Ms. Peterson has over 18 years of professional experience in the fields of anthropology and archaeology, conducting and directing all phases of cultural resource survey, testing and excavation of prehistoric and historic sites, supervising lab analysis of artifacts, and writing project reports. She is familiar with projectile point types and the cultural chronology of the Plains, the Great Basin and the Pacific Northwest. Ms. Peterson is also proficient at locating, recording, and evaluating National Register of Historic Places eligibility of cultural resources. She has authored or co-authored over 50 cultural resource reports and she has experience working with the Crow, Northern Cheyenne, Sioux, Blackfeet and Colville Tribes. Ms. Peterson also has several years experience as a GIS analyst and has worked on projects for the U.S. Forest Service and consulting firms in the private sector. Post-Baccalaureate GeoTechnology Certificate Program, Idaho State University, 2006 MS, Anthropology, University of Oregon, 1989 BA, Anthropology, California State University-Long Beach, 1983
GREGORY C. DAWDY Senior Environmental Scientist/Project Manager	Mr. Dawdy has over 20 years of experience in wetlands delineation/mitigation and permitting, sediment and surface water sampling, biological assessments, preliminary assessments, site investigations and remedial investigations/feasibility studies (RI/FS), Mr. Dawdy has served as project manager and project biologist for numerous wetland delineation/mitigation projects in Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Nebraska, Minnesota, Missouri, New York, North and South Dakota, Wisconsin and Wyoming. He has extensive experience performing water quality and aquatic biota surveys in Lake Michigan and the Mississippi, Illinois, and Ohio River systems. He has also served as field task manager, site safety and health officer and/or environmental scientist for numerous remedial investigations performed for various districts of the U.S. Army Corp of Engineers (USACE) under the Defense Environmental Restoration Program (DERP). Society of Wetland Scientists American Fisheries Society BS, Biological Studies, Southern Illinois University, 1985

12.0 REFERENCES

American Society of Mammologists. 2007. Mammals of North Dakota. http://www.mammalsociety.org/statelists/ndmammals.html. *Accessed:* 10 January, 2008.

Austin, J. E., and A. L. Richert. 2001. A comprehensive review of observational and site evaluation data of migrant whooping cranes in the United States, 1943–1999. U.S. Geological Survey, Northern Prairie Wildlife Research Center, Jamestown, ND. Northern Prairie Wildlife Research Center Online. http://www.npwrc.usgs.gov/resource/ birds/wcdata/index.htm (Version 01JUL2003).

Avian Power Line Interaction Committee (APLIC). 1996. Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996. Edison Electric Institute and the Raptor Research Foundation. Washington, DC. 125 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, DC. 78 pp.

Canadian Wildlife Service and USFWS (U.S. Fish and Wildlife Service). 2005. Draft Recovery Plan for the Whooping Crane. Ottawa: Recovery of Nationally Endangered Wildlife (RENEW), and USFWS, Albuquerque, New Mexico.

Dyke, S. 2004. North Dakota's 100 species of conservation priority: what are they? North Dakota Outdoors. http://gf.nd.gov/multimedia/ndoutdoors/issues/2004/jul/docs/species-intro.pdf

Energy Information Administration. 2006. West North Central Division Renewable Potential Map. Department of Energy. http://www.eia.doe.gov/emeu/reps/rpmap/rp_wnc.html. Retrieved 1/4/08.

Gomes, S. No date. Hawks, eagles, and falcons of North Dakota. North Dakota Game and Fish Department, Bismarck, ND. Northern Prairie Wildlife Research Center Online. http://www.npwrc.usgs.gov/resource/birds/hawks/index.htm (Version 16JUL97).

Grover, S. 2002. Economic Impacts of Wind Power in Kittitas County, Final Report. Funded by State of Washington Office of Trade and Economic Development and the Energy Foundation. ECONorthwest. Portland, OR. 20 pp.

Hagen, S. K., P. T. Isakson, and S. R. Dyke. 2005. North Dakota Comprehensive Wildlife Conservation Strategy. North Dakota Game and Fish Department. Bismarck, North Dakota.

Hill, J. E., and J. D. Smith. 1984. Bats: a natural history. University of Texas Press, Austin, USA.

Kunz, T. H., E. B. Arnett, W. P. Erickson, A. R. Hoar, G. D. Johnson, R. P. Larkin, M. D. Strickland, R. W. Thresher, and M. D. Tuttle. 2007. Ecological impacts of wind energy development on bats: questions, research needs and hypotheses. Frontiers in Ecology and the Environment 5:315-3

Lowitz, M, and C. J. Cleveland. 2007. Altamont Pass, California. Encyclopedia of Earth. Environmental Information Coalition, National Council for Science and the Environment, Washington, D.C., USA. http://www.eoearth.org/article/Altamont_Pass,_California

Mid-Continent Area Power Pool. 2007. Mid-Continent Area Power Pool Load and Capability Report, Final Draft. St. Paul, MN. pp. III3-III4.

NWCC. 2004. Wind Turbine Interactions with Birds and Bats: A Summary of Research Results and

Remaining Questions. Resolve, Inc., Washington D.C., 7 pp.

National Institute of Environmental Health Sciences EMF-RAPID Program Staff, 1999. NIEHS Report on Health Effects from Exposure to Power Line Frequency Electric and Magnetic Fields. Research Triangle Park, NC.

Neuweiler, G. 2000. The biology of bats. Oxford University Press, New York, New York, USA.

North Dakota Department of Health. Division of Water Quality. 2001. A Guide to Temporary Erosion Control Measures for Contractors, Designers, and Inspectors. http://www.health.state.nd.us/wq/WasteWater/pubs/BMPManual.pdf. Retrieved 1/16/07.

North Dakota Department of Transportation Planning and Programming Division. 2006 Traffic Volume Map.

North Dakota Game and Fish Department. 2008. Wildlife Management Area Guide. http://gf.nd.gov/hunting/wildlife.html. Retrieved January 2008.

North Dakota State Water Commission. 2008a. Map and Data Resources – Ground and Surface Water Data Query. http://www.swc.state.nd.us/4dlink2/4dcgi/wellsearchform/Map%20and%20Data%20Resources. Retrieved January 2008.

North Dakota State Water Commission. 2008b. Map and Data Resources – Query Water Permits. http://www.swc.state.nd.us/4dlink7/4dcgi/permitsearchform/Map%20and%20Data%20Resources Retrieved January 2008.

Northern Prairie Wildlife Research Center (NPWRC) 2006. Ecoregions of North Dakota and South Dakota. http://www.state.nd.us/gis/mapsdata/. Retrieved December 2006.

PanAero Corporation. 1999. Wind Energy in North Dakota Final Report. Division of Community Service, State of North Dakota. http://www.state.nd.us/dcs/energy/docs/windmark.pdf. Retrieved 1/4/07.

Swier, V. J. 2006. Recent distribution and life history information for bats of eastern South Dakota. Texas Tech University Natural Science Research Laboratory. Museum of Texas Tech University: Occasional Papers 264:1-19.

Tetra Tech EC, Inc. 2007. Critical Issues Analysis for the Proposed Ashtabula Wind Resource Areas, Barnes County, North Dakota. *Prepared for*: FPL Energy. *Submitted* October 2007.

Union of Concerned Scientists. 2006. Clean Energy – Production Tax Credit. http://www.ucsusa.org/clean_energy/clean_energy_policies/production-tax-credit-for-renewable-energy.html. Retrieved 1/2/2007.

U.S. Census Bureau. 2000. Profile of General Demographic Characteristics. Barnes County, ND; Noltimier Township, ND; Grand Prairie Township, ND; and Baldwin, ND. http://factfinder.census.gov/servlet. Retrieved 1/14/08.

USDA. 2002. Census of Agriculture – County Data. http://www.nass.usda.gov/Census/Pull_Data_Census. Retrieved 1/17/08.

USDA. NRCS Soil Survey Staff. Official Soil Series Descriptions. http://soils.usda.gov/technical/classification/osd/index.html. Retrieved 2/19/08.

USFWS. 1995. North Dakota's federally listed endangered, threatened, and candidate species - 1995. U.S. Fish and Wildlife Service, Bismarck, ND. Northern Prairie Wildlife Research Center Online. http://www.npwrc.usgs.gov/resource/wildlife/nddanger/index.htm (Version 16JUL97).

USFWS. 2003. Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines. Washington, D.C. Wind Turbine Siting Working Group. http://www.fws.gov/r9dhcbfa/wind.pdf.

USFWS. 2006. Mountain-Prairie Region, Endangered Species, North Dakota. Accessed September 5, 2007. Available online at http://www.fws.gov/mountain-prairie/endspp/CountyLists/NORTHDAKOTA.htm

USFWS. 2007. America's National Wildlife Refuge System. http://refuges.fws.gov/. Retrieved January 2007.

United States Geologic Survey. 2007. National Atlas of the United States – Bat Ranges. Reston, Virginia. http://nationalatlas.gov/natlas/Natlasstart.asp. *Accessed:* 10 January, 2008.

13.0 DEFINITIONS

ADT	Average Daily Traffic
ANSI	American National Standards Institute
APE	Area of Potential Effects
ASTM	American Society for Testing and Materials
Asynchronous Generator	A cage-wound generator, also called an induction generator, used to generate alternating current
BCA	Beaver Creek Archeology
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
Class I Cultural Resources Inventory	Existing data inventory – a large-scale review and compilation of known cultural resource data
Class II/III Cultural Resources Inventory	Field inventory to identify cultural resources that could be affected by project facilities within the Project Area
Aggregate Surface	Road cover used for proposed access roads
Commission or PSC	North Dakota Public Service Commission
CRP	Conservation Reserve Program
Corridor Certificate	Certificate of Corridor Compatibility
DA	Department of the Army
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
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Environmental Site Assessment
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FPL Energy	Florida Power and Light Energy
FPPA	Farmland Protection Policy Act
Ft	Foot/Feet
GE	General Electric
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
GFD	North Dakota Game and Fish Department
Hub	The central part of a circular object (as a wheel or propeller)
Interconnection	To be or become mutually connected
kV	kilovolt
kW	kilowatt
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
NESC	National Electric Safety Code
NDAC	North Dakota Administrative Code
NDCC	North Dakota Century Code
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
NWP	Nationwide Permit
O&M	Operations and maintenance facility
PII	Potential Impact Index
Pitch	The action or a manner of pitching; especially an up-and-down movement
PPA	Power Purchase Agreements
Project, the	Ashtabula Wind Energy Center
PSC or Commission	North Dakota Public Service Commission
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)
SHPO	North Dakota State Historic Preservation Office
Step-up Transformer	A transformer that increases voltage
Substation	A subsidiary station in which electric current is transformed
SWPPP	Storm Water Pollution Prevention Plan
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
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
UT	Unincorporated Township
WMD	Wetland Management District
WPAs	Waterfowl Protection Area
WUS	Waters of the United States
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

FIGURES

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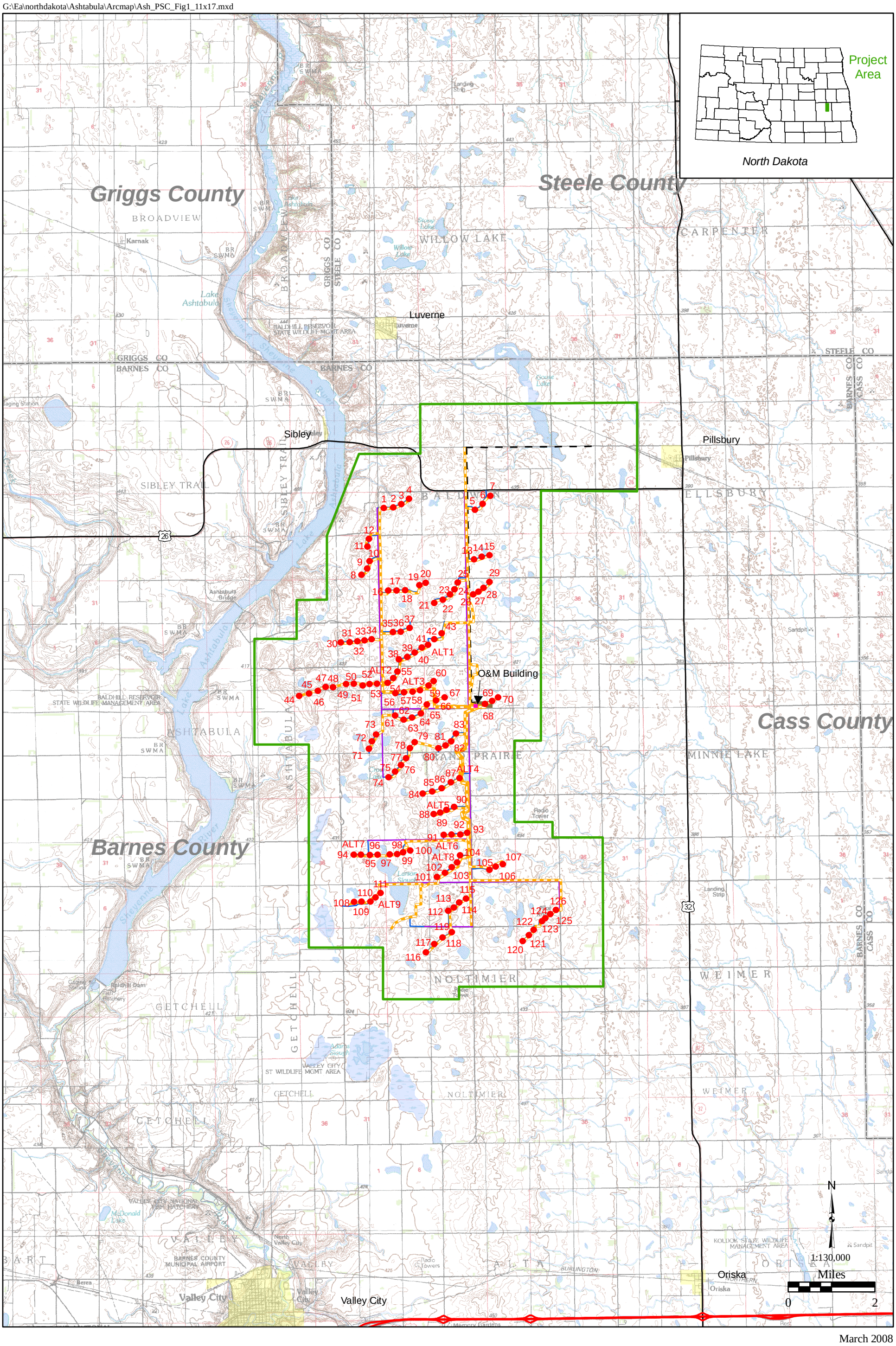

March 2008

Figure 1

Project and Vicinity Map - GE Turbine Array
Barnes County, North Dakota
Ashtabula Wind Farm

TETRA TECH EC, INC.

- GE Turbine Array (2-27-08)
- Access Road (12-30-07)
- Collection Line (12-30-07)
- Service Road (12-30-07)
- Transmission Line (2-19-08)
- Laydown Area
- O&M Building
- Substation
- Project Boundary (1 mile buffer)

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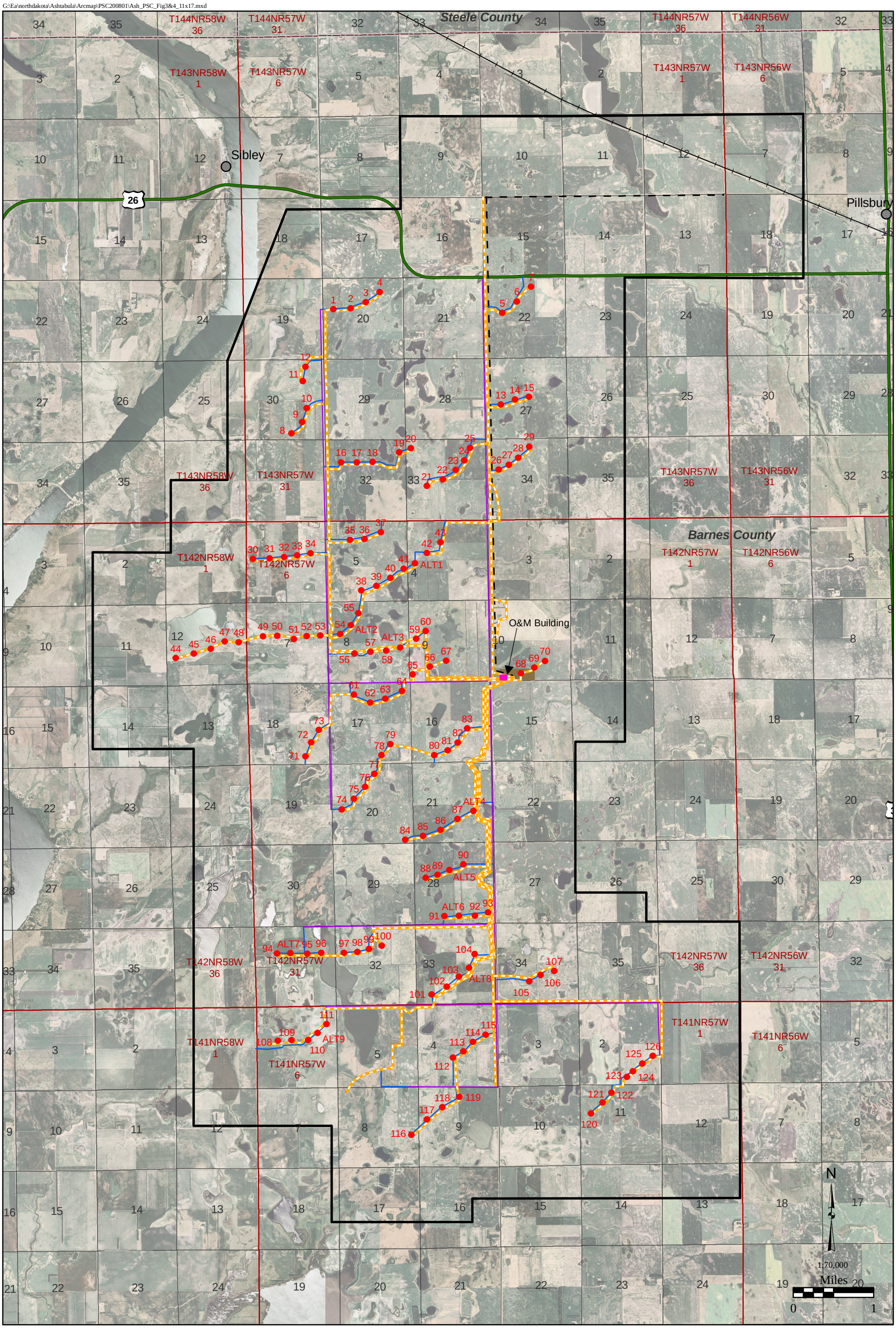

March 2008

Figure 2

Project Location Map (Aerial)
Barnes County, North Dakota
Ashtabula Wind Farm

TETRA TECH EC, INC.

- GE Turbine Location (2-27-08)
- Access Roads (12-30-07)
- Collection Line (12-30-07)
- Service Road (12-30-07)
- Transmission Line (2-19-08)
- Laydown Area
- O&M Building
- Substation
- Project Boundary

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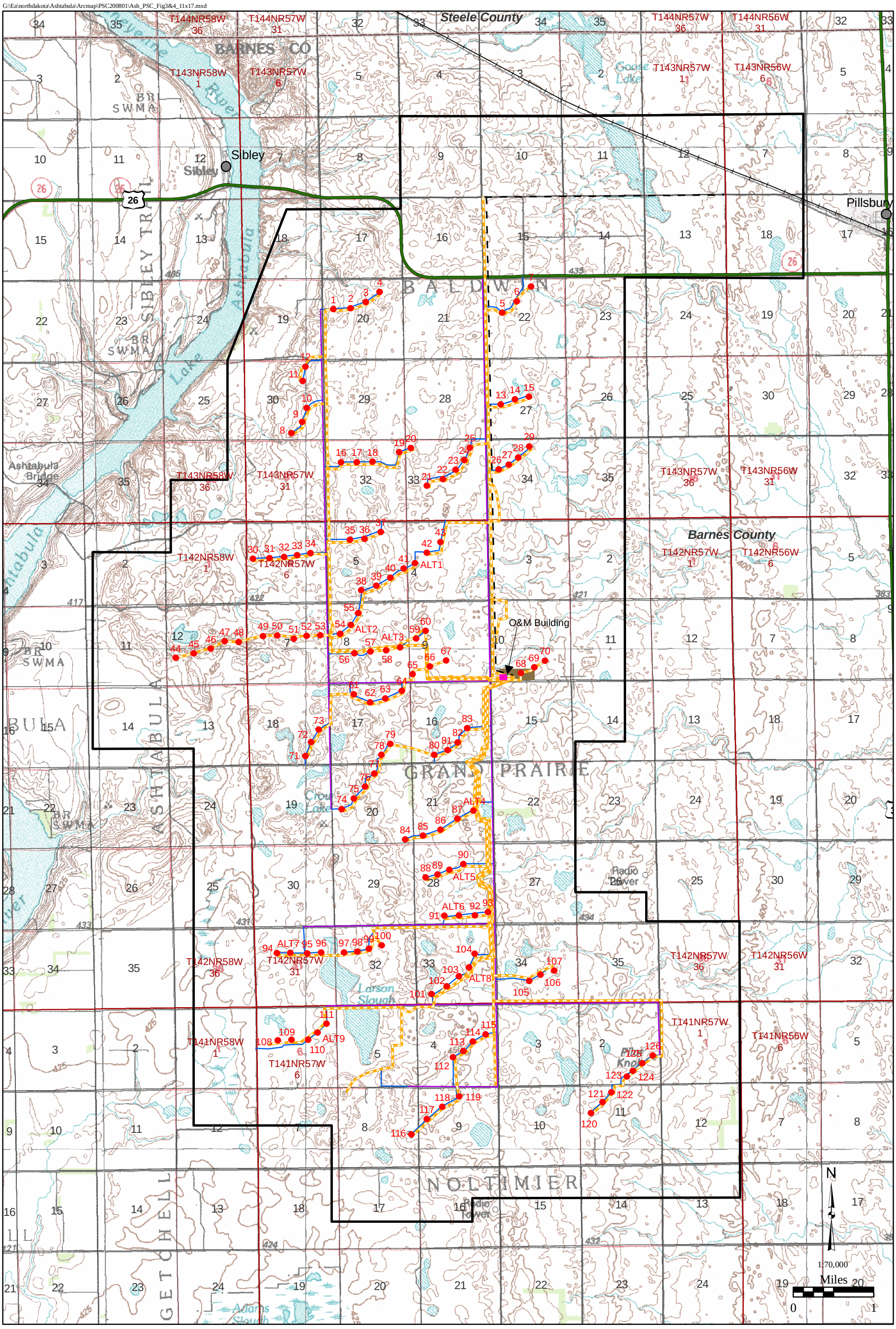

March 2008

Figure 3

Project Location Map (Topographic)
Barnes County, North Dakota
Ashtabula Wind Farm

TETRA TECH EC, INC.

- GE Turbine Location (2-27-08)
- Access Roads (12-30-07)
- Collection Line (12-30-07)
- Service Road (12-30-07)
- Transmission Line (2-19-08)
- Laydown Area
- O&M Building
- Substation
- Project Boundary

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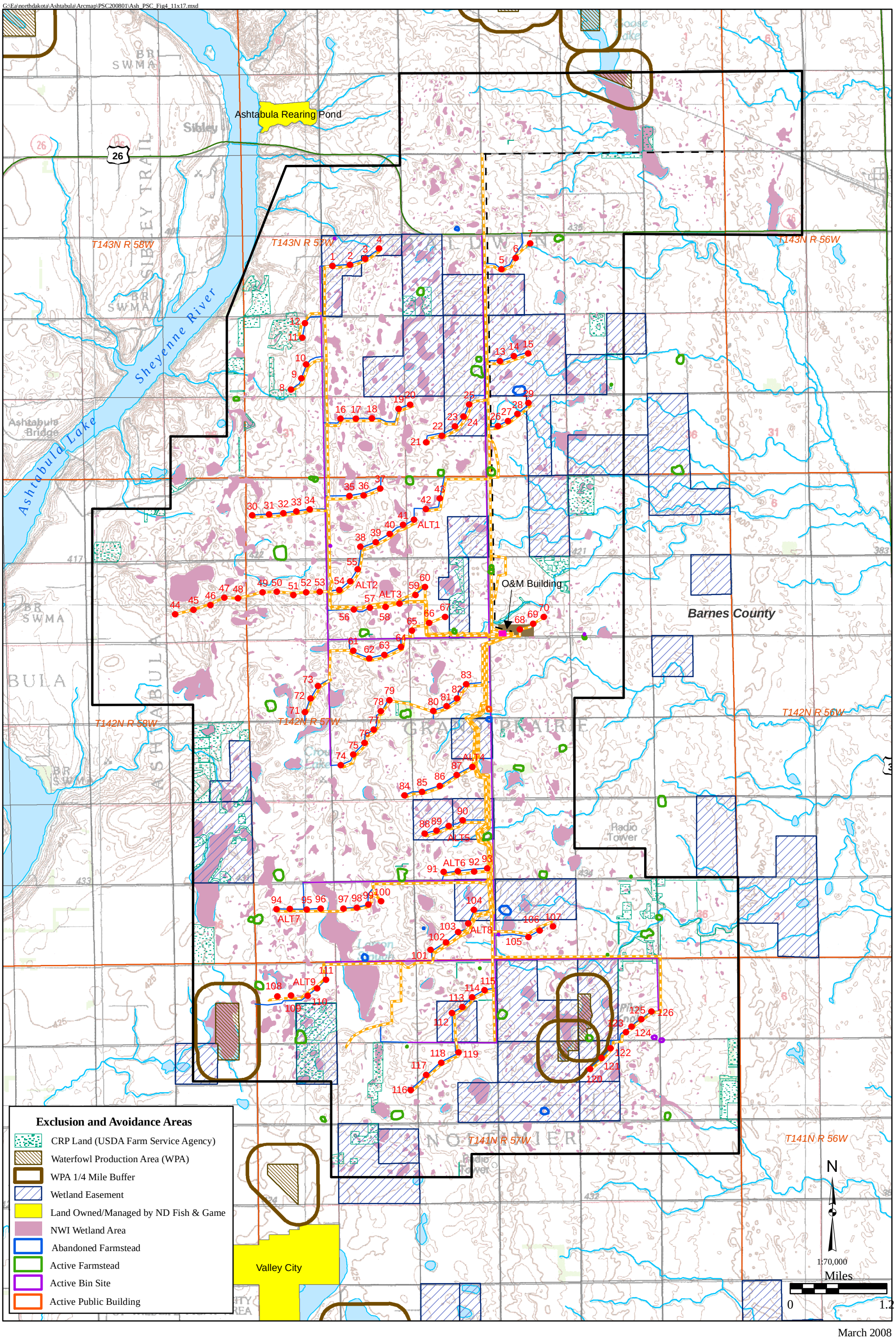


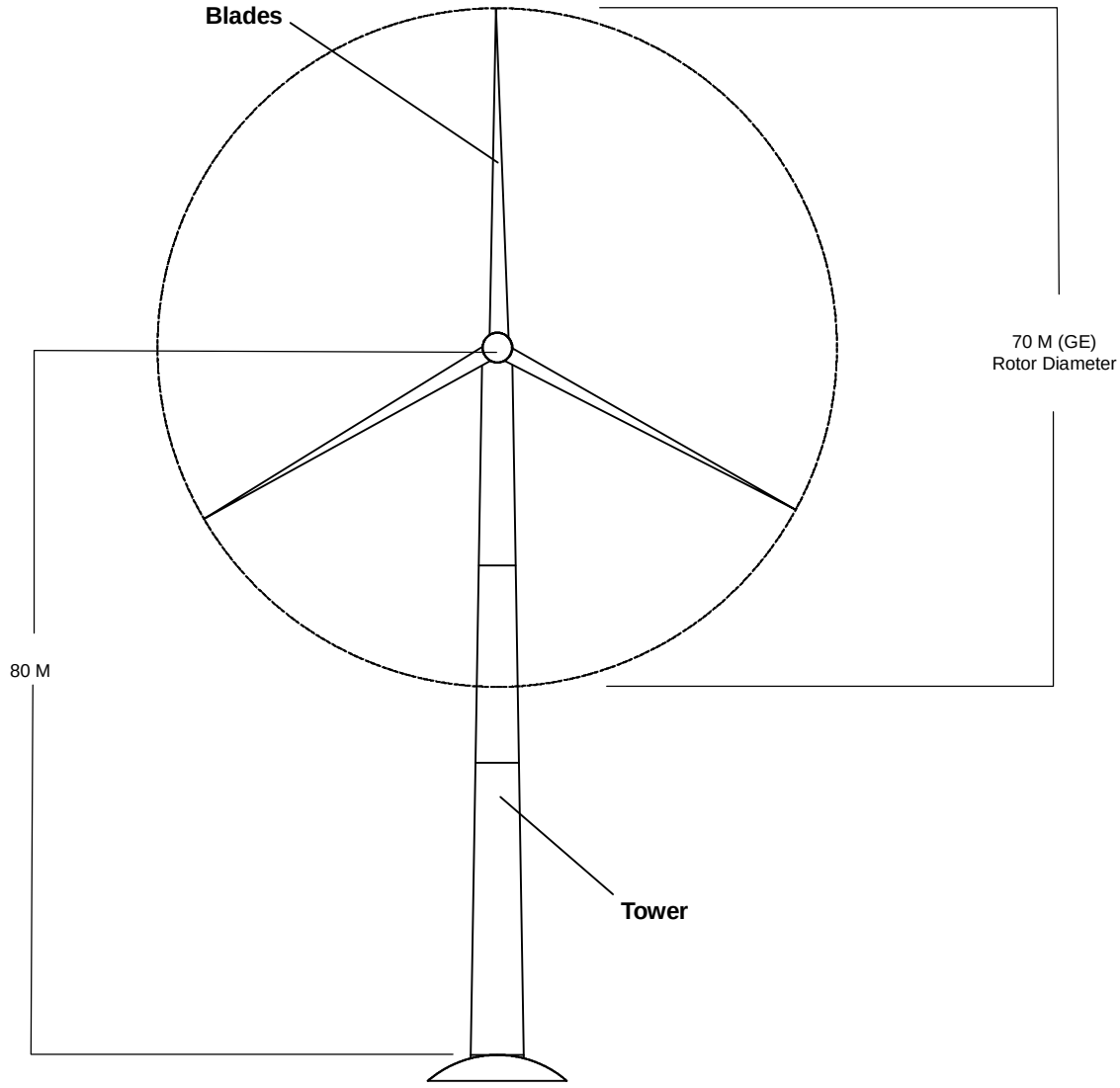
March 2008

Figure 4

Exclusion and Avoidance Areas
Barnes County, North Dakota
Ashtabula Wind Farm

TETRA TECH EC, INC.

GE Turbine Location (2-27-08)
Access Road (12-30-07)
Collection Line (12-30-07)
Service Road (12-30-07)
Transmission Line (2-19-08)
Laydown Area
O&M Building
Substation
Project Boundary



GE 1.5 MW Wind Turbine

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TETRA TECH EC, INC.

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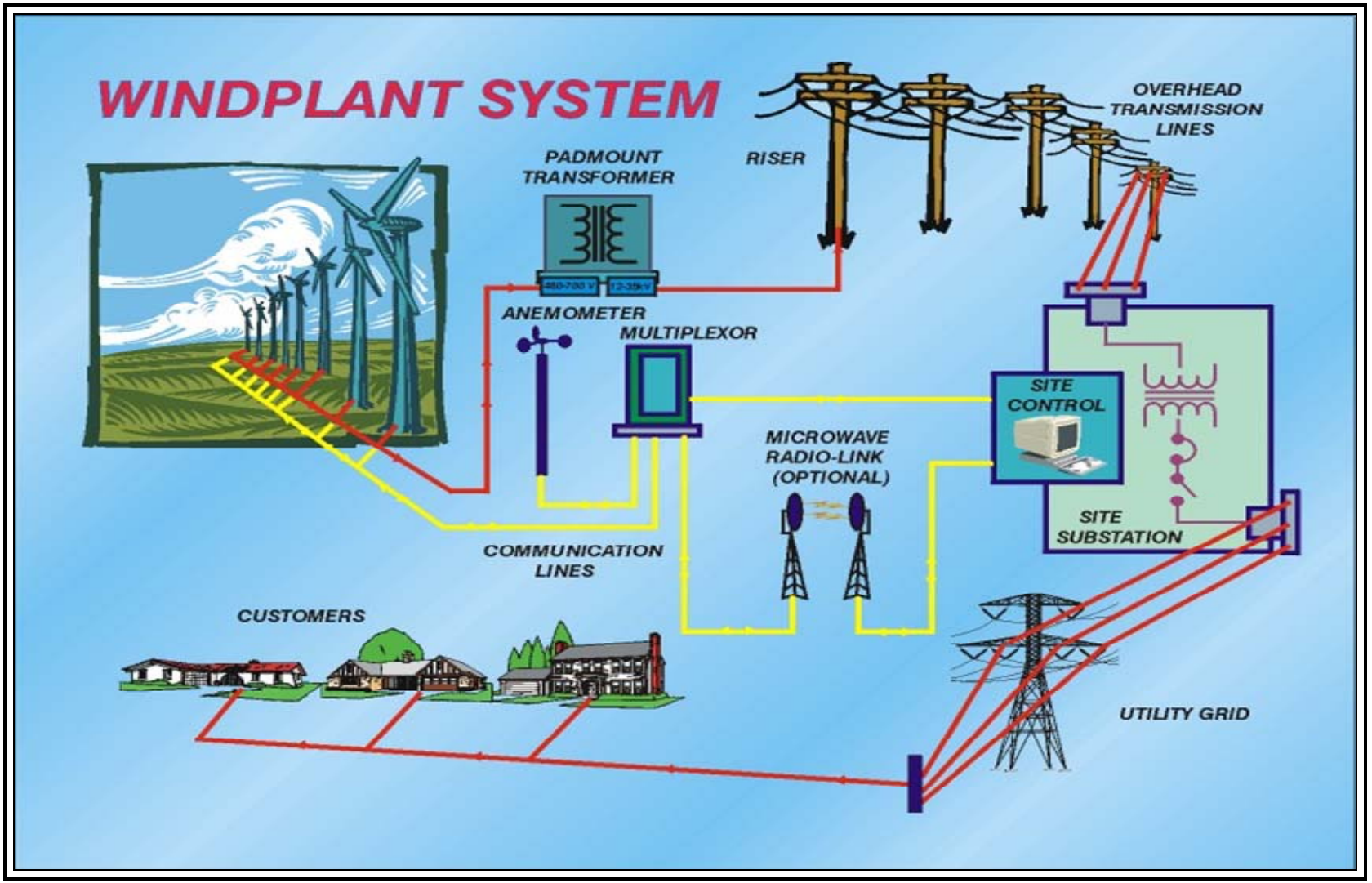
Figure 5

Wind Turbine Design Features
Ashtabula Wind Farm
Barnes County, North Dakota



TETRA TECH EC, INC.

Figure 6
Path of Energy Diagram
Ashtabula Wind Energy Center
Ashtabula Wind, LLC
Barnes County, North Dakota

TETRA TECH EC, INC.

Figure 7
Typical Wind Energy Center Layout
Ashtabula Wind Energy Center
Ashtabula Wind, LLC
Barnes County, North Dakota

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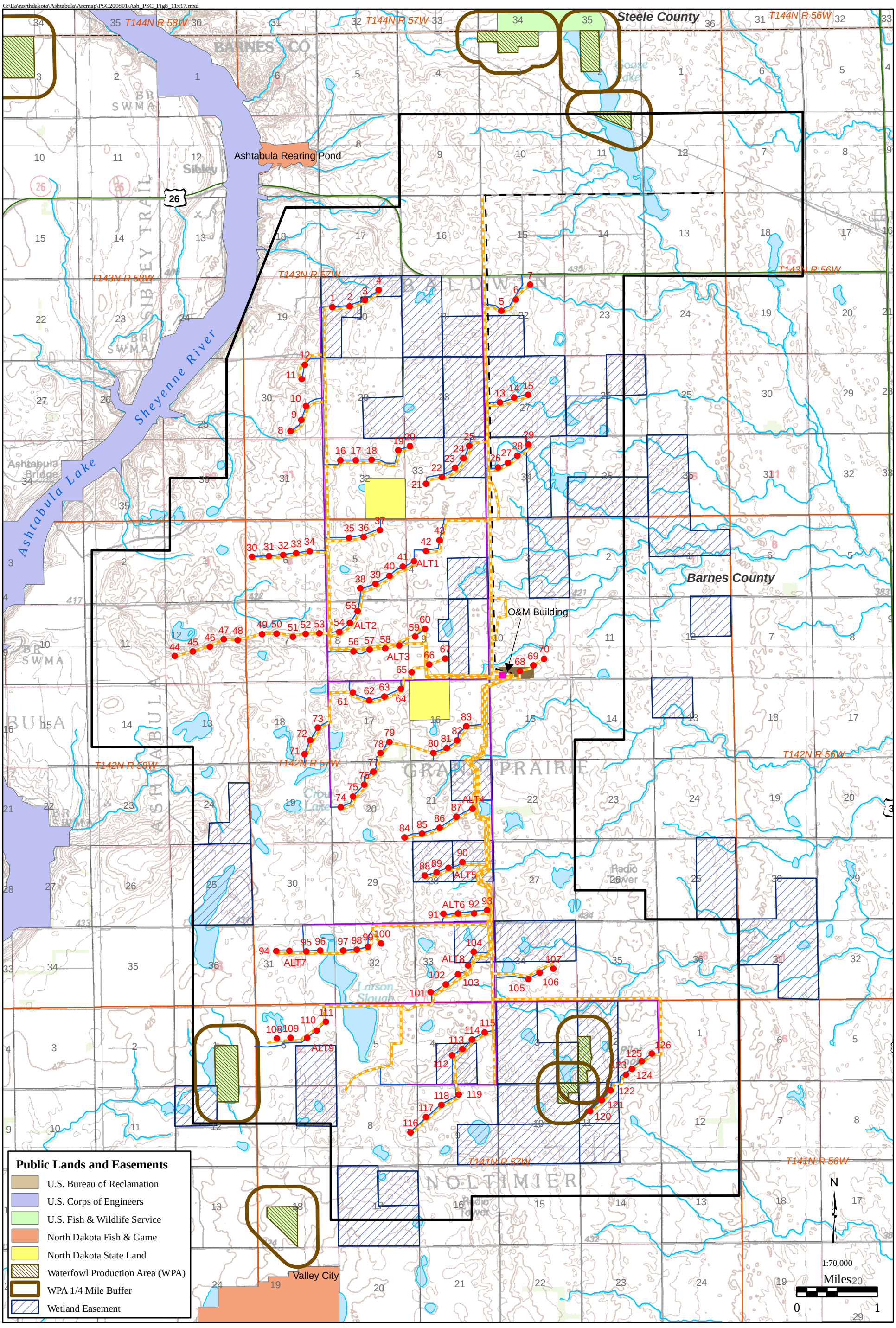

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Figure 8

Public Lands and Easements
Barnes County, North Dakota
Ashtabula Wind Farm

TETRA TECH EC, INC.

GE Turbine Location (2-27-08)
Access Road (12-30-07)
Collection Line (12-30-07)
Service Road (12-30-07)
Transmission Line (2-19-08)
Laydown Area
O&M Building
Substation
Project Boundary

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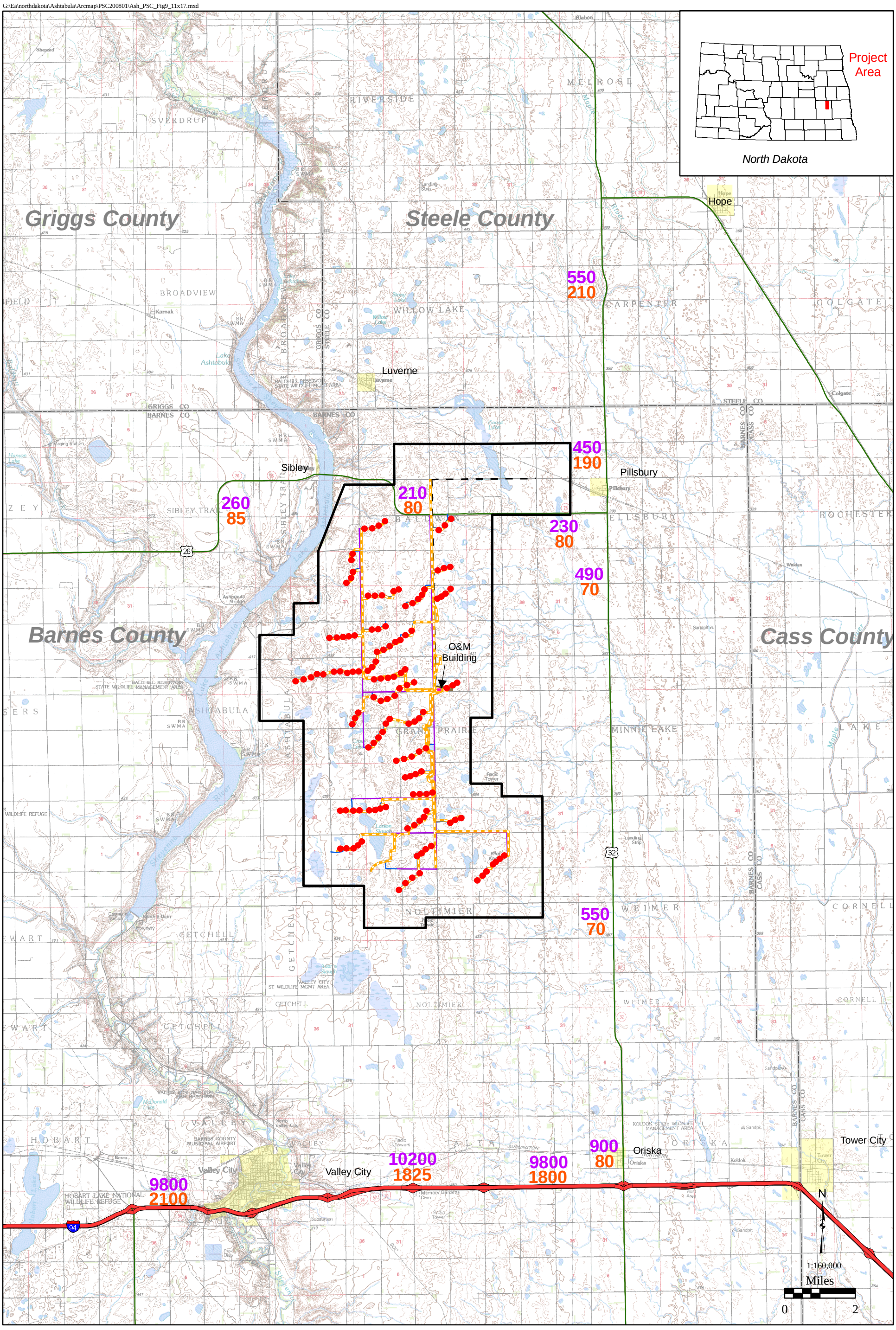


TETRA TECH EC, INC.

- GE Turbine Location (2-27-08)
- Access Road (12-30-07)
- Collection Line (12-30-07)
- Service Road (12-30-07)
- Transmission Line (2-19-08)
- Laydown Area
- O&M Building
- Substation
- Project Boundary

AADT Label

Average Annual Daily Traffic

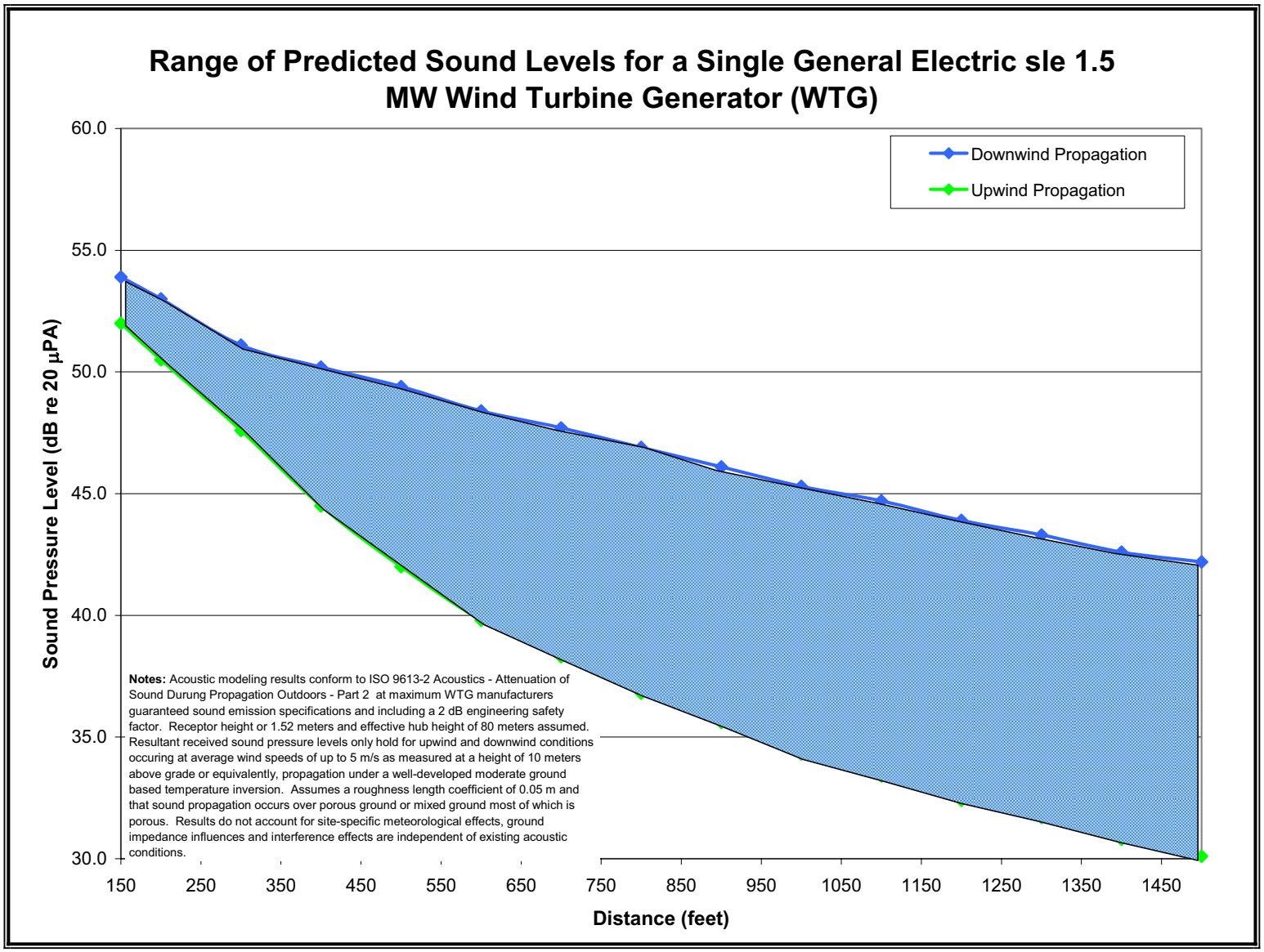
Commertial Truck Traffic

March 2008

Figure 9

Average Daily Traffic Map
Barnes County, North Dakota

Ashtabula Wind Farm



TETRA TECH EC, INC.

Figure 10
Predicted Range of Sound Pressure Levels for GE 1.5 sle (dBA)
Ashtabula Wind Energy Center
Ashtabula Wind, LLC
Barnes County, North Dakota

TETRA TECH EC, INC.

Figure 11
Photo of Typical Landscape
Ashtabula Wind Energy Center
Ashtabula Wind, LLC
Barnes County, North Dakota

TETRA TECH EC, INC.

Figure 12
Photo Simulation
Ashtabula Wind Energy Center
Ashtabula Wind, LLC
Barnes County, North Dakota

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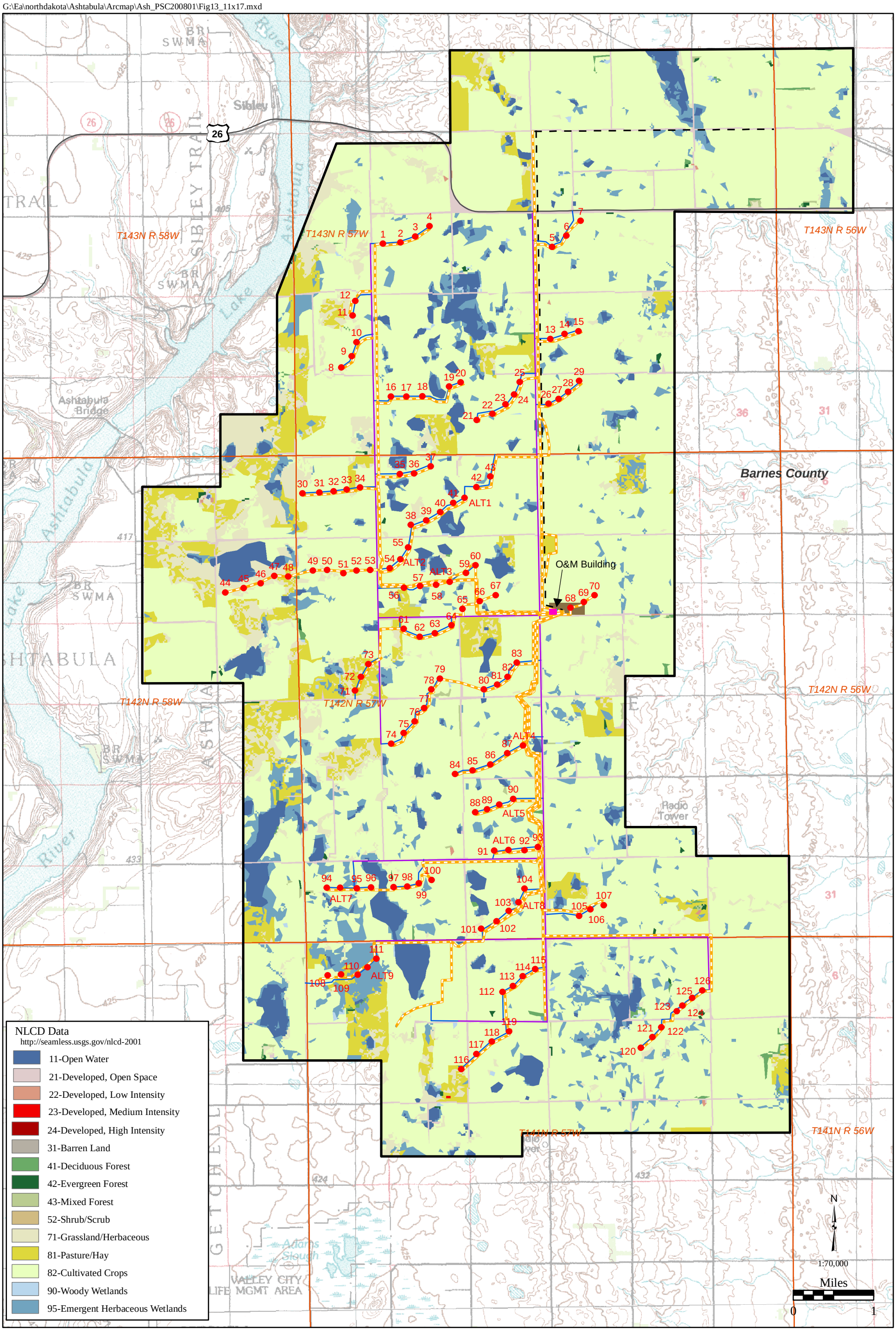

March 2008

Figure 13

Land Cover Map
Barnes County, North Dakota
Ashtabula Wind Farm

TETRA TECH EC, INC.

GE Turbine Location (2-27-08)
Access Road (12-30-07)
Collection Line (12-30-07)
Service Road (12-30-07)
Transmission Line (2-19-08)
Laydown Area
O&M Building
Substation
Project Boundary

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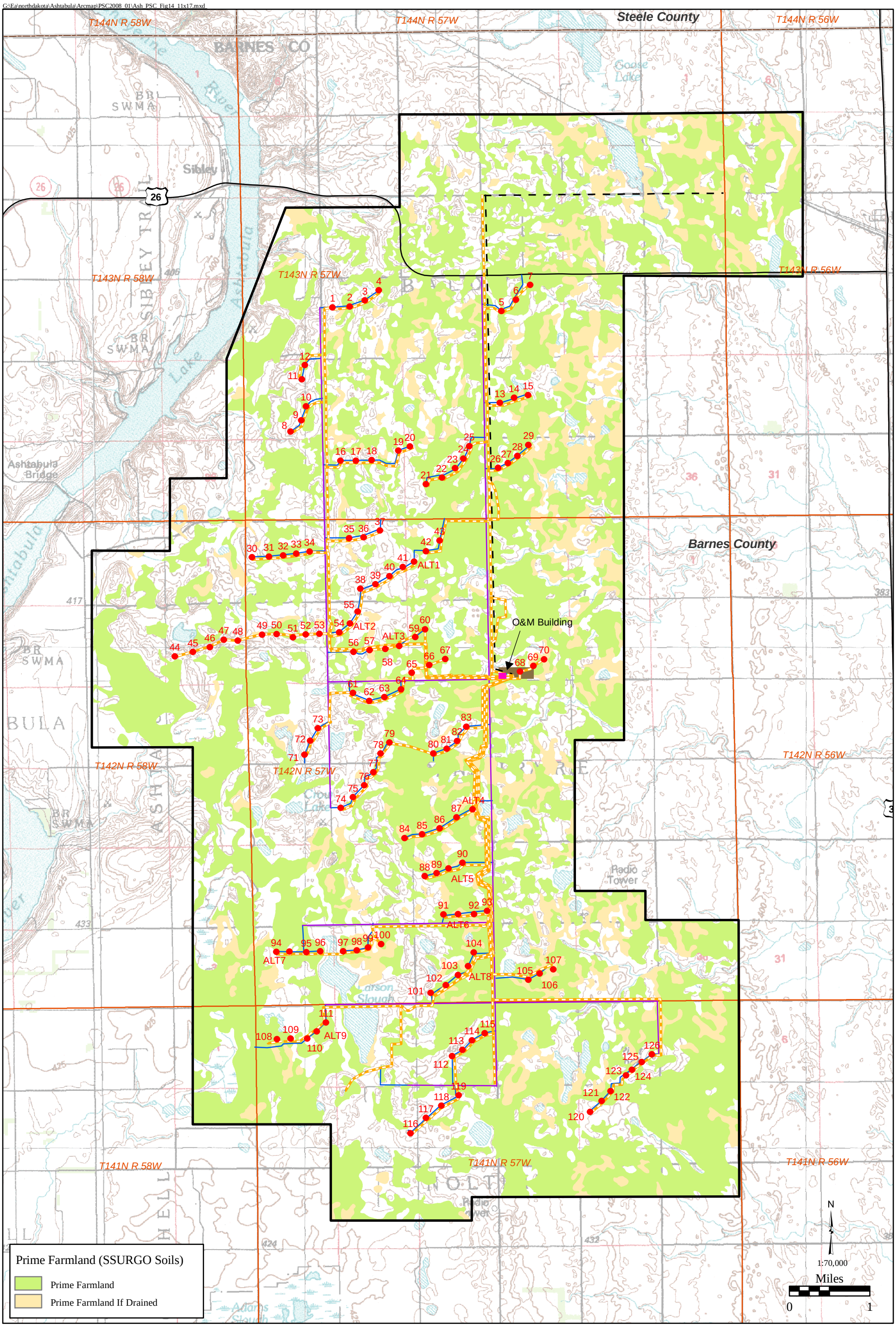

March 2008

Figure 14

Prime Farmland Soil Distribution Map
Barnes County, North Dakota
Ashtabula Wind Farm

TETRA TECH EC, INC.

- GE Turbine Array (2-27-08)
- Access Road (12-30-07)
- Collection Line (12-30-07)
- Service Road (12-30-07)
- Transmission Line (2-19-08)
- Laydown Area
- O&M Building
- Substation
- Project Boundary

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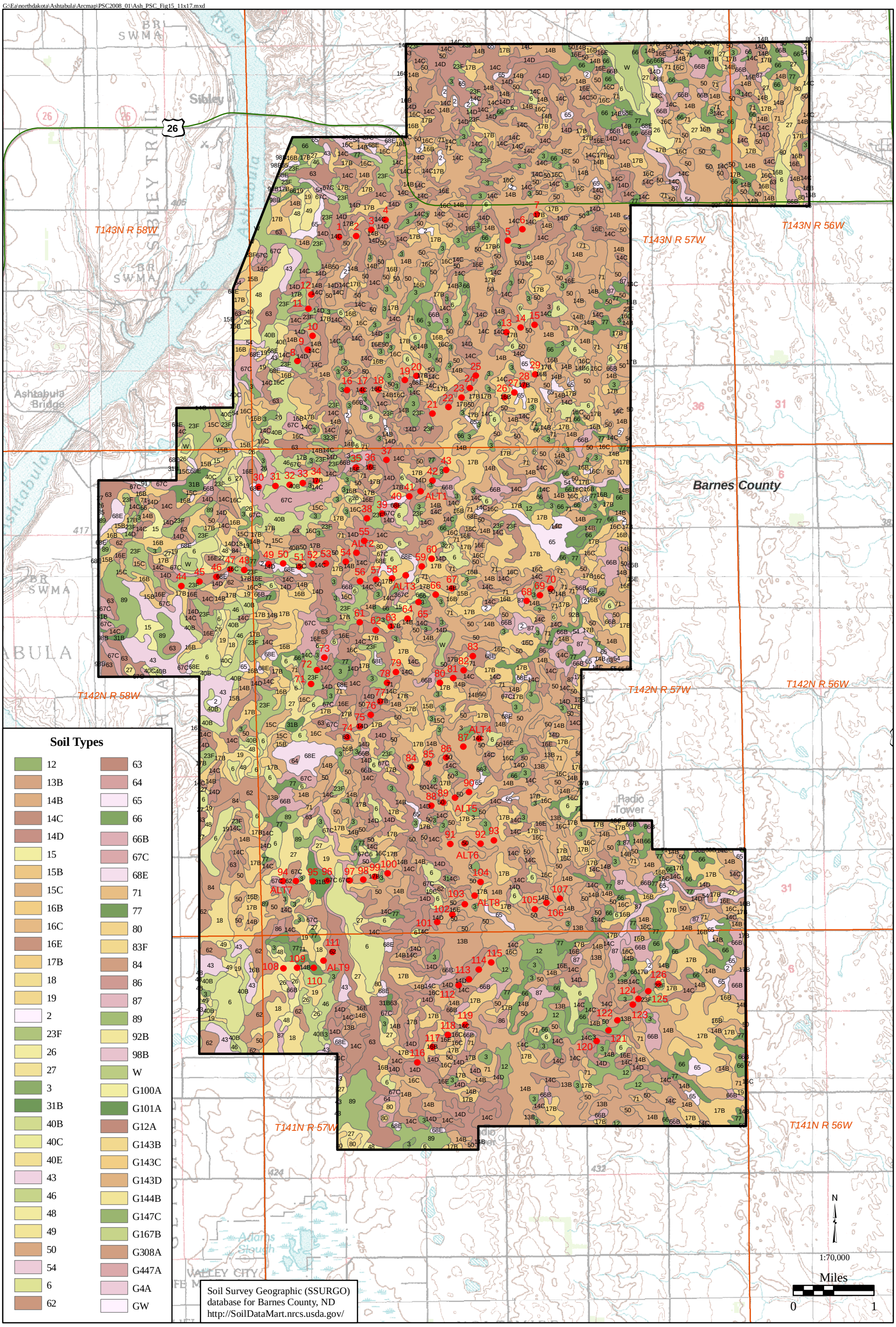

March 2008

Figure 15

State Soils Association Map
Barnes County, North Dakota
Ashtabula Wind Farm

TETRA TECH EC, INC.

GE Turbine Array (2-27-08)

Project Boundary

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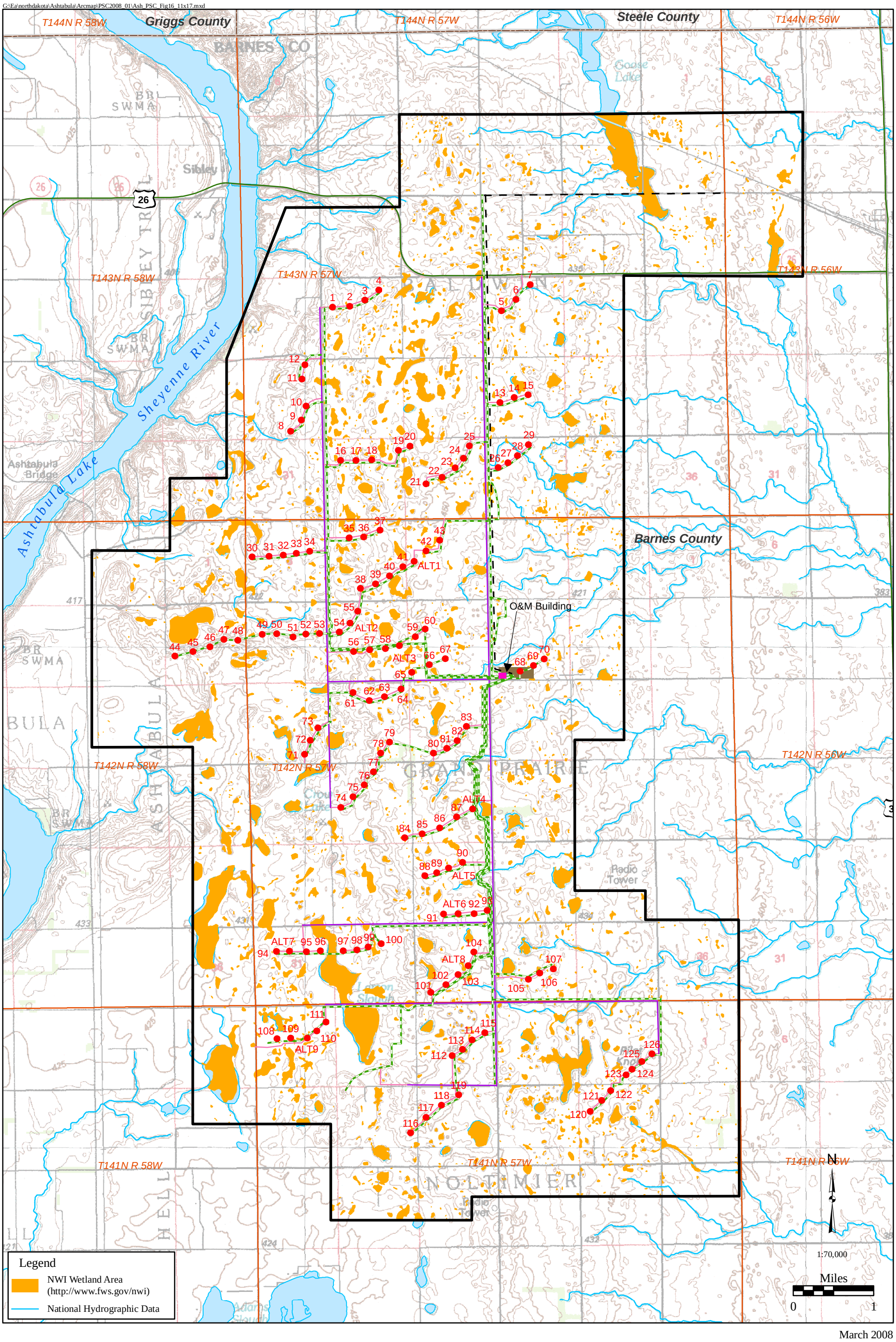


March 2008

Figure 16

National Wetlands Inventory and Surface Waters Map - Barnes County, North Dakota

Ashtabula Wind Farm

TETRA TECH EC, INC.

APPENDIX A

ASHTABULA WIND: *A Commitment to the Future*

A Commitment to the Future

Children are our future. The faces of our own employees' boys and girls are symbolic of FPL Group's commitment to sustainability as a framework for leading and managing the company's long-term success.

- A Message from the Chairman
- Profile
- Economic Accountability
- Environmental Stewardship
- Social Responsibilities

At FPL Group, one of the ways we've chosen to manage and measure our progress is by employing the concept of "sustainability." At its core, sustainability requires demonstrated attention to, and excellence in, three key areas: economic accountability, environmental stewardship and social responsibility. Following is a review of many of our strengths, activities and strategies, using the three elements of this sustainability concept as a framework.

We welcome your comments on this report and your thoughts on how we can continue our commitment to excellence in all aspects of our operation. Please e-mail your feedback.

A Message from the Chairman

The essence of a company's success is to achieve and sustain excellence in all aspects of its business. This is frequently referred to in today's corporate world as "sustainability," and it is a concept that we have strongly embraced at FPL Group for some time.

At its core, sustainability focuses on three key areas – the so-called "triple bottom line" that is the framework for reporting our performance against economic accountability, environmental stewardship and social responsibility.

More broadly, sustainability reflects our company's purpose, values and long-term approach to business. It requires us to take into account in our decision-making processes the needs of all our stakeholders – shareholders, customers, employees, business partners, governments, local communities and the public.

Under the umbrella of sustainability, we've shown that strong commitments to the environment and to the communities we serve are consistent with achieving outstanding operating and financial results.

By carefully balancing economic, environmental and social factors – and integrating them into our strategies and operations – we are working to make FPL Group a stronger, better and more responsible company.

Lew Hay, III
Chairman, President and Chief Executive Officer

Profile

FPL Group, Inc. is one of the nation's largest providers of electricity-related services and is nationally known as a high-quality, efficient and customer-driven organization. Its principal subsidiary, Florida Power & Light Company, serves more than 8 million people along the eastern seaboard and southern portion of Florida. FPL Energy, LLC, FPL Group's wholesale generation subsidiary, is a leader in producing electricity from clean and renewable fuels. Together, FPL's and FPL Energy's generating assets represent more than 30,000 megawatts of capacity. FPL FiberNet provides wholesale fiber-optic services and fiber-optic cable to Internet service providers and telecommunications companies in Florida.

Economic Accountability

FPL Group is highly regarded for its solid financial position, which is supported by a strong balance sheet, good cash flow, a balanced portfolio, excellent credit ratings and a disciplined approach to deploying capital.

Our financial strength sets us apart from many of our peers and provides a competitive advantage. With regard to the company's economic accountability, two characteristics stand out as integral to our success.

First, we have a strong commitment to integrity, personal accountability and openness, and this is supported by our outstanding record in corporate governance.

Second, there is throughout our company a deeply ingrained drive for continuous improvement and operational excellence.

FPL Group
Continuing to Perform Well

Today's dynamic electric industry is one of ongoing challenge and opportunity. Changes in customer preferences, regulation, industry structure and technology — to name just a few areas where transformation is occurring — call for innovative strategies, teamwork and sound execution.

Amidst this dynamic market environment, FPL Group recorded another year of outstanding performance.

- FPL Group generated an impressive 18.7 percent total shareholder return in 2004. In addition, we have outperformed our peers and industry over the last three-year and five-year periods.
- Net income, using generally accepted accounting principles, was $887 million or $2.45* per share in 2004, compared with $890 million or $2.50* per share in 2003. Notably, we estimate that the hurricanes had a negative 7 cents* per share impact on earnings.
- FPL Group's adjusted net income, which excludes the net unrealized mark-to-market effect associated with non-qualifying hedges and, in 2003, the cumulative effect of a change in accounting principle at FPL Energy (FIN 46), was $890 million or $2.46* per share in 2004, compared with $871 million or $2.45* per share in 2003. (See Financial Highlights for a reconciliation of net income to adjusted earnings and earnings per share to adjusted earnings per share).
- As anticipated, 2004 saw our free cash flow profile shift to positive. Considering the negative impact of the hurricanes of 2004, the company considers this a great achievement. Moreover, this trend was an important factor in the Board's decision to make a mid-year adjustment to our dividend. Combined with the February 2004 increase, the July 2004 increase provided a 13 percent increase in the quarterly dividend. Our dividend payout ratio and yield are now more in line with some of our peers while still providing us financial flexibility to invest in profitable growth opportunities.

Business Review and 2004 Performance

Both of our businesses have unique strengths and had outstanding years in 2004.

- Florida Power & Light Company is one of America's largest and best performing electric companies. With more than 4.2 million customers, FPL continued during 2004 to benefit from rates of growth in our customer base that are among the highest of any large electric company. Beyond restoring electric service and rebuilding portions of our electric system in the wake of Hurricanes Charley, Frances and Jeanne, FPL in 2004 continued the historical outstanding operational and cost performance that places us among the best in our industry.
- FPL Energy is a disciplined wholesale generator and a leading clean energy provider. During 2004, we continued to build on our strength as a low-cost provider, maintained operational excellence, optimized our asset portfolio, leveraged our position as the U.S. market leader by a large margin in wind power generation and continued carefully managing all forms of risk. We continued our pattern of strong earnings (despite a major contract restructuring described in more detail in the FPL Energy section), and over the last five years we have achieved average annual growth in adjusted earnings per share at FPL Energy of approximately 23 percent (see Financial and Operating Statistics for reconciliation of earnings per share to adjusted earnings per share).

Key Corporate Attributes and 2005 Outlook

A number of key attributes continue to form the cornerstones of FPL Group's success and provide reason for continued confidence in our prospects for 2005 and beyond.

- We continue to maintain financial strength, flexibility and discipline — hallmarks of this company for many years. Our credit ratings are among the best in our industry when compared to other large electric power companies.
- We have long been committed to integrity and accountability in all aspects of our business. Most recently, for example, in compliance with the Sarbanes-Oxley Act we have undergone a comprehensive assessment and testing of our internal controls to ensure their effectiveness. Taken together, in fact, our corporate governance practices continue to be rated among the best in industry by third-party observers.
- We have a demonstrated track record of strong performance. Our earnings growth has been steady, and our operating performance on a variety of metrics is among the best in our industry.
- We are a clean energy company and are committed to continued success in managing our operations with sensitivity to the environment. This could be a major competitive advantage for us in the future, especially if new environmental laws are enacted that recognize the investments FPL Group has already made in clean and renewable energy relative to many of our peers.
- Going forward, we have attractive growth prospects. We expect continued growth in customers and usage at FPL, in our U.S. market-leading wind generation business at FPL Energy and in other areas served by FPL Energy as certain wholesale power markets continue to recover.
- All this adds up to projected earnings per share in 2005, after the effect of the two-for-one stock split, of $2.50 to $2.60 (see **also 2005 Projected Earnings per Share Contribution).**

*Note: Per share information reflects the effect of the two-for-one stock split, effective March 15, 2005, of FPL Group's common stock.

Financial Highlights

Florida Power & Light
Serving a Fast-growing State

During an extraordinary year, Florida Power & Light Company demonstrated once again why it is so widely regarded as one of the nation's outstanding electric companies.

Despite an unprecedented series of devastating hurricanes that swept through its service area (see Restoring Power, Restoring Lives), FPL continued to achieve the high levels of performance that are a hallmark of the organization. At the same time, the ongoing customer growth that has set the utility apart from virtually all of its peers — and made it one of America's largest providers of electricity — continued to accelerate.

FPL added an average of 107,000 new customer accounts in 2004, the most since the late 1980s and a 2.6 percent increase over the previous year. Although the hurricanes clearly had a dampening impact on customer growth during the later part of the year, the company is optimistic that the effect will be moderate and not affect long-term growth. Florida's population continues to increase at a greater rate than any other large state.

In addition, Florida created the most jobs in the nation in 2004. Although the state's population is 6 percent of the nation's population, it created 12 percent of the new jobs during the year.

Since the beginning of 2002, the year in which FPL's current rate agreement went into effect, FPL has increased its electric generating capacity by more than 2,300 megawatts, at a cost of over $1.2 billion, and invested more than $1.9 billion in power delivery facilities. This has allowed the company to meet the energy demands of nearly 300,000 additional customer accounts while maintaining an adequate reserve margin for all FPL customers.

In 2004, expansion projects at FPL's Martin and Manatee power plants continued on track for completion later this year, adding 1,900 megawatts of generating capacity, or enough power to serve about 400,000 customers.

The company also received approvals to build a 1,150-megawatt natural gas-fired power unit at its existing Turkey Point site south of Miami. This will help FPL meet the rapidly increasing demand for electricity in Southeast Florida. Construction began in March 2005 with a projected 2007 completion. Beyond that date, growth forecasts indicate that FPL will need to add the equivalent of three 1,150-megawatt power plants over the next five years.

Growth, Higher Costs Drive FPL to Seek Increase in Base Rates

Continued and long-term growth in FPL's service area will require not only extensive investments in new generation, but in the utility's power delivery system as well. Siting new plants and gaining approvals for additional transmission routes, particularly in well-established and highly populated areas, will present challenges.

Generating resources are currently being added at three times the rate of previous years, and capital expenditures for power delivery are expected to average approximately $700 million a year going forward. In addition, although its costs are significantly below the industry average, the company is facing higher operating costs and making significant investments to maintain its nuclear units in top shape.

FPL's revenue sharing agreement with the Florida Public Service Commission ends Dec. 31, 2005. In January 2005, the company notified the Commission that it intends to seek an increase in its retail base rates and initiate what would be — barring a negotiated settlement — its first full base rate case since 1984. During the rate case, the PSC staff and commissioners will examine in depth FPL's operations and revenue needs. A final

decision on FPL's request for a base rate increase is expected in November 2005. If approved, it would be the first increase in FPL's base rates in more than 20 years.

The current residential base rate is 16 percent lower than when base rates were last increased in 1985. Since that time, FPL has added approximately 1.6 million customers and spent more than $17 billion in capital investments. Since 1999, base rates have been reduced twice, providing savings to customers totaling nearly $4 billion, including revenue sharing refunds. The reductions were possible due largely to FPL's increased productivity and more efficient operations, which has allowed the utility to establish itself as a low-cost provider of high quality electric service.

*Represents compound annual growth rate through periods shown. Industry source: Energy Information Administration

FPL's successful cost-management efforts have enabled it to maintain costs well below the industry average. In 2004, even as expenses continued to rise in such areas as insurance and security requirements, the company's operating and maintenance (O&M) costs of 1.24 cents per retail kilowatt-hour were slightly lower than the previous year and were approximately 31 percent below the industry average. Over the next several years, however, FPL expects increased upward pressures on O&M expenses, along with smaller incremental gains in productivity, while customer growth and energy usage continue to rise.

As a result, after many years, FPL believes an increase in retail base rates now is necessary to ensure that it can continue to provide reliable, cost-effective electric service at levels its customers have come to expect and that are consistent with the company's past record of performance.

FPL Energy
A Leading Clean Energy Provider

FPL Energy, the wholesale generating subsidiary of FPL Group with a growing presence in 24 states and more than 11,500 megawatts of generation assets in operation, experienced an exceptional year in 2004. By continuing to maximize the value of existing assets and capitalizing on its U.S. market-leading wind portfolio, the company further strengthened its position as one of the nation's leading low-cost wholesale energy providers.

Despite less than favorable conditions in the wholesale energy sector, FPL Energy has achieved average annual growth in its contribution to adjusted earnings per share of approximately 23 percent over the past five years. (See Financial and Operating Statistics for reconciliation of earnings per share to adjusted earnings per share.) During this time, the company has successfully added to its asset base and expanded its capabilities, while at the same time effectively managing risk.

In 2004, FPL Energy benefited from the integration of approximately 1,000 megawatts of wind projects placed into service in 2003. Other factors contributing to the company's performance included improved wholesale market conditions in New England and the absence of an outage at Seabrook. Losses from restructuring activities and higher interest expense negatively impacted FPL Energy's results.

Because of the above-listed factors, FPL Energy was able to take important strategic actions in 2004 that, while collectively having a negative impact on short-term financial results, will benefit the company and FPL Group shareholders in the longer term. As a result, the company's reported financial results obscured to some degree what was perhaps its best year ever. In addition, FPL Energy's performance was stronger than may be apparent because it was achieved despite a year of below-average wind resources, which negatively impacts the performance of its wind fleet.

Foremost among the items affecting FPL Energy's reported earnings was the restructuring of a steam contract related to the Marcus Hook power facility in Pennsylvania, which resulted in a charge against earnings of $48 million after tax. The transaction is expected to improve both cash flow and net income going forward. The 744-megawatt plant, which entered service at the end of 2004, was the company's last fossil-fueled merchant facility under construction.

FPL Energy has a proven record of accomplishment in contract restructurings and, as market conditions change, it seeks out opportunities to modify or restructure existing power sales or fuel contracts. In 2004, the restructuring of a power and gas contract allowed FPL Energy to reduce operating costs. This is expected to provide the company with significant positive financial benefits for many years to come.

*Per share information reflects the effect of the two-for-one stock split, efffective March 15, 2005, of FPL Group's common stock. See Financial and Operating Statistics for reconciliation of earnings per share to adjusted earnings per share.
Effective portfolio management and a continuous evaluation of assets also are important factors in FPL Energy's success. This was reflected in 2004 with the sale of the company's 50 percent interest in the 566-megawatt Bastrop Energy Center in Texas and a waste wood power facility in Virginia.

FPL Energy further solidified its position as one of America's leading clean energy providers in January 2005 with the purchase of a 45 percent ownership interest in 150 megawatts of solar power generation in California. The acquisition makes FPL Energy the largest generator of solar power in the U.S. with 310 megawatts.

Power Marketing Grows Business

Adding to its outstanding operating performance, FPL Energy continued to expand its capabilities and product offerings to customers in 2004, allowing it to open up new markets and generate new sources of revenue. One of the growth areas for power

marketing is "load-following" sales, in which FPL Energy is responsible for meeting the hourly variation in energy demands. After developing its load-following capability in the Northeast, FPL Energy applied its load-following expertise to the Texas market in 2004.

FPL Energy also continued to successfully hedge against commodity price fluctuations. The company's objective is to have roughly 75 percent of capacity hedged for the next 12 months. At the end of 2004, approximately 78 percent of FPL Energy's entire portfolio was hedged. More than 85 percent of the company's expected gross margin from its wholesale generation fleet is now protected against fuel and power market volatility.

FPL Energy's keys to success for 2005 and beyond are to continue to grow its wind business and remain a low-cost provider, while maintaining its world-class operational performance. In addition, the company remains focused on further optimizing its merchant portfolio and managing effectively, on a daily basis, the risks in its business.

Financial and Operating Statistics

Financial Statements

Underlying the business operations at FPL Group is a solid financial position. The company maintains a strong balance sheet, good cash flow and a disciplined approach to deploying capital.

Credit Ratings

FPL Group's credit ratings are among the best in its industry when compared to other large electric power companies.

Management's Report on Internal Controls over Financial Reporting

Governance

Our corporate governance practices continue to be rated among the best in the industry by third-party observers:

Institutional Shareholder Services, a leading independent appraiser of corporate governance, ranked FPL Group in the top 20 percent both in our industry and in the S&P 500.

Another rating organization, GovernanceMetrics International, ranked FPL Group well above average in corporate governance with a score of 9.0 out of 10 possible points, again placing us well above average as compared to other U.S. companies and better than most energy producers. Our goal is to raise the bar even further.

- Chairman's Statement
- Principles and Guidelines

- Officers
- Board Structure
- Directors & Officers Stock Ownership

Policies

- Bylaws
- Articles of Incorporation
- Certifications
- Code of Ethics for Senior Executives and Financial Officers
- Code of Business Conduct and Ethics
- Securities Trading by Company Personnel
- Stock Ownership by Officers

Committee Charters

- Audit
- Compensation
- Governance & Nominating
- Finance & Investment

Investors

- Financial News
- Presentations
- Financial Reports
- Quarterly Reports
- SEC Filings
- Dividend History
- Fundamentals
- Event Calendar
- Analyst Coverage
- Printed Materials

Sarbanes-Oxley Act

A major aspect of corporate governance activities involves implementing the Sarbanes-Oxley Act. This legislation is part of the government's response to the scandals and mismanagement uncovered at Enron, World Com and other companies over the past few years.

Although FPL Group voluntarily adhered to the spirit of Sarbanes-Oxley long before it and other new federal policies requiring specific compliance actions went into effect, the company nonetheless took action as required by the new laws.

Under what is known as "Section 404" of the Act, we performed a very careful and comprehensive examination of our underlying controls processes and objectives and completed documentation of our processes. This initiative confirmed our belief that we have excellent management controls in place at FPL Group.

Section 302 of Sarbanes-Oxley deals with personal accountability and holds senior officers responsible for the completeness and accuracy of financial information. Since 2002, FPL Group's chairman and the chief financial officer have personally certified the completeness and accuracy of our annual and quarterly reports. Additionally, each of our business unit leaders signs the same certifications.

Commitment to Quality

FPL Group is widely regarded as a high performance organization with a commitment to quality and continuous improvement that is deeply ingrained in our company's culture. As a result, we are among the top performers in key industry metrics.

This is reflected by our superior results in such divergent and critical areas as power plant availability, electricity reliability, operating and maintenance costs, and employee safety.

For example, FPL Group's "best practices" approach has lead to its industry-leading positions in power plant availability – among the highest in the industry; our fossil-fuel plant availability stood at 93.7 percent in 2004, our wind facilities at more than 97 percent, and our nuclear facilities at 99 percent, well above the industry average – and cost containment – operating and maintenance expenses as measured in dollars per customer remained at 42 percent below the industry average. This expertise is shared among FPL Group facilities in Florida (where they are part of a regulated utility) and facilities operated by FPL Energy in other parts of the country.

In addition, since launching an aggressive program in 1997 to improve electric reliability, FPL has achieved outstanding results. The annual average amount of time customers are without power has been reduced by nearly 50 percent, and the frequency and duration of outages have declined as well. Excluding hurricane-related outages, the average number of minutes that FPL customers were without power during 2004 was about half that of the most recent industry average.

By regularly benchmarking our processes and performances against the best of our peers, we are able to identify opportunities in these and other important areas for additional improvements and to further improve our bottom line.

The company's quality "roots" date back to the early 1980s and the establishment of quality improvement teams. In the mid-80s, a total quality management system based on the TQM practiced in Japan was implemented company wide. Because of this innovative program, FPL was awarded the prestigious Deming Prize in 1989, the first company outside of Japan ever to be so honored by the Union of Japanese Scientists and Engineers.

Learn more about FPL Group's quality commitment by visiting the topics in the list below.

- Current Quality Practices
- Quality Awards and Recognition
- The James L. Broadhead Award
- Benchmarking Opportunities

Clean energy is a focus of our business strategy. The vast majority of the power we generate is derived from clean and renewable fuels. In fact, we're the world leader in wind power, and we continue to invest in the development of new sources of energy designed to safeguard the environment for years to come.

Environmental Stewardship

We believe that meeting our customers' demand for electricity must go hand-in-hand with preserving, protecting and enhancing the environment.

As a result, our company is committed to complying with the spirit and intent, as well as the letter of all environmental laws, regulations and standards.

We incorporate environmental protection and stewardship as an integral part of the design, construction, operation and maintenance of our facilities. We also conduct periodic self-evaluations and report performance. In addition, we offer a variety of programs that encourage the wise use of energy to minimize the impact on the environment.

Environmental Policies

As part of our environmental policy:

- The Board of Directors reviews company environmental strategies and performance.
- Environmental performance is a key component in our operating divisions' business plans.
- Environmental audits of our facilities and operations are conducted regularly.
- Environmental factors make up a significant portion of our "due diligence" research when considering asset acquisitions.
- Employees are trained in many aspects of environmental awareness and management.
- Employee performance evaluations consider whether environmental targets have been completed successfully.

We continually work to achieve more efficient operations and improved performance with less impact on the environment. This includes managing water wisely as a valued natural resource, seeking ways to improve operations to minimize their impacts on

wildlife near our facilities, and properly disposing of waste and recycling materials required for company operations.

Fuel Mix/Renewable Resources

FPL Group is committed to promoting the generation of clean energy through the use of clean-burning fuels and renewable resources, while helping to minimize fuel costs.

Florida Power & Light
One of the Nation's Cleanest Utilities

At FPL, more than half of our electricity comes from nuclear plants free from greenhouse gas emissions and clean-burning natural gas plants, making us one of the cleanest electric utilities in the country.

FPL projects the need for 5,348 megawatts of net new capacity to be added by the end of 2014 to meet the growing power needs of existing customers as well as an average of more than 80,000 projected new customer accounts annually. Within the next seven years, much of this new generation will come from state-of-the-art, combined-cycle technology. Further out, plans call for consideration of other fuel and energy sources and other cost-effective generating technologies to strengthen our fuel diversity.

FPL Energy
A Leader in Clean Power

More than 90 percent of the electricity generated by FPL Energy comes from clean-burning natural gas, nuclear power, and renewable sources including wind, hydro and solar. The company further solidified its position as one of America's leading clean energy providers in January of 2005 with the purchase of a 45 percent ownership interest in 150 megawatts of solar power generation in California . The acquisition makes FPL Energy the largest generator of solar power in the country with 310 megawatts.

As the world leader in wind power, FPL Energy owns and operates wind facilities in 15 states with a capacity of nearly 3,000 megawatts of electricity, or about 40 percent of the U.S. wind energy market. At the end of 2004, wind power accounted for nearly one-fourth of FPL Energy's generating capacity.

Since 2000, FPL Energy has expanded its wind market share by adding an annual average of 545 megawatts, and the company is targeting between 250 and 750 megawatts of new wind generation in 2005.

In addition to FPL Energy's wind development activities in 2004, major projects were undertaken to improve the efficiency of the company's wind assets and to optimize their value. In addition to repowering, the projects included using surplus turbines and repositioning turbines to allow for greater long-term output.

Clean Air and Emissions Reductions

We recognize that climate change is a significant issue in the United States. As such, FPL Group is a clean energy company committed to managing our operations with sensitivity to the environment. Over the past decade, FPL Group has voluntarily made significant reductions in power plant emissions. Today our emissions rates of carbon dioxide, nitrogen oxide and sulfur dioxide are among the lowest of companies our size in the electric power industry. In addition, FPL Group has been successful in reducing toxic chemical releases from our power plants. Attached are Chemical Releases (TRI) reported to the Environmental Protection Agency by FPL.

As the first electric company to join the Environmental Protection Agency's "Climate Leaders" program in 2003, FPL Group is committed to further improving its environmental performance. To that end, we committed to achieving an 18 percent reduction in emissions rates of greenhouse gases between 2003 and 2008 compared to a 2001 baseline. The company has already achieved, and in fact, surpassed its goal and anticipates filing an early achievement with Climate Leaders.

Climate Leaders is a voluntary industry and government partnership that encourages companies to develop long-term climate change strategies. Among the industry participants are such prominent companies as Johnson & Johnson, IBM, Pfizer, 3M and General Motors.

FPL Group also is a participant in the World Wildlife Fund's "PowerSwitch! Pioneers" program, which is designed to reduce greenhouse gas emissions through the use of cleaner fuels and more efficient electricity generation. FPL Group's goal is to achieve a 15 percent improvement in the efficiency of our power plants by 2020, resulting in reduced emissions of CO2. The efficiency improvements will bemade in part by switching generation from oil to natural gas and continuing to invest in wind power and other renewable energy sources.

Power Plant Operations

FPL has long been committed to providing power in an environmentally responsible manner even as the demand for electricity in our service area has increased many-fold. As one of the nation's leaders in "repowering" – that is, converting older oil-burning power plants to modern natural gas operations – we've greatly increased the efficiency of many of our plants while reducing emissions.

In addition, FPL has recently entered into agreements with the Florida Department of Environmental Protection (DEP) to install pollution prevention technology that will substantially reduce particulate emissions at one plant and ozone forming emissions at a second plant.

Alternative Energy

To help meet its increasing energy demands, FPL is continually seeking to develop alternative and environmentally friendly technologies.

Presently, Florida depends on renewable or "green" energy for about 1 percent of its electricity needs. Because of FPL's efforts, this percentage may eventually grow. The company believes that greater use of conservation and cost-effective renewable resources is good for our nation and that the ongoing evaluation of emerging clean energy technologies is a worthy pursuit.

Not only does FPL have research and development programs that evaluate emerging energy technologies including renewable energy, the company currently uses renewable resources as part of its energy mix. For example, most of FPL's biomass resources are in Florida , where electricity is purchased from power plants that produce energy using fuel from:

- solid waste
- landfill gas
- waste paper and
- sugar cane wastes.

Research and Development Programs

In addition, FPL has research and development programs that evaluate emerging energy technologies including renewable energy. Here are some examples:

- FPL has been involved in solar photovoltaic research and development projects since the late 1970s. Among the company's pioneering efforts in this area is a 10-kilowatt photovoltaic (PV) system at its Martin power plant. The system is a type of solar power that generates electricity at customers' homes or businesses, and is tied directly into FPL's power grid. FPL also is currently helping to fund a number of PV pilot projects at homes and Florida schools. One program is looking at a technology that replaces existing roofing materials such as shingles with photovoltaic materials. This program, which is focused on test installations at two universities and five homes, is aligned with the federal government's "Million Solar Roofs" initiative. In addition to these projects, FPL generally supports a number of research and development initiatives of the Florida Solar Energy Center.
- FPL supports other developing cleaner energy technologies, including industry research and development on fuel cells and microturbines. Fuel cells are electrochemical devices that depend on chemical reactions rather than combustion to produce thermal energy and electricity. They operate more efficiently than an internal combustion engine, with fewer emissions. FPL has joined the Florida Department of Environmental Protection in a research project that puts a fuel cell to work at Hugh Taylor Birch State Park in Broward County. A microturbine – a

small combustion turbine that operates on clean-burning natural gas – is being tested by FPL in the Daytona Beach area at the Tomoka Correctional Institution.

- FPL customers who wish to support financially the development of renewable sources of energy generation in Florida and nationwide may now do so through a "green power" program called Sunshine Energy®. By participating in the program, each FPL customer can prevent more than 10,000 pounds of carbon dioxide emissions nationwide – as much CO2 as a car produces in more than 11,000 miles of driving. In addition, for every 10,000 customers who enroll in Sunshine Energy, 150 kilowatts of solar capacity will be added in Florida.
- FPL is at the forefront of a national industry program to develop hybrid line trucks that are capable of running in pure electric or conventional mode, or a combination of both. This year, FPL is testing three prototype diesel-electric bucket trucks that could impact its fleet services for years to come. The trucks can produce up to 25 kilowatts of electricity, and are expected to achieve greater fuel economy than standard gasoline-powered trucks in FPL's fleet. The biodiesel-electric engine also burns more cleanly than hybrid gasoline-electric engines.

Customer Energy Conservation Programs

FPL is an industry leader in providing conservation and energy management programs, and over the past two decades more than 1.7 million customers have participated in our energy-savings efforts. This has helped reduce energy demands by more than 4,300 megawatts and allowed the company to delay building the equivalent of 10 medium-sized power plants.

FPL offers its customers programs that provide year-round, energy-saving services such as duct tests, free home energy surveys and cash inventive programs to upgrade insulation and central air conditioning. The company also offers business customers incentives for installation of energy-efficient cooling/heating and lighting systems, roofs, insulation and window treatments. In addition, FPL provides optional "load management" programs that help reduce power usage by predictable and specific levels during times when energy demands are highest. These programs allow participating customers to receive lower electric bills for allowing FPL to reduce their electric use occasionally.

In particular, our rebate and incentive programs are aimed at reducing energy demands for:

- **Residential customers**
- **Business customers**

Recycling

Our commitment is to cost effectively recover and market surplus assets, maximizing their value while protecting the environment. FPL Group's Corporate Recycling & Services department manages the recycling, reuse, refurbishment and reduction of 100

types of waste products at more than 65 facilities. Created in 1981, FPL has its own recycling center to process scrap wire and cable. As one of the first utilities in the United States to establish a recycling department, FPL continually consults with other utilities and salvage operations to offer an environmentally conscious, proactive and cost-effective alternative to the ever-increasing landfill problem.

Preserving and Protecting the Environment

We incorporate environmental protection and stewardship into the design, construction, operation and maintenance of our facilities. FPL Group's commitment to preserve and protect the environment is reflected in both its day-to-day operations and its large number of special environmental programs.

- Water is a key ingredient in the generation of electricity, and a valued natural resource. This is especially evident at FPL Energy's hydroelectric facilities in Maine, where we manage water levels for fish spawning, loon nesting and public water access as part of our efforts to meet the habitat needs of fish and bird species, as well as to provide opportunities for whitewater recreation, boaters and anglers.
- FPL Energy's Seabrook nuclear station supports the New Hampshire Estuary Project, an organization working to improve the water quality in the Hampton/Seabrook Estuary. The plant is located on marshlands adjacent to the Atlantic Ocean.
- FPL Energy's Bellingham Energy Center in Massachusetts and the Doswell Energy Center in Virginia are known as "zero discharge" facilities. This means we re-use all industrial wastewater, preserving the quality of our rivers, lakes and streams.
- With all our wind projects, we care about the potential impacts that wind facilities might have on birds and bats. Although wind turbines present small relative risk to flying animals, our personnel take actions to assess and reduce when possible – the risk to these creatures. In addition, our interest in our wind facilities' impact on birds and bats does not end after project siting and construction, but continues into the operational phase of the projects through involvement in research efforts.
- In Florida, FPL is especially sensitive to the state's unique ecosystems. Programs have been in place for many years to protect the numerous species of plants and animals that are found near the company's power plants. These include such endangered or threatened species as the American crocodile, Florida manatee, southern bald eagle, wood stork, sea turtle and Florida panther.
- Sea turtles -- As part of our commitment in support of protecting and rehabilitating sea turtles, FPL donated $250,000 to the Loggerhead Marinelife Center in Juno Beach. The Center helps to educate the public on the importance of protecting and preserving these remarkable animals, and FPL is proud to be a partner with this prestigious group. In addition, FPL maintains an extensive sea turtle monitoring and research program at our St. Lucie nuclear power plant.
- Manatee Island -- FPL also made the unusual donation of an island to the U.S. Fish and Wildlife Service. Manatee Island is an 18-acre refuge for migratory and

native birds that also serves as a winter landmark for West Indian manatees seeking the warm waters near the Fort Myers plant. The island is the first addition to the Caloosahatchee National Wildlife Refuge, which was established in 1920 as a preserve and breeding ground for native birds.

- Everglades Mitigation Bank -- FPL's 13,455-acre Everglades Mitigation Bank is a critical link to the success of restoring the Everglades ecosystem to its natural condition. Strategically located between Everglades National Park and Biscayne National Park in south Miami-Dade County, the Everglades Mitigation Bank is home to dozens of protected species of wildlife designated as endangered, threatened or as species of special concern. It also contains several unique ecosystems. Mitigation banking generally involves the creation, enhancement and preservation of wetlands on a large tract at one location to provide mitigation "credits" for numerous smaller projects where wetlands will be impacted. FPL's Mitigation Bank has earned the support of various state and local environmental organizations, including the Audubon of Florida, Tropical Audubon (Miami-Dade County), Friends of the Everglades and Wilderness Society. In addition, the Edison Electric Institute presented its national Land Management Award to FPL for its environmental stewardship and management of wetlands, including the Everglades Mitigation Bank.

Awards

FPL Group's commitment to the environment – as well as overall sustainability – is reflected in the number of awards we've received.

- In June, FPL received the 2005 Hurricane Heroic Award from the Council for a Sustainable Florida. FPL was cited for implementing its highly efficient storm restoration plan to achieve unprecedented results in restoring power and restoring lives in the wake of the 2004 hurricane season. The council deemed getting the power back on as soon as possible important to the economic viability of the community, as well as the protection of Florida's fragile environment and vital citrus industry. FPL also was recognized for its commitment to social responsibility as it raised nearly $1.4 million toward hurricane relief.
- In January 2005, FPL Group was named one of the Global 100 Most Sustainable Corporations in the World by Corporate Knights, Inc., a Canadian media company. Chosen from a universe of 2,000 of the world's largest corporations, FPL Group was cited for the honor after achieving a sustainability performance that places it within the top five percent of its sector.
- As one of America's cleanest energy providers, the emissions rates of our power plants are among the lowest in the electric industry. Our environmental achievements were reflected by our No. 1 environmental ranking – for three consecutive years – in the Innovest Strategic Value Advisors report, which compares the environmental performance of 26 U.S. electric utilities. Innovest is an internationally recognized independent investment research firm specializing in environmental finance and investment opportunities.

- FPL Group scored the No. 1 ranking in the United States and No. 2 globally in a World Wildlife Fund report in 2004 that analyzed 72 of the world's leading power companies on current use of available technologies to reduce carbon dioxide emissions, as well as clear commitments made for future improvements.
- FPL was named a Tree Line USA utility for the third year in 2004 by the National Arbor Day Foundation. FPL was honored for our quality tree care program, annual worker training in quality tree care practices, as well as a tree planting and public education program.
- FPL Group was presented with the 2003 Edison Award, the electric power industry's highest honor. In announcing the award, EEI said, "FPL Group's winning strategy clearly demonstrates that environmental excellence and outstanding financial performance can go hand in hand. FPL Group's success is emblematic of the ingenuity and vision that are the hallmarks of our industry. Its leadership and boldness, and the ability to see what lies ahead in a constantly changing industry, are what set them apart."
- Platts, the energy information and market services unit of The McGraw-Hill Companies, presented FPL Group with a 2003 Global Energy Award as "Renewable Company of the Year" for our clean energy portfolio.

Social Responsibilities

FPL Group and our employees are working to build better communities where we work and live. Our commitment to safety, caring and education is extended to our workforce and beyond to the customers we serve. Never do we take our social responsibility more seriously than during times of crisis, such as in the wake of the hurricanes of 2004. FPL recognizes that the success of our company depends on the prosperity of the communities where we operate. Among FPL Group's social responsibilities are safety and well being, diversity and equal opportunity employment, and being a good and caring neighbor to the communities we serve.

Community Care

We believe that we have a responsibility as a corporate citizen and good neighbor to improve the quality of life in our communities. We do this by identifying important community needs and offering the strengths of our company and the talent of our employees in meeting those needs.

One of our primary concerns is the safety of our customers and the public. We promote general electrical safety through a variety of public channels, including broadcast and television messages and the company's monthly "Energy News" newsletter to customers. The Florida Power & Light Company Web site also provides important safety tips, as does FPL For Kids Web site for children. FPL also uses a flatbed-mounted demonstration called Sparky to drive home the importance of safety around FPL facilities to firefighters, police officers, building inspectors and emergency personnel.

Also important to FPL Group are the opportunities we provide in the communities we serve. Our minority business program gives qualified small, disadvantaged and women-owned businesses the chance to market their products and services to the company and to become more competitive when seeking business relationships with FPL Group. In 2004, FPL spent $138 million with 375 diversity suppliers.

Employee Policies

FPL Group is one of 12 companies nationwide named to the Companies That Care Honor Roll, which recognizes organizations that demonstrate outstanding and measurable commitment to their communities, both within the workplace and beyond. The company received this special designation from The Center for Companies That Care, a national, not-for-profit organization. FPL Group was placed on the honor roll following a rigorous evaluation process conducted by an independent panel of business and academic professionals. Of 10 characteristics considered in the center's evaluation, FPL Group scored particularly high in cultivating the full potential of all employees and enabling the well-being of individuals and their families through compensation, benefits, policies and practices.

Providing Excellent Employee Benefits

FPL Group is committed to providing our employees with excellent employment opportunities and benefit programs that promote a sense of security and a work-life balance. Our company carefully examines plans and programs that result in the best value coverage for our employees and their families. FPL Group's contributions to our employees' benefits generally account for more than 30 percent of total compensation.

A wide variety of benefit plans are available.

Building Workforce Relations

Approximately one-third of FPL's employees are represented by the International Brotherhood of Electrical Workers (IBEW). For years, the company has worked to build and strengthen relationships with union members through:

- Collaborative decision-making among company and union leaders
- Joint safety advisory groups
- Business unit operational reviews and updates
- Business unit labor management meetings
- Executive labor management meetings
- Communications briefings

Keeping Employees Safe a Priority

FPL Group treats safety as a value. We're committed to providing a safe and healthy work environment for all employees and require that safety should not be compromised for any other business priority. We also expect companies providing services to FPL Group to have the same high standards of safety and health as we do.

The company takes responsibility to provide the facilities, equipment, tools, procedures, safety programs and training for employees to work injury free. Our employees have the responsibility to work safely for their own benefit as well as their co-workers. This responsibility includes following appropriate safety rules and planning each work activity using appropriate risk assessment, good judgment and skills, along with a sincere dedication to work safely.

No other business objective has a higher priority than safety, and in recent years we have significantly reduced the number of serious injuries on the job. As an example, from 2000 through April of 2004, the FPL Occupational Safety and Health Administration (OSHA) injury rate declined by 65 percent from just under 3.5 injuries to 1.2 injuries per 200,000 hours worked. If FPL were to calculate lost time (which the company does not because not every OSHA rate translates into lost time) the rates would be:

- 2001 2.86%
- 2002 2.94%
- 2003 2.17%
- 2004 1.92%

Helping Employees Get and Stay Healthy

As part of an integrated and balanced approach to the health and well-being of employees and members of their families, the FPL-Well program offers a wide scope of health and wellness-related services. In 2005, the company was awarded the Best Employees for Healthy Lifestyles Platinum Award from the National Business Group on Health in recognition of our efforts to create, promote and support healthy lifestyles at FPL.

FPL's fitness centers include two state-of-the-art facilities at its Juno Beach and Miami headquarters that offer cardio and strength equipment, fitness testing and group exercise classes. The facilities' health centers offer medical services and other health-related services to both employees and their dependents. Periodic special promotions feature such issues as nutrition and weight management, stress management and smoking cessation.

Assisting Employees in Times of Need

The company also offers a confidential Employee Assistance Program (EAP) that provides help to employees working through personal problems. The EAP is separate

from, but coordinates with, the mental health and substance abuse benefits the company offers to its medical plan participants.

In 2003, FPL established Operation Homefront to provide support for FPL employees and their extended families directly affected by the war in Iraq. A support group is available with informal sessions led by a professional psychologist for those who have loved ones in the war or anyone who is affected by the war in other ways.

Offering Equal Opportunity and Education

We have long believed that the maximum utilization of human resources and equal employment opportunity are mutually dependent. Not only are discriminatory practices unlawful, but that they are unjust and economically wasteful as well. Therefore, all of our corporate activities reflect the full acceptance of our responsibilities as an Equal Opportunity Employer (EEO). Our EEO program addresses specific equal employment opportunity issues and ensures that equal opportunities are made available to all employees.

In addition, FPL takes affirmative action to employ and to advance in employment qualified disabled individuals, qualified disabled veterans, and qualified veterans of the Vietnam era.

As part of a renewed focus on employee growth and development, the company established FPL Group University in 2003. The University includes curriculum in the areas of quality, leadership development, business and commercial skills and professional effectiveness. FPL Group University features five colleges entailing power generation, power systems, customer service and sales, nuclear power and information management.

Community Programs

FPL is involved in numerous community-based programs that strive to improve the quality of life in FPL communities. We offer an array of information to schools, community groups and individuals about how we do business, electrical safety and environmental issues.

The company supports education at all levels. The focus of the programs supported by the company varies at different grades. FPL also supports education through school mentoring.

Our outreach at the elementary and middle school levels is primarily directed toward teaching children about energy, electrical safety and energy conservation. Examples of our educational programs include:

- Energy Encounter (more than 30 interactive exhibits pertaining to energy and environmental education)
- Classroom presentations

- Teacher workshops
- Special events for families
- Scout activities
  FPL's Electrifying Experience demonstration
  FPL's Energy Whys demonstration
  Turtle walks

College and university level support focuses on institutions that prepare our future workforce and provide the expertise in research and development and employee development necessary to maintain FPL as a high performance organization.

Outreach

Through its subsidiaries, FPL Group provides electricity to thousands of communities in over two dozen states. As part of our social responsibility, we are committed to being a good neighbor. This entails anticipating and understanding our customers' needs, building long-term relationships in the neighborhoods and communities of which we are a part, and being open-minded and receptive to new ideas.

As part of our community outreach program, we solicit the views and opinions of community members before we undertake major electric system expansion or upgrade projects.

As part of our approval processes, we are committed to involving the community in our planning so that we can learn more about community interests and priorities and take them into consideration in our planning along with the technical requirements of providing electricity.

Corporate Citizenship

FPL is involved in the community in many ways including contributions, management involvement, community programs and employee volunteerism. In 2004, FPL Group donated $3.5 million in charitable and civic contributions and sponsorships. Highlights include:

- BuildSmart for Humanity – FPL has joined BuildSmart for Humanity in a regional partnership to sponsor Habitat homes in counties affected by the hurricanes of 2004. FPL is investing more than half a million dollars into the program in 2005 to build six homes. More homes will be built in 2006 and 2007. FPL also will incorporate BuildSmart® energy conservation features into more than 300 Habitat for Humanity homes in communities we serve.
- Race for the Cure – FPL has been a lead sponsor of the Race for the Cure to fight breast cancer for several years, and has pledged to continue its commitment into the future. Seventy-five percent of the money raised from the race goes to breast cancer treatment and education programs in Palm Beach, Martin and St. Lucie

counties. The remaining 25 percent goes to the Susan G. Komen Breast Cancer Foundation for national breast cancer research studies.

- United Way – The company is a major corporate donor to the United Way, annually contributing approximately $615,000. In 2004, FPL Group's annual United Way campaigns raised more than $2.3 million in pledges from employees.
- Community Volunteer Corps – Through this employee-run group, a strong network of employee volunteers gave 15,000 hours of their time to participate in a wide variety of neighborhood and community projects such as cleaning shorelines, renovating playgrounds, volunteering for Earth Day projects, mentoring and holiday food drives. The group operates independently of any corporate partnership or financial support. FPL's internal Web site also offers employees the opportunity to help through VolunteerMatch.org.
- American Red Cross Real Heroes – FPL is the major sponsor of the American Red Cross' Real Heroes Awards event to honor local heroes who have demonstrated extraordinary courage.
- Sunfest – FPL provides an environmental sponsorship at Sunfest, Florida's largest music, art and waterfront festival held annually in West Palm Beach. Company volunteers also work in booths designed to promote hurricane and conservation awareness.
- Care to Share program – This program invites FPL customers to join the company in contributing to a fund that helps people having difficulty paying for electric service.
- ASSIST – This FPL referral program seeks help from government and private organizations for families finding it difficult or impossible to pay their electric bills.
- AWARE program – Through Always Watching for At Risk Elders, FPL's field employees identify and help customers who show signs of needing assistance.
- Medically Essential Service program – FPL's program assists people with special medical needs who may depend on electricity for their well-being.
- Employee blood drives – Company-sponsored blood drives are held approximately every eight weeks at many company locations.
- Support for overseas troops – FPL's Community Volunteer Corps has been collecting supplies for FPL reservists and encouraging employees to send cards and letters to their co-workers fighting in Iraq.

Investments

Through the FPL Group Foundation, we provide civic and charitable contributions that focus on education, the environment, human services and community development. The foundation matches employee contributions to education dollar for dollar and supports scholarships for employees' children who qualify as national merit finalists. Other examples of these community investments include:

Education

- Florida A&M Foundation
- Junior Achievement
- Florida International University
- Collier County Education Foundation
- University of Florida Foundation

Environment

- Audubon Society of Florida
- Florida Wildlife Federation
- Hobe Sound Nature Center
- Marine Life Center of Juno

Human services

- Big Brothers & Big Sisters of Palm Beach
- Florida Council on Aging
- Habitat for Humanity
- United Way (26+counties)

Community development

- Economic Development Councils
- Local Initiative Support Corporation
- Manatee Community Foundation
- Urban League
- Kids Voting

Energy Conservation

For many years, FPL's industry-leading energy management and conservation programs have helped defer the building of new power plants. The company provides incentives to customers who are willing to take advantage of FPL's products, services and programs designed to lower energy usage. Overall, FPL energy conservation programs have saved enough electricity to postpone the need for 10 additional medium-sized power plants in Florida. Energy advice and programs are offered to both:

- **Residential customers**
- **Business customers**

BuildSmart® -- FPL's program for energy-efficient new home construction offers customers the option to upgrade to energy-efficient air conditioning, attic insulation and other energy conservation measures to keep their new home's energy bills lower. The

program makes it possible for homeowners to reduce monthly electric bills by up to 30 percent when compared to similar homes not upgraded to BuildSmart standards. The Department of Energy and the Environmental Protection Agency have selected FPL's BuildSmart program to receive the ENERGY STAR® Outstanding Achievement Award for 2004.

Responsibility

In our mission to be a good neighbor to the communities we serve, we take our responsibility to provide safe, continuous and reliable electric service very seriously. We're also taking the actions necessary to meet our customers' growing demand for electricity.

Because the generation and flow of electricity is so vital to our nation's health and well-being, electric companies must be able to effectively deal with unforeseen events such as major storms, oil spills or capacity shortfalls.

FPL Group's ability to respond quickly during times of crises is well documented, never more so than during the 2004 hurricane season. The company has instituted a comprehensive business continuity plan to further enhance our restoration capabilities. The plan provides processes and specific actions to ensure that the company's employees are safe and accounted for, that key business functions are maintained, and that inconvenience to customers is minimized should a crisis of any type occur.

Hurricane Restoration Completed in Record Time

When three devastating hurricanes swept through our service area within a six-week period last year, FPL's entire system was put to the test. No electricity provider in America has ever had to face what we experienced.

Hurricanes Charley, Frances and Jeanne forced us to mobilize more field crews over a more concentrated time period than any energy company in history. At one point, nearly 17,000 people were working on the relief effort with crews brought in from 39 states and Canada helping FPL restore electric service to nearly 5.4 million homes and businesses.

The restoration of power to millions of customers in record times for such extraordinary circumstances did not go unnoticed. Despite the frustration of being without power for extended periods of time, many customers levied high praise upon FPL employees for their selfless and dedicated service through countless letters and e-mails.

$1.4 Million Raised for Victims

In addition to working around the clock to restore power, FPL also helped rebuild the lives of thousands of Floridians by offering a $250,000 matching grant to the American Red Cross. FPL employees and customers almost doubled that target by donating $490,000. FPL provided a matching gift of $277,000 to the Florida Hurricane Relief

Fund, to which FPL customers also donated $400,000. Combined, FPL helped raise nearly $1.4 million toward hurricane relief.

EEI Emergency Response Award

FPL was presented the Emergency Response Award by the Edison Electric Institute, the leading trade association of the electric power industry, for outstanding efforts to restore electric service in the wake of the unprecedented 2004 hurricane season.

Planning for Future Electricity Needs

Florida is the nation's fourth largest state and is growing at a faster rate than any other large state. Responding to the state's growth is a major challenge for Florida Power & Light Company, which is adding new accounts at the rate of more than 100,000 per year and currently services more than 4.2 million accounts.

In recent years FPL has added significantly to its generation and power infrastructure, increasing its generating capacity to nearly 19,000 megawatts. This has allowed us to meet our growing customer demands while maintaining a reserve margin of 20 percent.

On an average residential customer basis, use of electricity by FPL customers has increased by 28 percent since 1985.

From 1985 to 2002, the company added 4,000 megawatts of generation. In contrast, from 2003 to 2007, the company has or will invest more than $2 billion in adding another 4,000 megawatts, growing its capacity at a pace three times the rate of the previous 17 years. In addition, FPL is investing $520 million between 2004 and 2007 in maintaining its nuclear units in top shape to ensure continuation of that supply of low-cost electricity. From 2003 through 2007, FPL, in order to maintain its reliable service, expects to invest

more than $4 billion in poles, wires and other electrical equipment necessary to deliver power to customers.

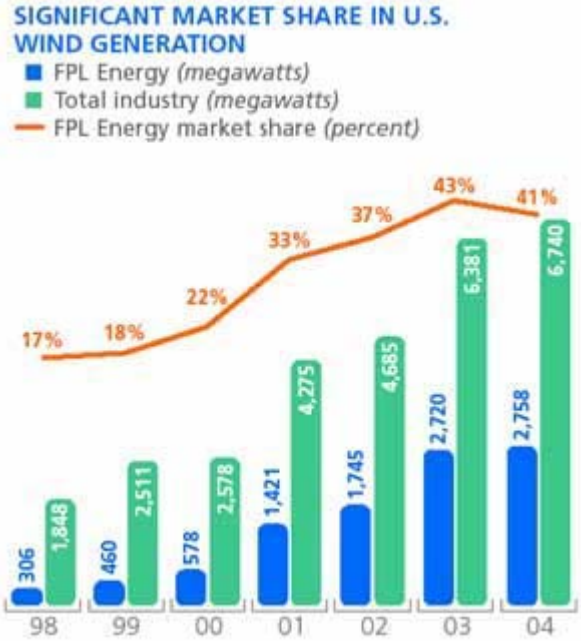
Since launching an aggressive program in 1997 to improve electric reliability, FPL has achieved outstanding results. The annual average amount of time customers are without power has been reduced by nearly 50 percent, and the frequency and duration of outages had declined as well. Excluding hurricane-related outages, the average number of minutes that FPL customers were without power during 2004 was about half that of the most recent industry average.

The company also has focused on improving customer satisfaction, and this was reflected by high scores in residential and business surveys conducted in 2004. The J.D. Power and Associates' Electric Utility Customer Satisfaction StudyTM of the nation's largest electric utilities placed FPL tied for second in the southern region in overall customer satisfaction. This marked the fifth consecutive year that the company ranked above the industry average. FPL also scored well in the J.D. Power and Associates' customer

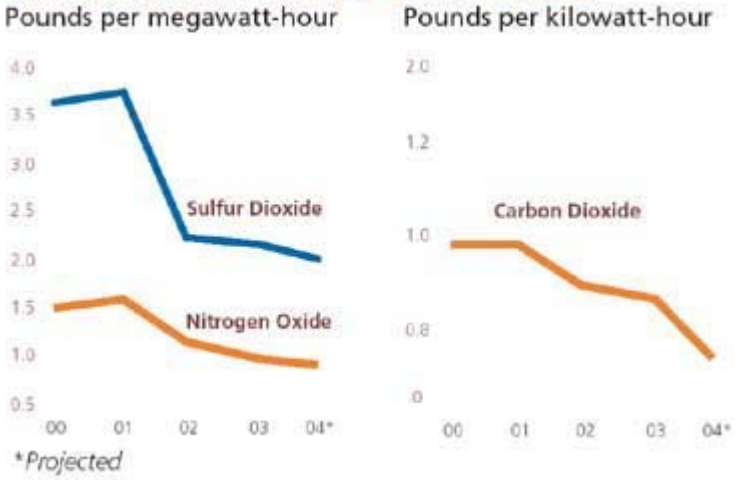
satisfaction survey of mid-size businesses, improving to fourth best in the southern region.

An FPL Group Company | Terms | Privacy & Security | Top ^

SIGNIFICANT MARKET SHARE IN U.S. WIND GENERATION

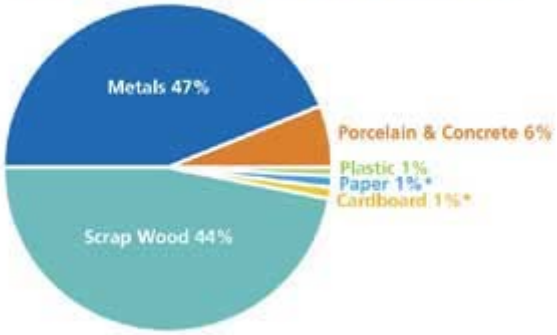


REDUCING EMISSIONS RATES AT FPL GROUP



*Projected

TYPE OF MATERIAL RECYCLED 2000–2004



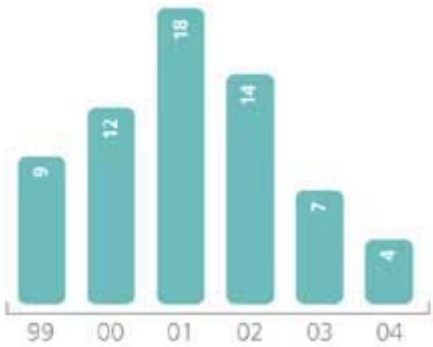
* A large quantity of paper and cardboard are recycled by local vendors

TOTAL MATERIAL RECYCLED 2000–2004

(tons)

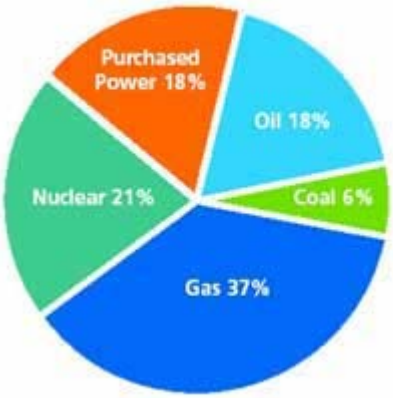
HAZARDOUS WASTE GENERATED 1999–2004

(tons)



DIVERSIFIED ENERGY MIX

Based on megawatt-hours produced in 2004

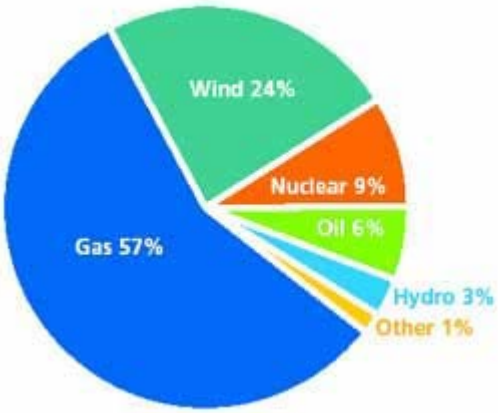


FPL Energy: A Leading Clean Energy Provider

With power plants in 24 states, FPL Energy is a leader in producing electricity from clean and renewable fuels (blue areas denote states with FPL Energy projects and offices).

DIVERSIFIED PORTFOLIO PROVIDES BALANCE

11,520 net megawatts in operation at 12/31/04



FPL: Serving A Fast-Growing State

Florida Power & Light Company serves more than 4.2 million customer accounts in 35 counties.

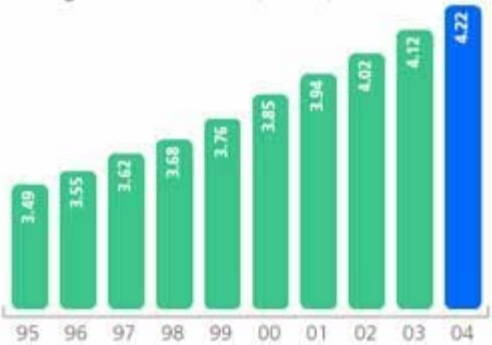
FPL GROUP COMPARATIVE TOTAL SHAREHOLDER RETURN

STEADILY GROWING DIVIDEND

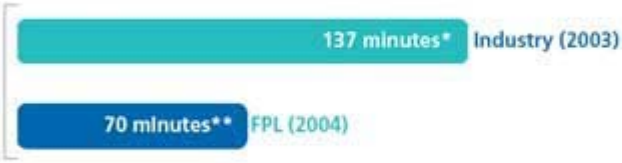
Dividends per share*

STEADY CUSTOMER GROWTH

Average customer accounts *(millions)*



TIME CUSTOMERS WERE WITHOUT POWER



**Industry source: 2003 Edison Electric Institute survey*

***Excluding the impact of the three hurricanes that hit FPL's service territory.*

APPENDIX B
DESIGN DATA REPORT

Ashtabula
Cavalier County, North Dakota

Design Data Report

Project Overview

- 199.5 MW Ashtabula Wind Energy Center
- Up to 133 additional wind turbines
- Wind turbine generator model(s) to be used pending micrositing and wind resource optimization, but project generically based on use of General Electric 1.5 MW series
- PSC to receive final layout after turbine micrositing, but prior to construction

Wind Turbine Generator

General Electric 1.5 MW Series Technical Data	
Model Types	1.5se/1.5s/1.5sle/1.5xle
Rotor Diameter	70.5 m – 82.5 m
Swept Area	3,904 m^2 – 5,346 m^2
Rotorspeed	10.2 rpm – 22.0 rpm
Blade Material	Fiberglass and epoxy or polyester resin
Pitch System	Independent blade pitch control
Approximate Minimum Wind Speed Necessary for Operation	3.5 m/s – 4.0 m/s
Approximate Wind Speed Necessary To Achieve Rated Electrical Output	14.5 m/s
Approximate Maximum Wind Gust Allowed During Operation	25 m/s
Maximum Wind Speed	> 45 m/s
Modular Tower System	2 conical & 1 cylindrical sections
Obstruction Marking and Lighting	Turbine and tower finish color RAL 7035 (light grey). Aviation lighting as required by FAA Determination.
Foundations	Spread footing
Generator Type	Doubly-fed asynchronous Generator with slip rings
Rated Power	1,500 kW
Generator Rated Voltage	575 V

Balance of Plant Facilities

Wind Farm Power Collector System	
Construction Type	Ten (10) circuits of primarily underground direct-buried cable
Collector System Voltage	34.5 kV
Step-up Transformer at Tower Base	34.5 kV/575 V
Collection System Design Standards	National Electric Safety Code (NESC) / FPL Energy (FPLE)
Substation	
Approximate Substation Area	5 Ac
Main Transformer Rating	230/34.5 kV, 132/176/220 MVA
Major Equipment	One main transformer, 230 kV motor operated air break switch, 230 kV gas-insulated breaker, 230 kV manual air break switch, 34.5 kV open-air breaker arrangement with control house, telemetry and metering to interconnecting utility
Substation Design Standards	NESC/FPLE, Telemetry and metering in accordance with Interconnecting Utility requirements
Interconnecting Utility	Minnkota Power Cooperative

APPENDIX C

STUDIES and ASSESSMENTS

Class I Cultural Resource Inventory for the Ashtebula Wind Farm Project in Barnes County, North Dakota.

By
Christina Grimsrud Burns, M.S.

Prepared for:
TETRA TECH EC, INC

Prepared by:

Beaver Creek Archaeology, Inc
111 S Broadway, P.O. Box 489
Linton, ND 58552

September, 2007

1.0 Introduction

Tetra Tech, EC contracted Beaver Creek Archaeology, Inc (BCA) to perform a Class I Cultural Resource Inventory (Literature Review/File search) of a proposed wind farm project by the town of Valley City, Barnes County, North Dakota. The area of potential effect (APE) covers approximately 78,700 acres across 123 sections located in the Baldwin, Ashtebula, Grand Prairie, Noltimer, and Alta Townships (Sibley, Dazey NE, Pillsbury, Pillsbury SE, Pillsbury SW, Baldhill Dam, Valley City East, Valley City West, and Oriske Quadrangle Maps).

Township Name	Township	Range	Sections	Quadrangle Maps
BALDWIN	T143N	R57W	25-36	Sibley, Pillsbury
ASHTEBULA	T142N	R58W	11-14; 23-26; 35-36	Sibley, Pillsbury SW, Baldhill Dam, Dazey NE
GRAND PRAIRIE	T142N	R57W	1-36	Pillsbury, Sibley, Pillsbury SW, Pillsbury SE
NOLTIMIER	T141N	R57W	1-36	Pillsbury SE, Pillsbury SW, Valley City East, Oriska
ALTA	TN	RW	2-11; 14-18	Oriska, Valley City East
GETCHELL	T141N	R58W	1-2; 11-14; 23-26; 35-36	Pillsbury SW, Valley City East, Baldhill Dam, Valley City West

On September 6, 2007 Christina Grimsrud Burns conducted the file search at the State Historical Society of North Dakota (SHSND). Seven manuscripts, nine Archaeological Site Leads, one Architectural Site, and one Architectural Site Lead were found within the records.

This report contains information about currently recorded Historic and Pre-historic sites and the potential for such sites within the APE. It also contains an environmental description of the area as well as recommendations for future Cultural Resource Inventories.

2.0 Project Goal

The goal of the Class I Cultural Resource Inventory is to provide Tetra Tech EC with knowledge of the Cultural Resources and the potential of Cultural Resources within the project area. This knowledge can aid in the planning stages of the wind farm project by potentially avoiding such resources and thereby complying with Federal and State regulations.

3.0 Environment

The Sheyenne River/Lake Ashtebula is a major river that flows into the Red River of the North which is bordered by North Dakota and Minnesota. The APE is located on the Drift Prairie within the Prairie Pothole Region with rolling hills, lakes and wetlands . The terrain is characterized as level to rolling, with flats, knolls, ridges, and drainageways, with soils such as Barnes Busey represented.

This area of North Dakota is situated in the tall grass prairie with wooded areas along terraces and floodplains of rivers and creeks. Elm, ash, box elder, bur oak, and grasses are found on riparian areas where nuts, berries, and tubers would have been found seasonally (SHSND 1990). There is also an abundance of wetlands throughout the area.

This habitat provided ample food for a number of animals, such as elk, bison, deer, antelope, moose, caribou, muskrat, beaver, fox, wolf, and other fur-bearing animals. There was also an abundance of waterfowl along wetland marshes and prairie potholes.

This biotic diversity along with the availability of water makes this setting favorable for human settlement, both during prehistoric and historic time-periods. Stream gravels in the area also provided people with chippable stones such as Swan River chert, Tongue River silicified sediment and cherts.

4.0 Result

BCA conducted a literature review at the State Historical Society of North Dakota and discovered seven manuscripts, nine Archaeological Site Leads, one Architectural Site, and one Architectural Site Lead within the records.

Table 1: Manuscripts on File as of September 6, 2007 at the Archaeology and Historic Preservation Division, State Historical Society of North Dakota in or near the APE.

Year	MS #	Author	Location			Title
			Twp	R	S	
1991	5698	J. Borchert	140	57	7, 8	Williston Basin 8" Natural Gas Pipeline Reroute in Barnes County, North Dakota Cultural Resource Inventory UW#1488
1992	5781	G. Wermers	140	57	10	Class III Cultural Resource Inventory for Three Williston Basin 8" natural Gas Pipeline Reroutes in Barnes and Cass Counties of North Dakota UW# 1534
1990	5347	D. Klinner/ J. Borchert	140	57	7-12	Class III Cultural Resource Inventory for the Williston Basin 8" Natural Gas Pipeline in Barnes and Cass Counties of North Dakota UW# 1381
2000	7646	G. Wermers	141	57	16	Thirteen NDDOT Living Snow Fence planting Areas in Adams, Oliver, Burleigh, Barnes, and Cass Co., ND
2006	9969	A. Bleier et al	141	57	6-8, 17	Keystone Pipeline Project: Class I, II, and III Cultural resource Investigations in Eastern North Dakota, Volumes 1 & 2.
			142	57	19	
1987	4280	J. Schimer	141	57	33	Final Report Field Reconnaissance Survey of Churches in Barnes, Ransom, Richland, Sargent and Steele Counties of ND
1978	547	R. Fox	142	57	24-26	Archaeological Field Report: 1978 Fall Field Season and Rip Rap Operation Investigations, lake Ashtabula, Barnes Co., North Dakota

Four projects have been performed within T140N R57W: MS#s 5698, 5781, 5397, and 9969. One project MS# 7646 has been performed in T141N R57W. These are all linear pedestrian surveys (see maps Appendix A). No large area surveys have been performed within the project area.

Table 2. Summary Information on Archaeological Site Leads near the APE.

SITS #	Location			Affiliation	Description	Recorder	MS #
	Twp	R	S				
32BAx165	142	58	13	Historic	CM Scatter	E. Benson	80
32BAx168	142	58	26	Historic	Alderman PO	E. Benson	80
32BAx134	141	57	2	Prehistoric	Mound	E. Benson	80
32BAx135	141	57	5	Historic	Charleston PO	E. Benson	80
32BAx233	141	57	7	Prehistoric	Grave/CM Scatter/ other rock feature	B. Thomas	85
32BAx234	141	57	20	Prehistoric	CM Scatter	B. Thomas	85
32BAx138	141	57	28	Historic	No description	E. Benson	80
32BAx139	141	57	30	Historic	Camp Smith	E. Benson	80
32BAx140	141	57	30	Historic	CM scatter	E. Benson	80

Nine site leads have been recorded within the project area. These have not been evaluated by an archaeologist. As most of the site leads do not contain maps, a general location of these site leads are marked on the maps in Appendix A:

32BAx165 "Camp Libby". Historic CM Scatter. In the NW ¼ SE ¼. No map
32BAx168 "Alderman Post Office". Historic site lead. Somewhere in Section 26.
32BAx134 "Hamburg/Hamburg Mound". Effigy Mound. No map.
32BAx135 "Charleston Post Office." No map. Somewhere in Section 5.
32BAx233 "O'Mally Farm". No map. In the SE ¼ of Section 7. Consists of a grave with human remains, other rock feature, and CM scatter.
32BAx234 "Smith Camp Site". CM Scatter. No map. Somewhere in SW ¼ of section 20.
32BAx138 No feature type/cultural material/site name. No map. Located in SW ¼ SW ¼ Section 28.
32BAx139 "Camp Smith". No map. Historic CM Scatter. Located in SE ¼ SW ¼ NE ¼ of Section 30.
32BAx140 Historic CM Scatter. No map. Somewhere in W ½ of Section 30.

Table 3: Summary Information on Architectural Sites near the APE

Location			Site Number	Feature	Recorder	NRHP Status
Twp	R	S				
141	57	33	32BA208	Church	R.Ford-Danker	Ineligible

Site 32BA208, a church, is deemed ineligible to the National Register of Historic Places.

Table 4: Summary Information on Architectural Site Leads near the APE

Location			Site Number	Feature	Recorder	Year Recorded
Twp	R	S				
142	57	9	32BAx84	Cemetery	B. Mertz	2001

32BAx84 "Grand Prairie Free Methodist and Free Cemetary."

The project area contains relatively few Archaeological, Historic, and Architectural sites, but this is primarily due to the lack of Cultural Resource Inventories performed in the project area. According to State Historical Society of North Dakota, the Sheyenne River Study Unit, in which the project area is located, has a relatively low site density, one site per 26.6 mi^2. This is due to sporadic survey work rather than actual site density (1990:12.7). The rolling prairie landscape with hills, knolls, and bluffs combined with an abundance of water makes the project area a high potential area for containing archaeological sites.

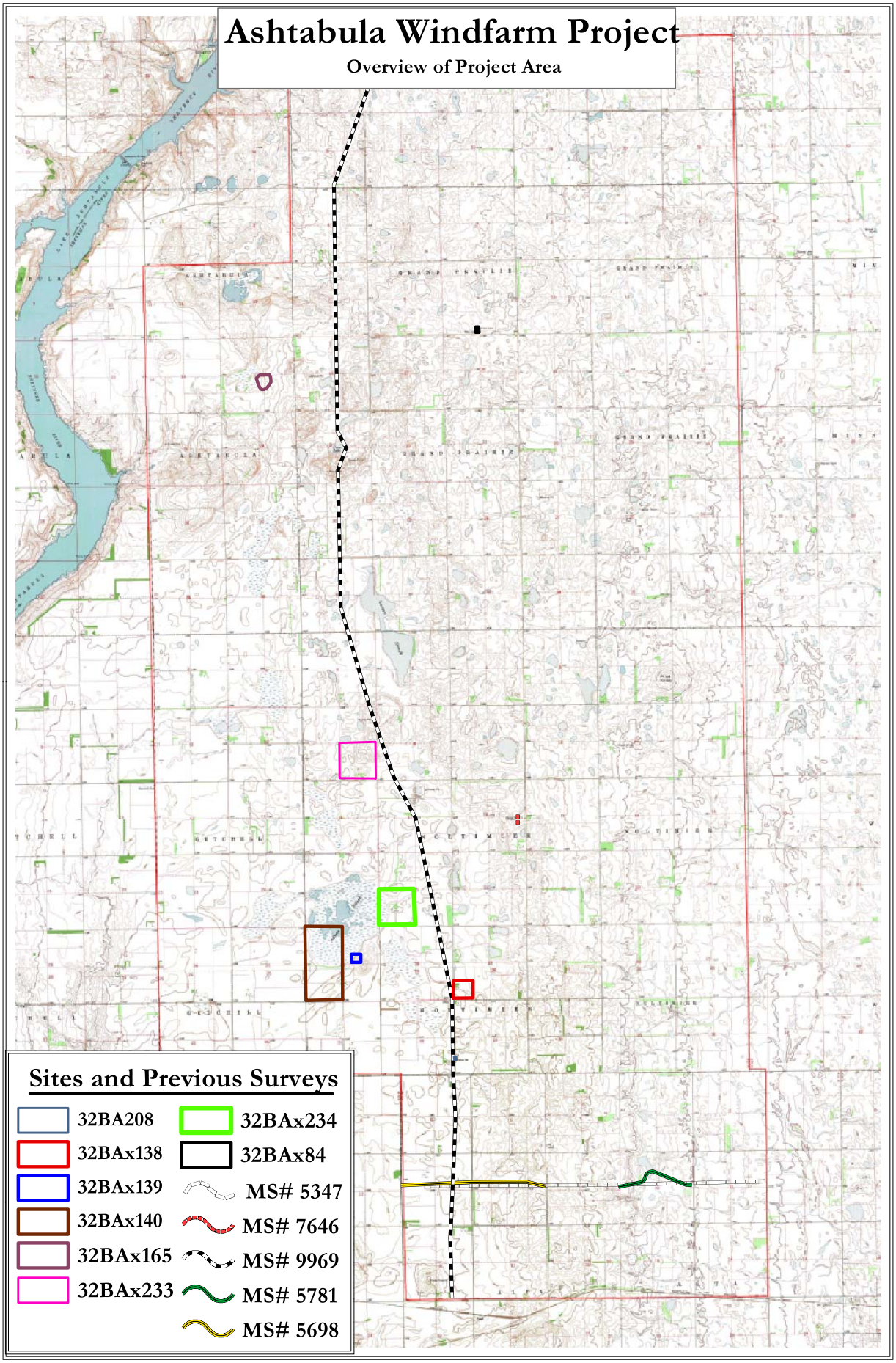
5.0 Recommendation

The proposed project area is located in a region that has high potential for archaeological sites. There are not many sites recorded within the project area, but this is primarily due to the lack of Cultural Resource Inventories performed.

Most sites recorded within the Sheyenne River Study Unit are located on a Hill/Knoll/Bluff landform as well as on Upland Plains (SHSND 1990). As the project area is located within this setting, it is recommended that a Class III Cultural Resource Inventory be performed within the proposed project area. The recorded site leads needs to be further investigated if the project is to impact these areas.

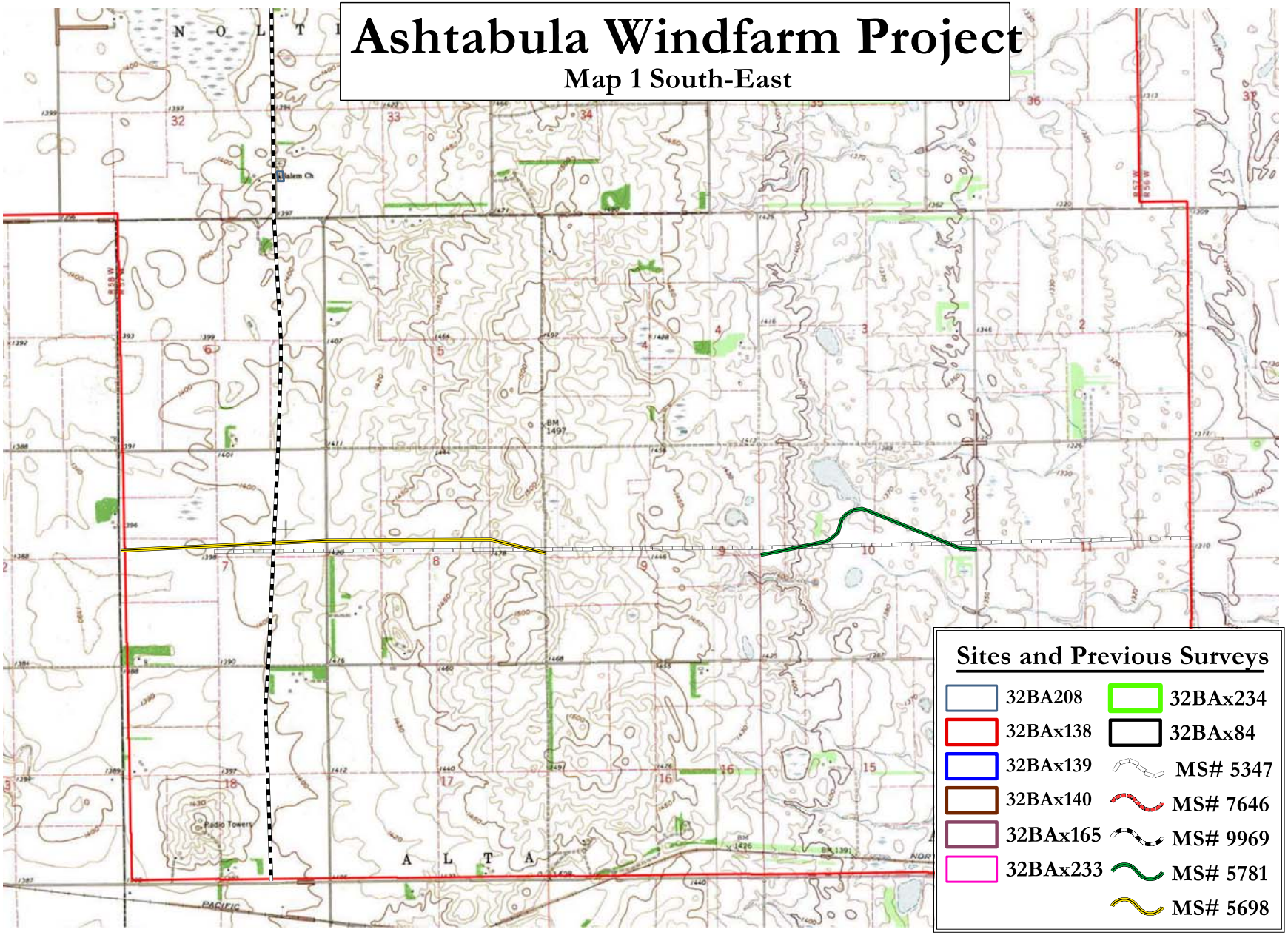
Ashtabula Windfarm Project

Overview of Project Area



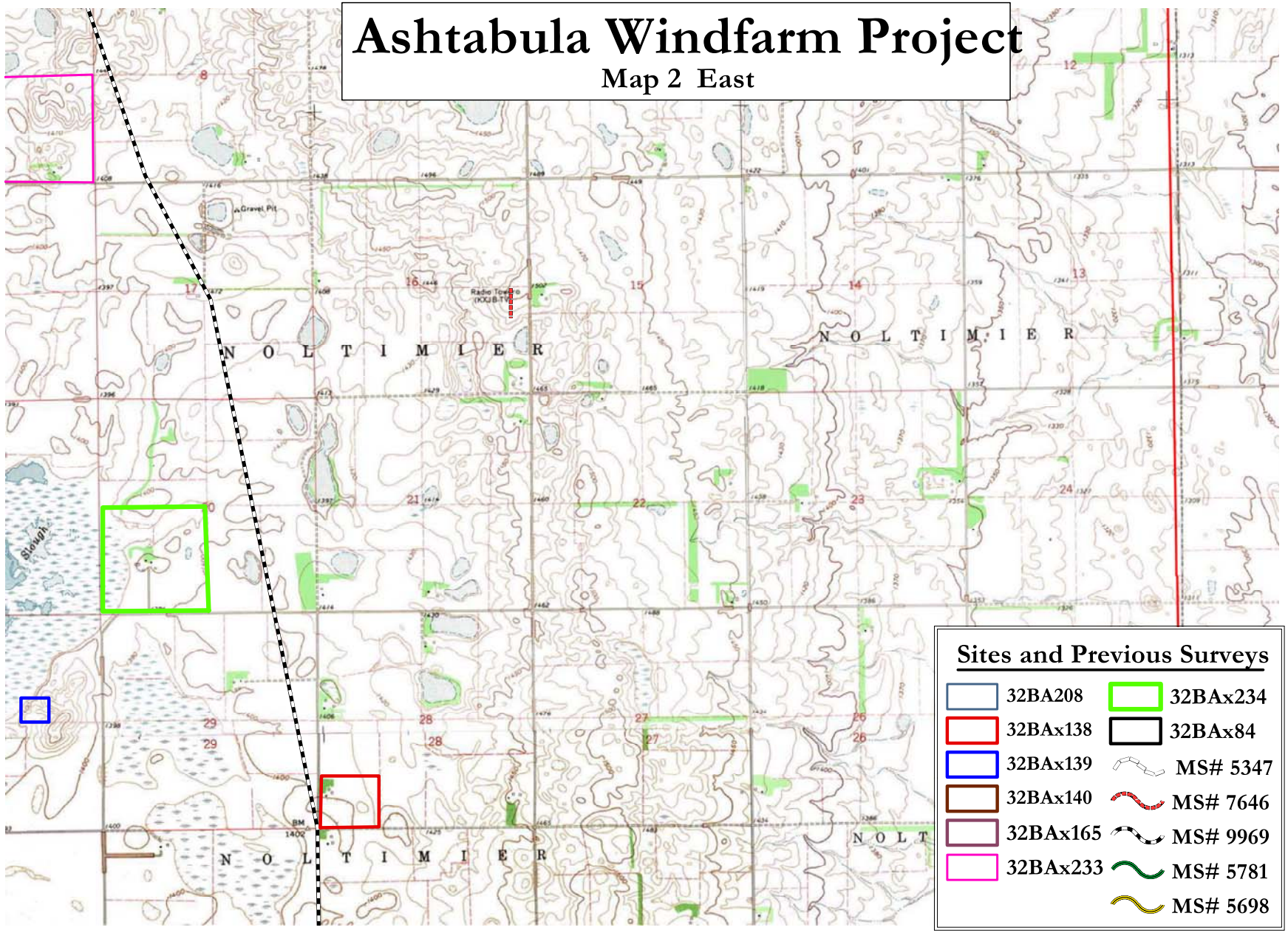
Ashtabula Windfarm Project

Map 1 South-East



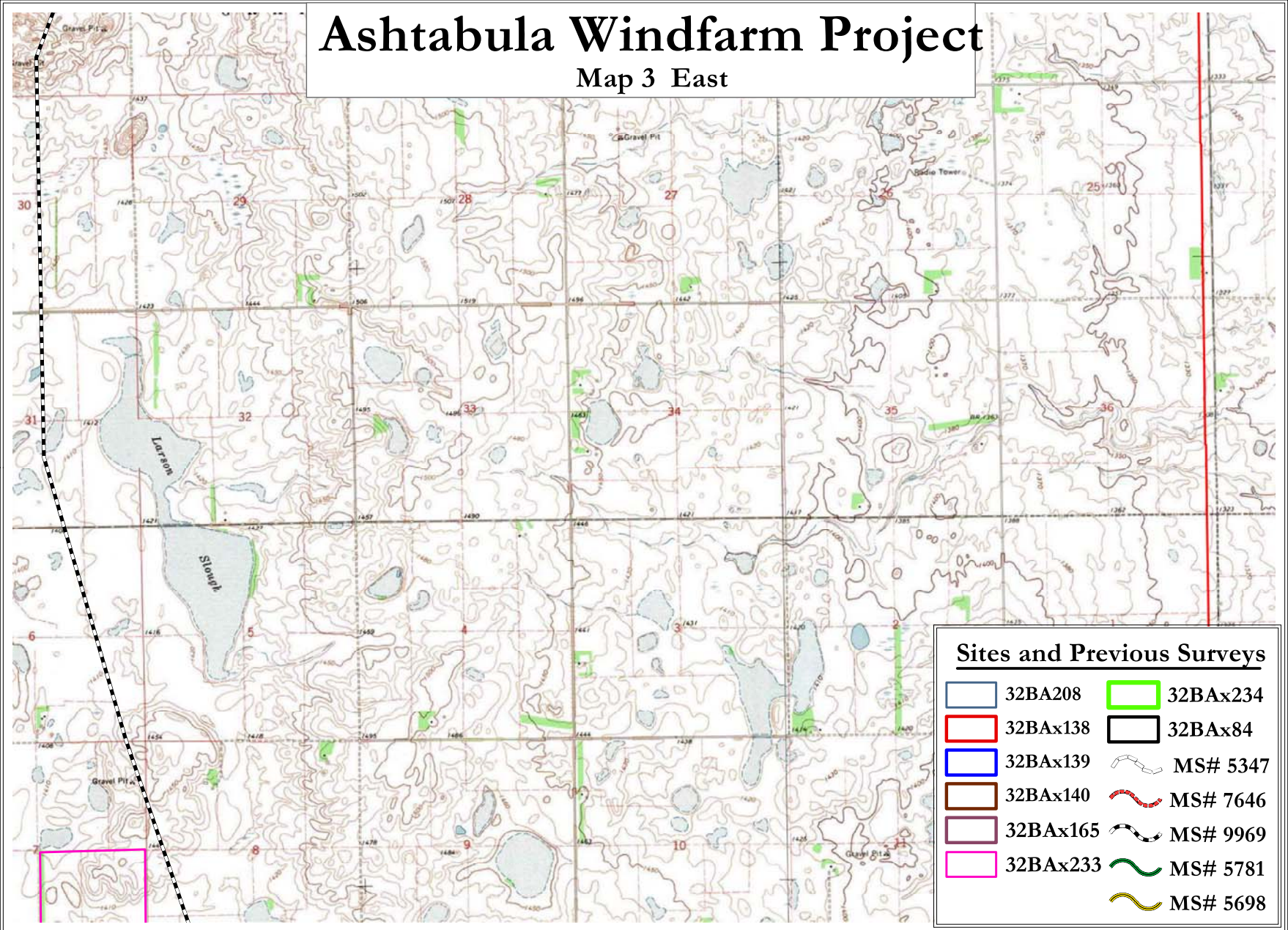
Ashtabula Windfarm Project

Map 2 East



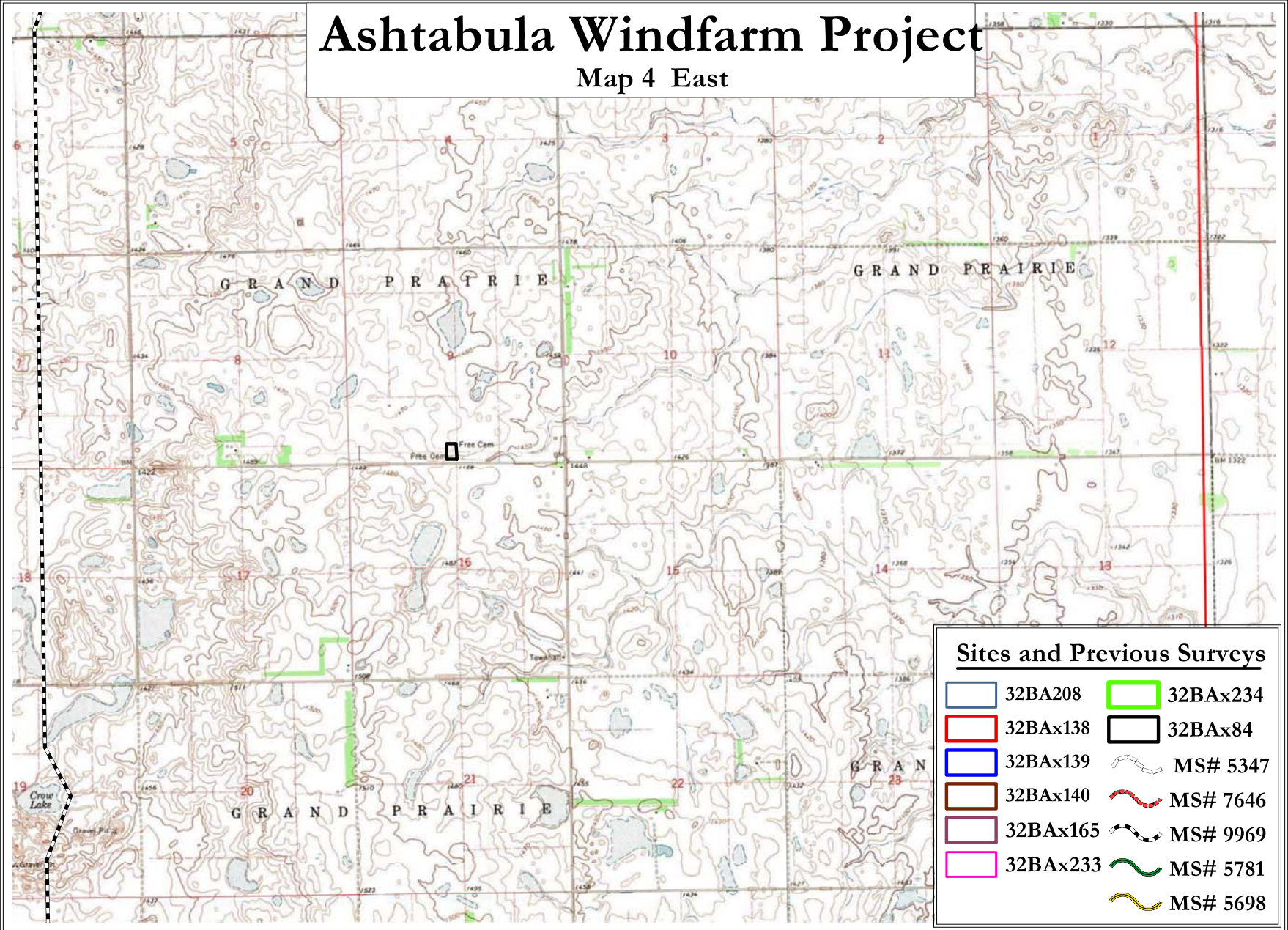
Ashtabula Windfarm Project

Map 3 East



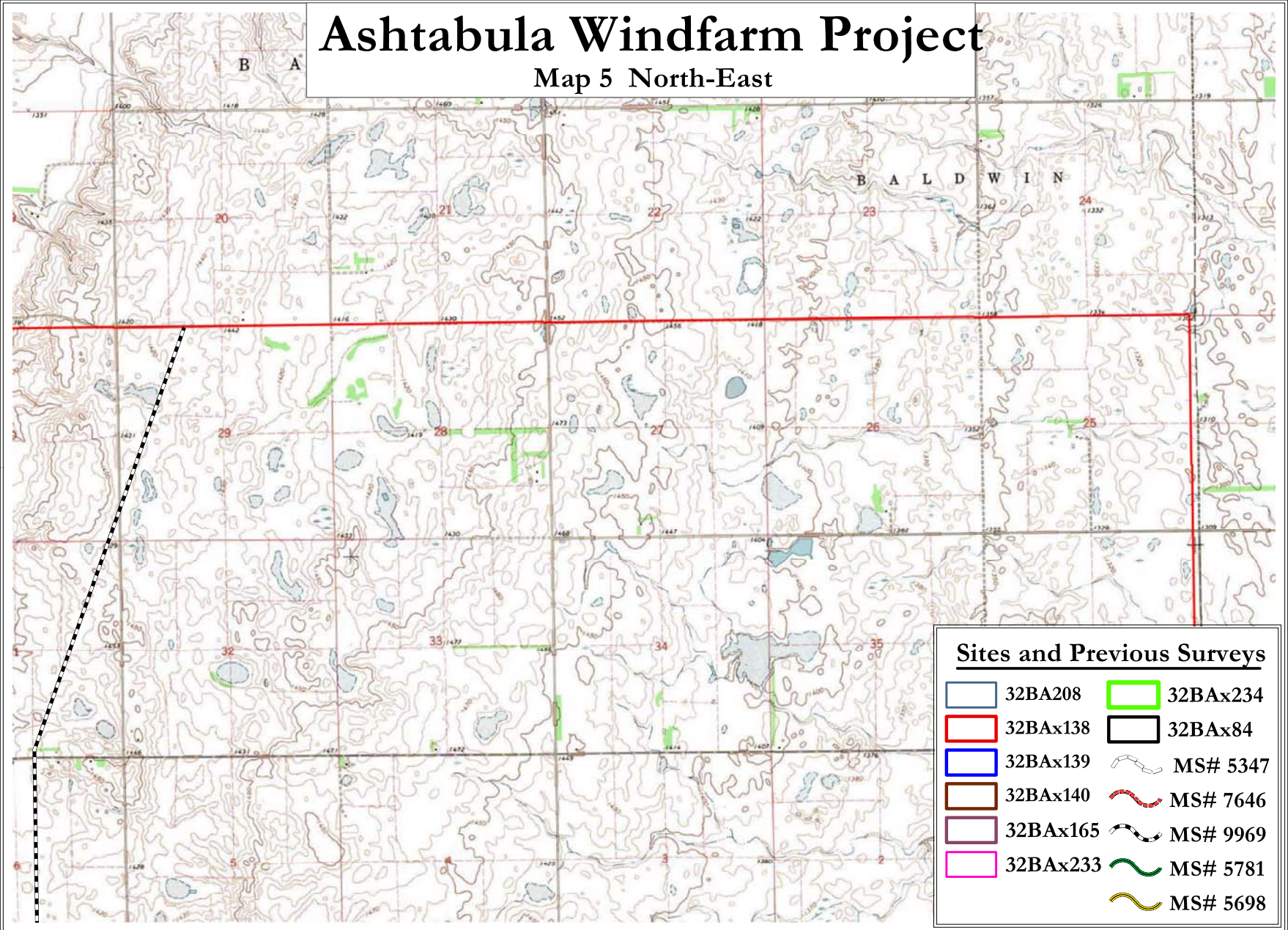
Ashtabula Windfarm Project

Map 4 East



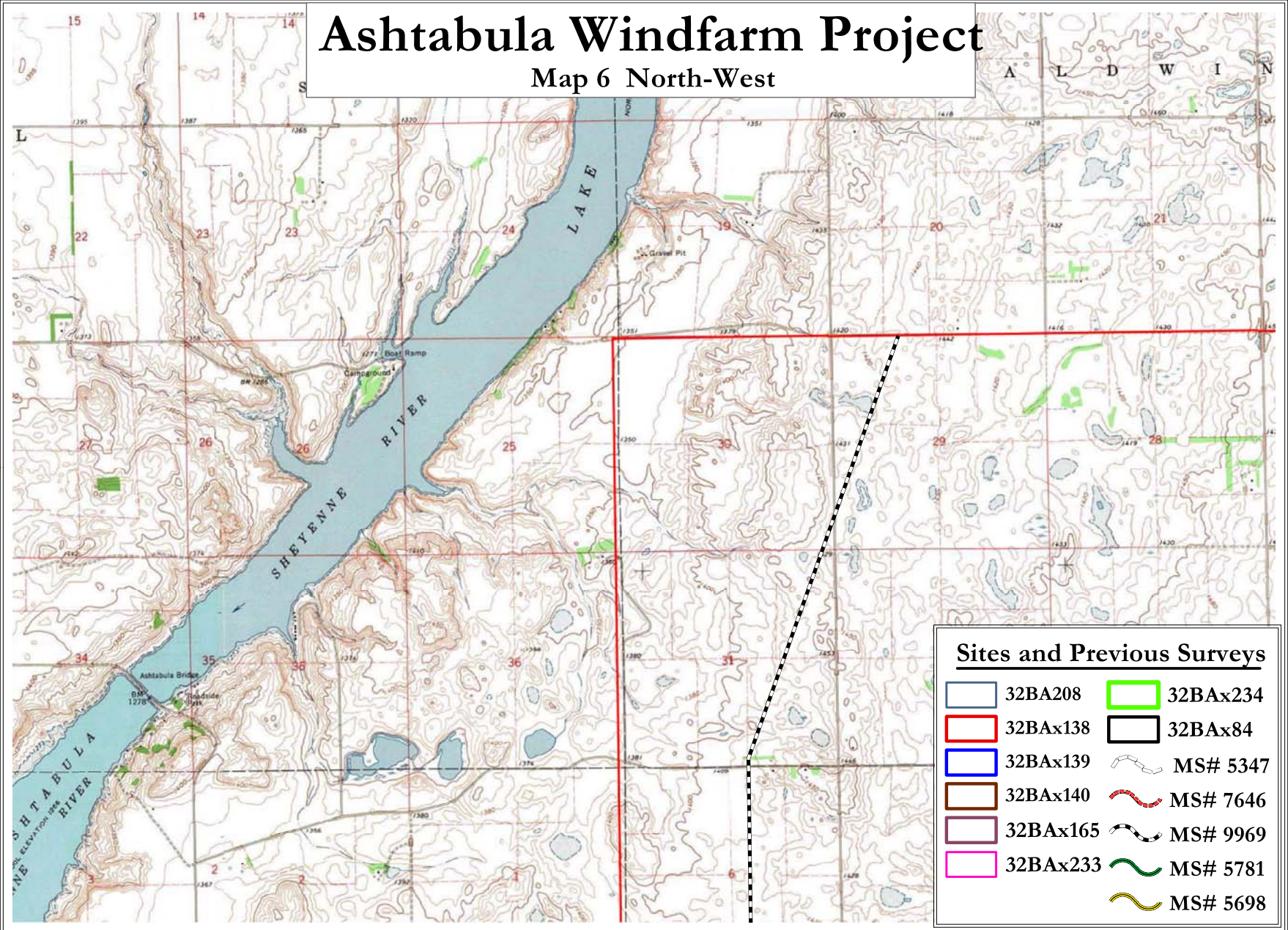
Ashtabula Windfarm Project

Map 5 North-East



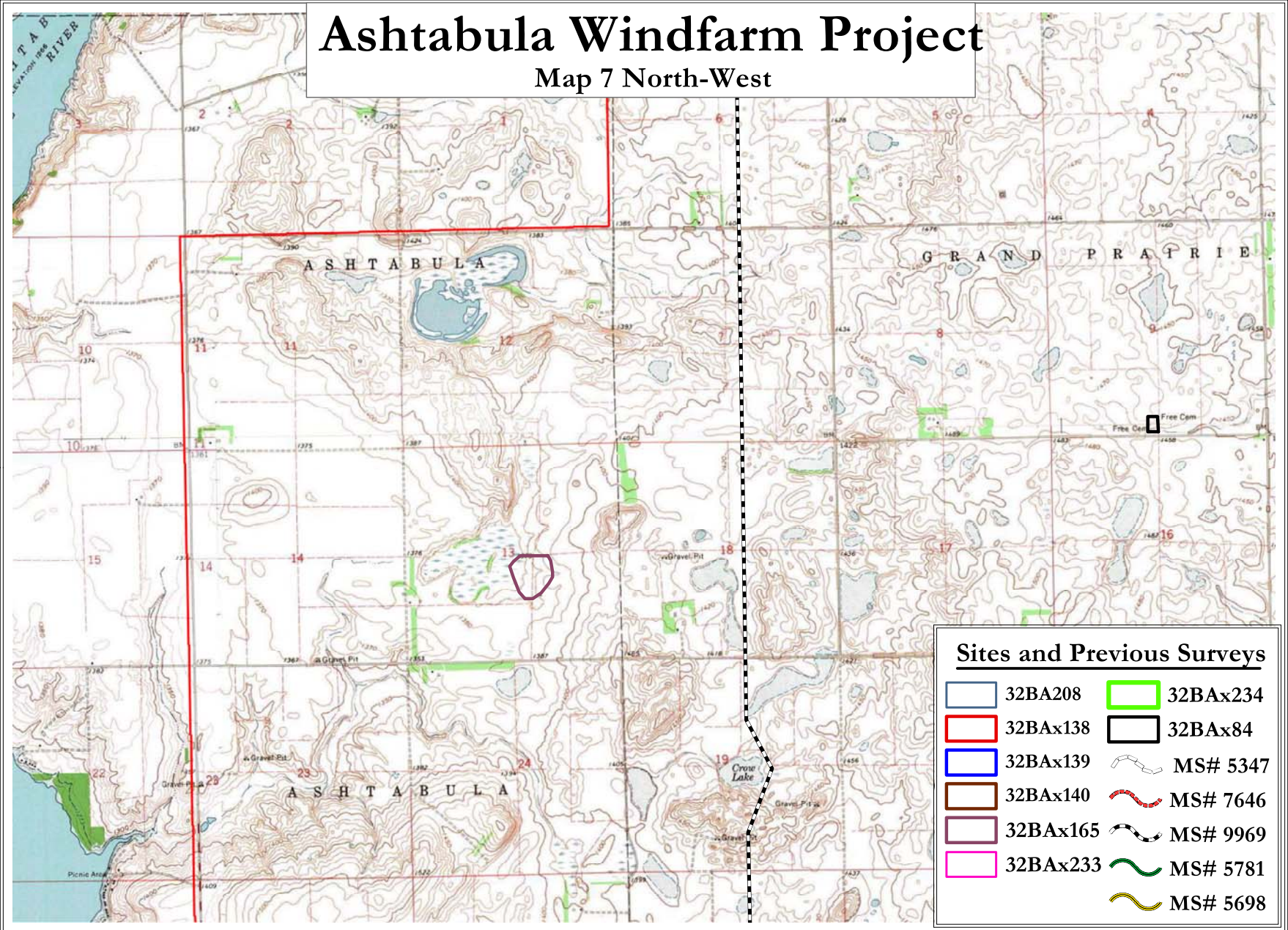
Ashtabula Windfarm Project

Map 6 North-West



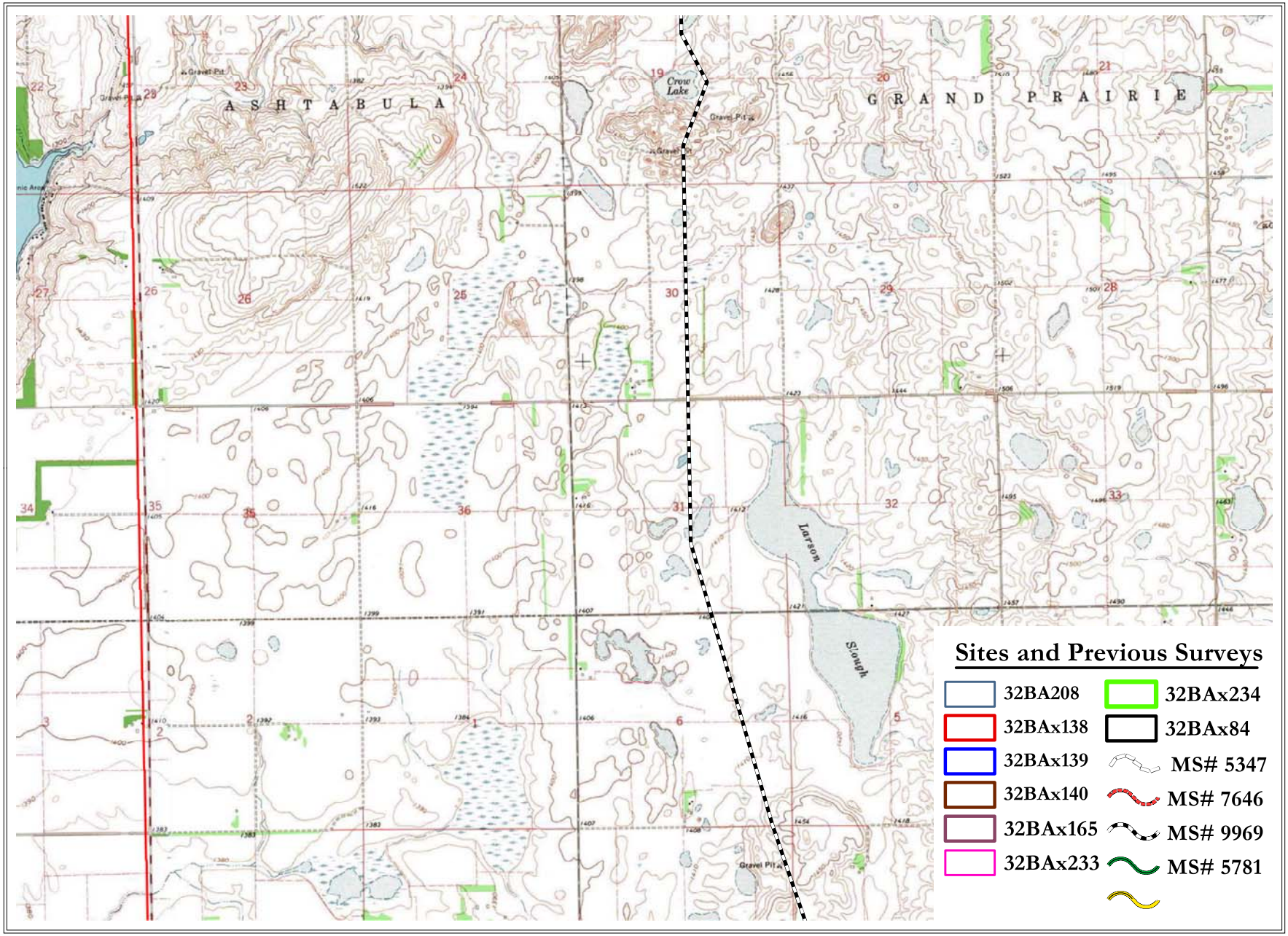
Ashtabula Windfarm Project

Map 7 North-West



Sites and Previous Surveys

- 32BA208
- 32BAx138
- 32BAx139
- 32BAx140
- 32BAx165
- 32BAx233
- 32BAx234
- 32BAx84
- MS# 5347
- MS# 7646
- MS# 9969
- MS# 5781
- MS# 5698


ASHTABULA
GRAND PRAIRIE
Crow Lake
Larson Slough
Gravel Pit
Sites and Previous Surveys
32BA208
32BAx138
32BAx139
32BAx140
32BAx165
32BAx233
32BAx234
32BAx84
MS# 5347
MS# 7646
MS# 9969
MS# 5781

Final Fall Avian Survey

Ashtabula Wind Resource Area
Barnes County, North Dakota

Prepared for
FPL Energy, LLC

January 2008

TETRA TECH EC, INC.

EXECUTIVE SUMMARY

Tetra Tech, EC, Inc. (TtEC) was contracted by FPL Energy, LLC (FPLE) to undertake fall avian use surveys for the proposed Ashtabula Wind Resource Area (WRA) in Barnes County, North Dakota. The studies were conducted to identify potential avian impacts associated with building and/or operating the wind conversion facility. Birds have been identified as a group potentially at risk because of collisions with wind turbines and power lines and displacement due to the presence of the associated structures. Weekly fall surveys were performed at the Ashtabula WRA from August 30 to November 4, 2007. Fixed point count surveys (800-meter radius) were conducted at 12 points distributed throughout the Ashtabula WRA.

A total of 61 identified species and 9 groups (that could not be identified to species), consisting of 29,895 birds from 13 species groups, were observed within the Ashtabula WRA. Overall mean bird use within the Ashtabula WRA was 226.48 birds/20 min, ranging from 0 to 7,000 birds per 20-minute point count. Comparing bird use rates in fall for existing wind energy facilities throughout the country, the Ashtabula WRA ranked ninth out of 16 for raptor use, and first out of 8 for non-raptor use.

Songbirds had the highest mean use out of all species groups observed (118.24 birds/20 min). The most commonly observed species, the red-winged blackbird (67.01 birds/20 min), common grackle (15.57 birds/ 20 min), and horned lark (7.63 birds/20 min) are all widespread species and have relatively stable populations. Thus, local mortality is not expected to have population level consequences for most species observed. Many blackbird species are regarded as agricultural pests and are unlikely to elicit concern from wildlife agencies.

Waterfowl also had very high mean use (84.58 birds/20 min). Commonly observed species included the Canada goose (41.66 birds/20 min) and mallard (22.17 birds/20 min). Among the remaining species groups mean use was low (< 1.0 birds/20 min). Lake Ashtabula is a potential breeding and staging area for waterfowl and other water birds, shorebirds, and wading birds. The Ashtabula WRA also contains smaller bodies of water including Larson Slough and Adams Slough. In post-construction mortality studies at other wind resource areas, waterfowl mortality was generally low. Canada goose mortality in particular is very rare at wind farms. However, waterfowl mortality increased at sites with significant sources of open water near turbines. Due to the large numbers of waterfowl observed during the fall survey, waterfowl mortality could result, but should not have population level impacts because high rates of waterfowl mortality have not been documented.

Red-tailed hawks and northern harriers were the most commonly observed raptor species during the fall avian survey. Red-tailed hawks, the major contributor to overall raptor use (0.28 birds/20 min), were observed in 19.7 percent of all surveys. Red-tailed hawks have a propensity to fly within the rotor swept area (RSA), and as a result are at risk of being killed by turbines. Harriers were also commonly observed (0.11 birds/20 min), but because of their propensity to fly below the RSA, their risk of mortality from collisions is low.

Listed and Sensitive Species

The United States Fish and Wildlife Service indicated that there is a potential for federally endangered whooping crane to migrate through the Ashtabula WRA. Whooping cranes often travel with sandhill cranes, and sandhill cranes visited the Ashtabula WRA. TtEC suggests performing crane surveys to assess the possibility of the endangered whooping crane using the Ashtabula WRA.

The American white pelican, Franklin's gull, northern harrier, Swainson's hawk, and sharp-tailed grouse are all listed as State Species of Conservation Priority in North Dakota by the North Dakota Game and Fish Department and were observed during surveys. Additionally, the northern pintail and prairie falcon were seen only as incidental observations. All of the species observed during point counts had low encounter rates (birds flying through the RSA/20 min), and therefore population level impacts are not expected if these numbers are representative of use during other times of the year.

Recommendations

The greatest potential impact of the Ashtabula WRA on avian species is direct mortality or injury from collisions with turbines and associated overhead transmission lines and loss of habitat. TtEC recommends standard best management practices, siting turbines away from points count locations 5 and 10 and additional studies. Specifically, we recommend conducting raptor nest, crane, sharp-tailed grouse lek, and spring avian surveys to understand and minimize potential impacts to avian species. We also recommend conducting post-construction mortality monitoring after the facility is constructed.

TABLE OF CONTENTS

List of Figures

List of Tables

1.0 INTRODUCTION

FPL Energy, LLC (FPLE) is planning to develop a wind energy conversion facility in Barnes County, North Dakota. The Ashtabula Wind Resource Area (WRA) is located in eastern North Dakota, north of the town of Valley City (Figure 1). FPLE is committed to environmental due diligence and has contracted Tetra Tech EC, Inc. (TtEC) to conduct a fall avian migration survey at the Ashtabula WRA to quantify local avian use in the area and to identify potential avian impacts associated with building and/or operating the proposed facility.

The Ashtabula WRA is 56,956 acres and is located approximately 1.6 miles east of Ashtabula Lake. The Ashtabula WRA is located in the Northeastern Glaciated Drift Planes ecoregion, and is characterized by a flat to rolling landscape. This region receives 17 to 19 inches of precipitation a year and has numerous temporary and seasonal wetlands. Land use within the Ashtabula WRA is primarily cropland. Patches of trees and shrubs exist throughout the area and are found primarily between agricultural fields, in riparian areas, and around homesteads.

Wind energy provides a clean, renewable energy source that is in high demand. As wind power has become more common, the need to address potential environmental impacts has increased. Birds have been identified as a group potentially at risk because of collisions with wind turbines and power lines and displacement due to the presence of the associated structures (Erickson et al. 2005, Drewitt and Langston 2006). Specifically, raptors and migrant passerines (e.g., songbirds) were found more often in post-construction mortality monitoring compared to other groups of birds (Erickson et al. 2005, Drewitt and Langston 2006).

To evaluate avian risk at wind energy facilities, standardized protocols for pre-construction point counts have been established and were used here. Data collected from these counts can then be used to identify species or species groups of concern and may provide additional information for micro-siting to minimize impacts to birds. To facilitate identifying species at risk, results in this report are presented in terms of species groupings, and highlight federally listed species, state listed species, and species of concern.

In North Dakota, 353 bird species have been documented (Faanes and Stewart 1982). North Dakota, and the Ashtabula WRA, are situated within the Central Flyway, which is one of the main bird migratory routes in the United States (BNC 2004). Most birds that move along the Central Flyway through the central United States, eventually reach the Gulf Coast from Texas to Florida (BNC 2004).

P:\GIS 2007 PROJECTS\FPL Ashtabula\maps\Avian Survey\FPL_Ashtabula_Figure1_Vicinity_120507.mxd

Benson Co.
Nelson Co.
Grand Forks Co.
Eddy Co.
Foster Co.
Griggs Co.
Steele Co.
Traill Co.
Stutsman Co.
Barnes Co.
Cass Co.
LaMoure Co.
Ransom Co.
Richland Co.
Dickey Co.
Sargent Co.

Spring Lake
Devils Lake
Stump Lake
North Washington Lake
Lake Coe
Johnson Lake
Mannie Lake
Cherry Lake
James River
Juanita Lake
Sibley Lake
Kelly Creek
Lake George
Baldhill Creek
Arrowhead Lake
Mud Lake
Jim Lake
Spiritwood Lake
Jamestown Reservoir
Pipestem Lake
Jamestown
Eckelson Lake
Kee Lake
Beaver Creek
Buffalo Creek
Maple Creek
Maple River
Cottonwood Creek
Lone Tree Lake
Lake Ashtabula
Sheyenne River
Goose Creek
Little Goose River
Hazen Brook
English Coulee
Red River
Cole Creek
North Branch Goose River
Middle Branch Goose River
Beaver Creek
Goose River
South Branch Goose River
Elm River
South Branch Elm River
Rush River
Swan Creek
Buffalo Creek
Maple River
Spring Creek
Bear Creek
Wild Rice River
Lake Fedge

Grand Forks
Valley City
Fa

1:600,000
0 10 20
Miles

December 5, 2007

Figure 1.
Ashtabula Vicinity Map
Barnes County, North Dakota

Project Area
Reference
County Boundary
Water Bodies
Rivers/Streams
Lakes/Reservoirs
Transportation
Limited Access
Highway
Major Road

North Dakota
Montana
Bismarck
Minnesota
South Dakota
Pierre
Wyoming
Nebraska
Iowa

TETRA TECH EC, INC.

2.0 METHODS

2.1 Diurnal Fixed-point and Incidental Avian Use Surveys

Fixed-point Surveys

Avian point count surveys were conducted to evaluate avian use, behavior, and species composition during fall migration at the Ashtabula WRA. Fixed-point surveys (described below) were conducted for 20 minutes at 12 circular plots (Figure 2). Survey dates and locations of survey points were selected to occur during migration, to cover a diversity of habitats, and to ensure the best possible viewshed. Fall surveys were conducted weekly between August 30 and November 4 (Table 1).

Data were collected on all birds observed within an 800-meter radius circle centered on the point count location. Birds outside the 800-meter radius circle were recorded as incidentals (see below). Surveys at each point lasted for 20 minutes, during which time the observer continuously scanned for birds and recorded any visual or auditory observations. Point counts were conducted sequentially, by one observer. Counts were scheduled to cover all daylight hours. Data that were recorded and used in the analysis include species, number of individuals, time, height above ground, behavior, and flight direction. The order in which point count locations were surveyed differed among weeks to account for species variation during the day. Flight heights and distances from the observer were estimated by experienced field ornithologists, who had existing meteorological towers, local transmission lines, and topographic maps available for reference.

The survey protocol used in this study was designed to collect data on all bird species and to provide results that are comparable with other studies of avian use at wind farms (see discussion), rather than to target specific taxa. The benefit of using this method is that it estimates avian use throughout the day and captures activity by a variety of bird species. During the breeding season, songbirds are most active in the morning and can be difficult to detect during the afternoon. In contrast, raptors become active as the sunlight heats the air and creates thermals, which individuals use for soaring (Ballam 1984). Raptors, therefore, are more readily detected several hours after sunrise. Thus, the survey method used in this study is appropriate for the bird communities using the Ashtabula WRA.

Twenty-minute survey periods were selected because they provide adequate time to detect both raptors and non-raptors. However, time periods of 20 minutes may lead to double-counting of songbirds (i.e., counting the same individual more than once) because individuals may appear and disappear from view. For example, if a horned lark is detected perched on a fence then disappears from view, and 6 minutes later, a horned lark is seen flying, these birds are recorded as separate observations because it is not possible to distinguish individuals. Double-counting of birds is not problematic for this type of

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Figure 2. Ashtabula Avian Survey Points

Barnes County, North Dakota

PC 01
PC 02
PC 03
PC 04
PC 05
PC 06
PC 07
PC 08
PC 09
PC 10
PC 11
PC 12

Sheyenne River
Bald Hill Creek
Lake Ashtabula
Crow Lake
Larson Slough
Adams Slough

17th St
19th St
20th St
21st St
22nd St
23rd St
24th St
25th St
26th St
27th St
28th St
29th St
30th St
31st St
31 1/2 St
32nd St

116th Ave
117th Ave
118th Ave
119th Ave
120th Ave
121st Ave
122nd Ave
123rd Ave
124th Ave
125th Ave
126th Ave
127th Ave

River Rd
31st St
23rd-St
25th-St
20th-St
21st St
32

ASHTABULA
GRAND PRAIRIE
GETCHELL
NOLTIMIER

TETRA TECH EC, INC

1:80,000

0 1 2

Miles

FPL Energy

December 19, 2007

Water Bodies
- Perennial Stream
- Intermittent Stream
- Lakes/Reservoirs

- Avian Survey Points
- 800m Buffer Avian Survey Points
- Proposed Turbines 10/25/2007

Transportation
- Highway
- Major Road
- Local Road
- Minor Road
- Trail
- Service Roads

survey because the objective is to document use in terms of number of birds noted per 20-minute survey, not number of distinct individual birds.

Detectability varies among species and potentially not all individuals within the 800-meter survey were counted. This variation in detectability results in an overestimate of mean use in conspicuous species and an underestimate of mean use in reclusive species (Thompson 2002). Birds not easily identifiable, such as those seen under low light conditions, were identified to the lowest taxonomic level possible. Hence, unidentified birds are presented in the results.

Incidental Observations

Incidental observations were those recorded outside of the official 20-minute survey period and beyond 800 m from the point count sites. Incidental observations included observations that occurred 1) during travel between points, 2) before or after the official 20-minute survey period, and 3) outside the 800-meter radius circular plot. These observations were recorded on separate data sheets and were not used in the formal analysis; however, a summary of incidental birds is presented to provide additional information about species found in the local area.

Data Quality Assurance/Quality Control (QA/QC)

QA/QC measures were implemented during all stages of data collection, analysis, and report preparation. To ensure legibility and completeness of data sheets, each observer reviewed, and clarified if needed, all data sheets before data entry into a Filemaker™ relational database for data storage and analysis. Prior to analysis, an independent reviewer conducted a 100 percent quality review of the data entries. Any questions that arose at this time were directed toward and answered by field personnel.

2.2 Analysis

Species Groupings

Two primary groups of interest were considered: raptors and non-raptors. Raptors were defined as vultures, hawks, eagles, falcons, and owls. Although vultures are more closely related to storks, their flight behavior is similar to raptors and they are often included as raptors in other studies; therefore, they have been included as raptors for the purpose of the analyses. Non-raptors were defined as all other species groups.

Avian Use of the Ashtabula WRA

Avian use of the Ashtabula WRA was derived by calculating the average number of birds observed per point count location. To evaluate the diversity and composition of avian species using the Ashtabula WRA, the number of individuals and species were summarized. In addition, the number of observations is also presented, where an observation can be either an individual bird or a discrete flock of birds. This information helps evaluate if a high mean use is driven by a single event (e.g., flock of birds moving through the rotor swept area).

Flight Behavior

Flight behavior was evaluated by calculating the proportion of flying birds that were observed below, within, or above the turbine rotor swept area (RSA). Turbines proposed for this site are Clipper 2.5 megawatt. Therefore, an RSA between 32 and 128 meters above ground was used. A bird was considered to have flown within the RSA if any of its recorded heights overlapped the RSA. That is, if a bird flew at heights that correspond to the RSA at any time during the survey, it was considered to have occurred within the RSA.

Encounter Rate

To estimate the rate at which a species flies though the anticipated RSA, the following equation was applied to each species observed in the Ashtabula WRA:

$$\text{Encounter Rate} = A*P_f*P_t$$

where A is the mean number of birds/20 min for a given species, Pf is the proportion of the species observed flying; and Pt is the proportion of the flying observations that were within the turbine RSA. The encounter rate provides information on the rate at which a species moves through the RSA. This information is an important component in evaluating risk; however, this number alone does not indicate risk to a species.

3.0 RESULTS

3.1 Ashtabula WRA

About 2.4 square miles of the Ashtabula WRA were surveyed during point count surveys. The 12 point count locations were surveyed 11 times, which resulted in 132 total 20-minute surveys.

3.2 Species Composition

A total of 29,895 birds of 61 identified and 9 unidentified species groups were recorded during 132 fixed-point count surveys. The most frequently observed birds were the red-winged blackbird (29.6 percent of all birds observed), Canada goose (18.4 percent), mallard (9.8 percent), common grackle (6.9 percent) and unidentified duck (4.9 percent; Table 2). Each remaining species comprised 4 percent or less of the total number of birds observed.

3.3 Avian Use

Overall mean bird use within the Ashtabula WRA was 226.48 birds/20 min, ranging from zero to 7,000 birds per 20-minute point count. Mean use by non-raptors was 225.93 birds/20 min. The non-raptors with the highest mean use were the red-winged blackbird (67.01 birds/20 min), Canada goose (41.66 birds/20 min), mallard (22.17 birds/20 min), common grackle (15.57 birds/20 min), and unidentified duck (11.04 birds/20 min; Table 2). Mean use was above 300 birds/20 min on the October 14, 28, and November 11 surveys (Figure 3). Two species, the Canada goose and mallard, were the primary contributors to high mean use on these 3 survey dates. Species that contributed to high

mean use on October 14 were the Canada goose (1,022 individuals), red-winged blackbird (636 individuals), horned lark (621 individuals), mallard (606 individuals), unidentified blackbird (591 individuals), American coot (420 individuals), common grackle (260 individual), ring-necked duck (170 individuals), and ruddy duck (120 individuals). Species that contributed to high mean use on October 28 were the red-winged blackbird (7,300 individuals), Canada goose (1,219 individuals), mallard (600 individuals), and horned lark (203 individuals). Species that contributed to high mean use on November 4 were the Canada goose (1,887 individuals), mallard (950 individuals), common grackle (800 individuals), snow bunting (548 individuals), and snow goose (200 individuals). Mean use for non-raptors was highest at point 5 (approximately 758 birds/20 min) and point 10 (approximately 866 birds/20 min; Figure 4).

Among species groups, mean use was highest for songbirds (118.24 birds/20 min). The top species, red-winged blackbirds (67.01 birds/20 min) accounted for 56.7 percent of individuals in this species group. Other songbirds commonly observed included common grackle (15.57 birds/20 min), unidentified blackbird (8.32 birds/20 min), horned lark (7.63 birds/20 min), unidentified passerine (6.90 birds/20 min), tree swallow (4.37 birds/20 min), and snow bunting (4.15 birds/20 min; Table 3). Waterfowl had the second highest mean use (84.58 birds/20 min) and included the Canada goose (41.66 birds/20 min) and mallard (22.17 birds/20 min). Among the remaining species groups, mean use was low (< 1.0 birds/20 min).

Raptors, because of their propensity to fly at heights similar to those encompassed by a turbine RSA, are a group of special interest. Overall mean use for raptors was 0.55 birds/20 min. The raptor species with the highest use was the red-tailed hawk (0.28 birds/20 min). Species with lower use included the northern harrier (0.11 birds/20 min) and unidentified hawk (0.07 birds/20 min). Mean use for each other raptor species was 0.03 birds/20 min or fewer and included the American kestrel, merlin, great horned owl, unidentified falcon, Swainson's hawk, and rough-legged hawk. On October 9, mean use (1.17 birds/20 min) was notably higher than overall mean use for raptors and included 8 red-tailed hawk observations (Figure 5). Mean use by raptors was lower than 1.0 birds/20 min on all other survey dates and was very low at the beginning (August 30) and end (October 28 - November 4) of the fall survey period. Mean use by raptors varied among point count locations and ranged from 0.09 birds/20 min at point 10 to 0.91 birds/20 min at point 8 (Figure 6).

3.4 Frequency of Occurrence

Songbirds were present in all survey points and were widely distributed throughout the Ashtabula WRA (Table 4). The red-winged blackbird (34.1 percent of all surveys), barn swallow (16.7 percent), unidentified blackbird (15.9 percent), and horned lark (15.9 percent) occurred most often (Table 3). Each other passerine species was detected in less than 10 percent of surveys.

Figure 3: Mean non-raptor use by survey date (fall 2007)

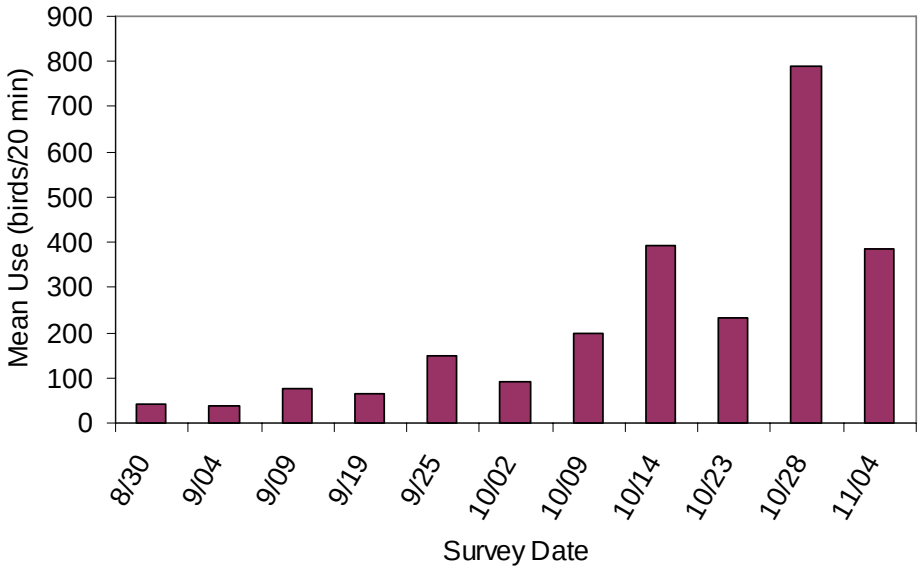
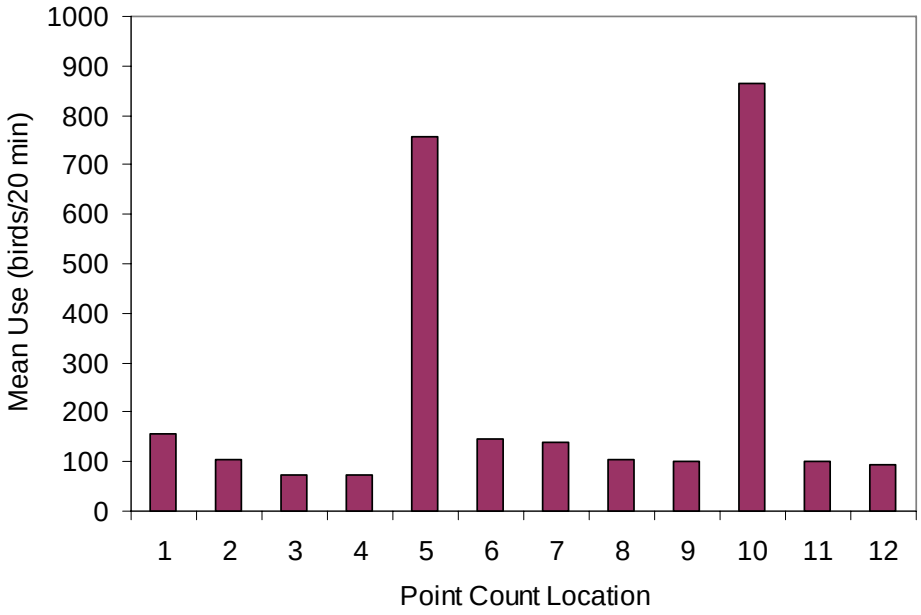


Figure 4: Mean non-raptor use by point count location (fall 2007)



Waterfowl were the second most common species group observed during fall surveys. The Canada goose (31.1 percent of all surveys), mallard (15.9 percent), and unidentified duck (15.2 percent) were observed regularly (Table 3). Each remaining waterfowl species was detected in less than 5 percent of surveys.

Raptors were the third most common species group observed during the fall surveys. Among raptors, red-tailed hawks (19.7 percent of all surveys) and northern harriers (9.1 percent) were most prevalent (Table 3). Red-tailed hawks were observed at all point count locations except point 12 (Table 4).

3.5 Flight Height and Encounter Rate

During fall avian use surveys, behavioral data were collected for 100 percent of all birds observed during point count surveys. Of these birds, 36.4 percent were observed flying with flight height and flight direction data available for 100 percent of the observations. For flying raptor species, 57.9 percent flew below the anticipated RSA and 42.1 percent flew within the RSA (Table 5). For all other species, 56.0 percent occurred below the anticipated RSA, 42.9 percent flew within the RSA, and 1.1 percent flew above the RSA (Table 5).

The ring-billed gull had the highest encounter rate (6.82 birds flying within the RSA/20 min), followed by unidentified passerine (5.71 birds flying within the RSA/20 min), Canada goose (5.21 birds flying within the RSA/20 min), double-crested cormorant (3.38 birds flying within the RSA/20 min), unidentified duck (2.89 birds flying within the RSA/20 min), snow bunting (2.65 birds flying within the RSA/20 min). All remaining species had encounter rates of <2.0 bird/20 min (Table 6). Raptor encounter rates were low, of these red-tailed hawks had the highest encounter rate (0.14 birds flying within the RSA/20 min).

Figure 5: Mean raptor use by survey date (fall 2007)

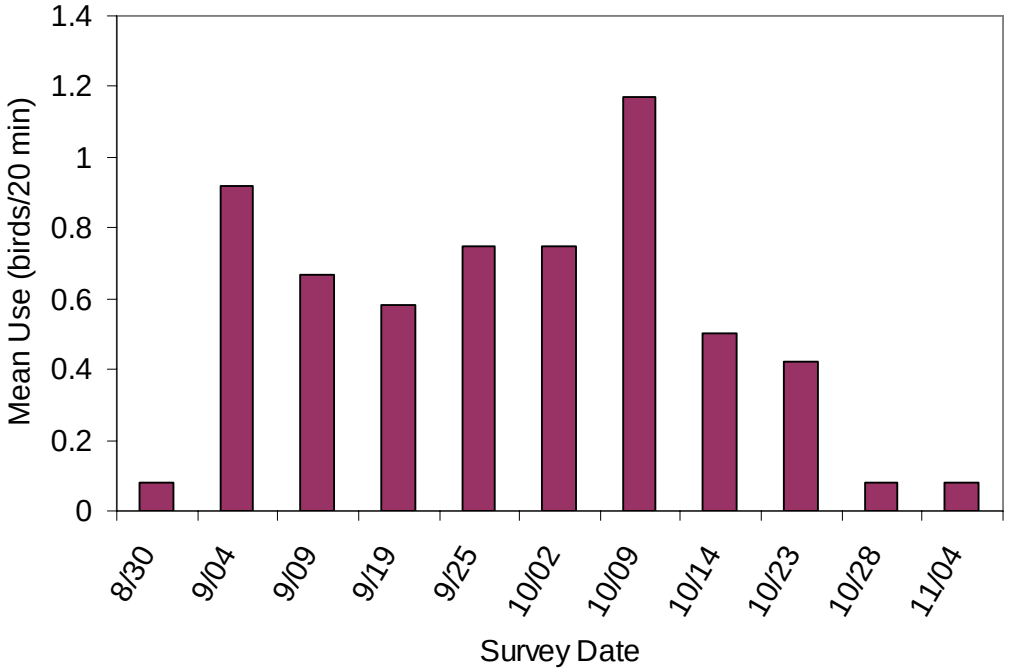
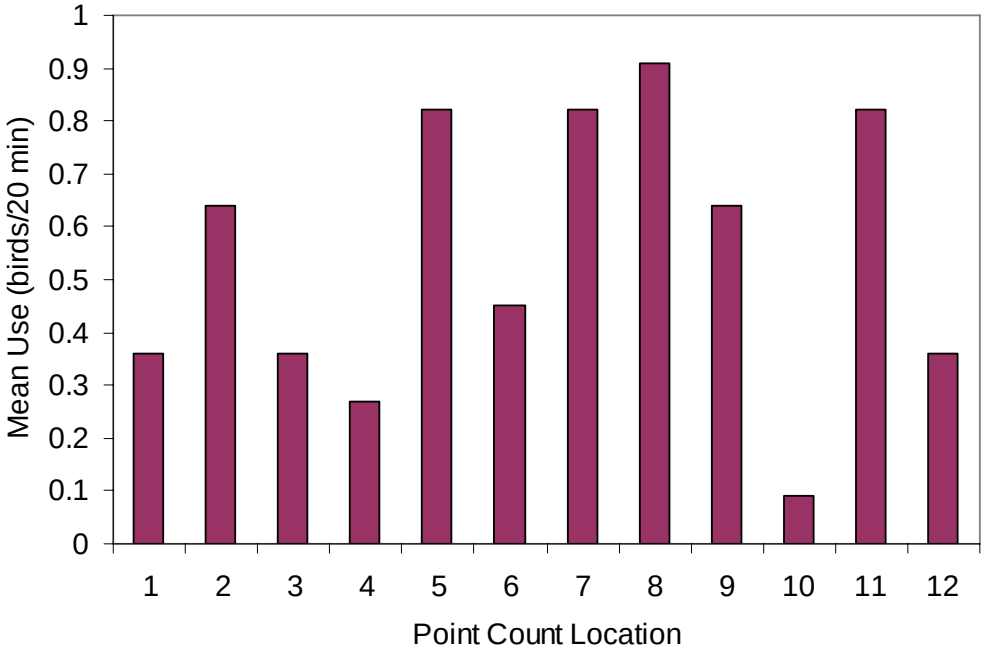


Figure 6: Mean raptor use by point count location (fall 2007)



3.6 Flight Direction

No patterns emerged in overall bird flight direction; however, patterns did occur with some of the most abundant bird species. Red-winged blackbirds were commonly seen flying north (55.8 percent of the time seen flying; Table 7). Canada geese flew predominately east (46.0 percent). Unidentified blackbirds commonly flew east (48.0 percent) and southwest (30.5 percent).

3.7 Incidental Surveys

During incidental spring surveys, field personnel documented 51 species, and a total of 20,894 birds (Table 8). Red-winged blackbirds were the most commonly recorded species during incidental surveys within the Ashtabula WRA (18,000 birds). Seven species, the American pipit, blue jay, dark-eyed junco, greater yellowlegs, northern shrike, prairie falcon, and semipalmated sandpiper, were documented as incidentals but were not detected during fall point count surveys. Several raptor species were observed both as incidentals and during the point count surveys including the American kestrel, northern harrier, red-tailed hawk, and Swainson's hawk.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 Raptor Use and Encounter Rate

Overall raptor use at the Ashtabula WRA was moderate during the fall 2007 surveys (0.55 birds/20 min). Mean raptor use was relatively consistent throughout the survey period, although was very low at the beginning (August 30) and end (October 28 - November 04). On October 9, mean use (1.17 birds/20 min) was notably higher than overall mean use for raptors and included 8 red-tailed hawk observations. Raptor use varied among point count locations but was <1.0 birds/20 min at each point suggesting that there are no areas of high raptor concentrations. These results could be due to weather patterns that influence raptor activity or raptor use increased during migration.

The Ashtabula WRA ranked ninth out of 16 when compared to fall raptor use rates reported for existing wind energy facilities throughout the country (Table 9). Because studies of avian use do not share identical methodologies (e.g., length of survey period), comparisons of avian use represent generalizations only. High raptor use has been associated with high raptor mortality at wind farms (Erickson 2007). However, the conclusion is based on two data points for high raptor use (>2.0 birds/20 minutes). Similarly, raptor mortality appears to be low when raptor use is low (<1.0 birds/20 min; Erickson 2007). Continued monitoring and additional analysis of encounter rate and post-construction mortality data will help elucidate the relationship between these two variables.

Red-tailed hawks, the major contributor to overall raptor use, were seen throughout the Ashtabula WRA. Red-tailed hawks had the highest encounter rate of all raptors (0.14 birds flying within the RSA/20 min). This represents a low overall encounter rate indicating that there should be low levels of mortality. However, based on the propensity

of red-tailed hawks to fly within the RSA, coupled with mortality records from other wind farms, they are at risk of being killed by wind turbines (Erickson et al. 2004). Because red-tailed hawks are widespread and the populations are increasing across the United States (Poole 2005), population level impacts are unlikely to result from collisions with wind turbines at the Ashtabula WRA.

Several other raptor species with lower encounter rates were observed in the Ashtabula WRA. The northern harrier, a Level II North Dakota State Species of Conservation Priority (see *Listed and Sensitive Species* section), was the second highest contributor to overall raptor use; however, this species has a very low encounter rate (0.01 birds flying within the RSA/20 min). This is a result of northern harrier's propensity to fly below the RSA (96.4 percent observed flying below the RSA) coupled with low mean use. American kestrels, merlins, great horned owls, Swainson's hawks, and rough-legged hawks were also observed at the Ashtabula WRA (Table 3). All had relatively low encounter rates (0.01 or fewer birds flying within the RSA/20 min) due to their low number of observations and the fact that, when observed flying, they were below the RSA (Table 6). The Swainson's hawk is a Level I North Dakota State Species of Conservation Priority (see *Listed and Sensitive Species* section).

4.2 Non-Raptor Use and Encounter Rate

Overall use by non-raptors at the Ashtabula WRA was very high in the fall 2007 surveys (225.93 birds/20 min). Mean non-raptor use increased in October and began to decline at the end of the fall survey period in November. Red-winged blackbirds, Canada geese, mallards, and common grackles (all common during the surveys) form flocks during the non-breeding season and often forage and travel in large groups. Flock size may be increased when individuals that bred outside of the area join the group for the winter. High non-raptor use was detected at point 10 (9,528 total non-raptors) and included high numbers of Canada geese, mallards, unidentified ducks, coots, ruddy ducks, unidentified gulls, European starlings, and redheads. Point 10 is located near Lake Ashtabula, which accounts for the high numbers of waterfowl. Point 5 also had high non-raptor use (8,344 total non-raptors) and included red-winged blackbirds, common grackle, unidentified blackbirds, and snow buntings. The habitat near point 5 is characterized by pastureland and is in close proximity to Larson Slough, which provides both foraging and roosting habitat for the most commonly observed species at this point.

The Ashtabula WRA ranked first out of 8 when compared to fall non-raptor use rates reported for existing wind energy facilities throughout the country (Table 9). Songbirds had the highest mean use out of all groups (118.24 birds/20 min), and waterfowl had the second highest (84.58 birds/20 min). Mean use was less than 0.1 birds/20 min for each remaining non-raptor species groups. The most commonly observed species, the red-winged blackbird (67.01 birds/20 min), Canada goose (41.66 birds/20 min), mallard (22.17 birds/20 min), and unidentified duck (11.04 birds/20 min) all had high encounter rates because they regularly flew through the RSA and had high mean use. The common grackle, also observed regularly (15.57 birds/20 min), had a low encounter rate despite high mean use because individuals did not regularly fly though the RSA.

The highest encounter rates for non-raptors were found for the ring-billed gull, unidentified passerine, Canada goose, and double-crested cormorant. Encounter rates were high for the ring-billed gull (6.82 birds flying within the RSA/20 min), unidentified passerine (5.71 birds flying within the RSA/20 min), and double-crested cormorant (3.38 birds flying within the RSA/20 min) because mean use was high and these species almost always flew within the RSA. Conversely, Canada geese (5.21 birds flying within the RSA/20 min) flew less often in the RSA, but had a high encounter rate because of their high mean use.

Red-winged blackbirds had the highest mean of all species. Land use within the WRA is predominantly agricultural and contains areas of suitable breeding habitat. Red-winged blackbirds tend to travel in flocks during the non-breeding season containing large numbers of birds. Within the United States, blackbirds are very abundant, exhibiting broad stable populations, and often managed as a pest species in agricultural settings (Yasukawa and Searcy 1995), consequently, fluctuation in their local populations elicit very little concern from wildlife agencies. Additionally, in a post-construction fatality monitoring survey conducted at the High Winds project at the Montezuma Hills in California, where blackbird use has been shown to be exceptionally high, only two red-winged blackbird fatalities were recorded during the year long survey (Kerlinger et al. 2005).

Waterfowl were a primary contributor to high mean non-raptor use. However, the high use rates are unlikely to translate into high mortality rates for waterfowl. In post-construction mortality studies at other wind resource areas, waterfowl mortality were generally low (Erikson et al. 2002), and no waterfowl were found dead at a wind farm in Iowa surrounded by areas of high waterfowl use (maximum of 10,000 individuals present during bi-weekly census, Jain 2007). Canada goose mortality in particular is very rare at wind farms (Erikson et al. 2002, Jain et al. 2007). However, waterfowl mortality has been noted at sites with significant sources of open water near turbines (Erikson et al. 2002, Drewitt and Langston 2006). Lake Ashtabula is a potential staging area for waterfowl and other water birds, shorebirds, and wading birds. The Ashtabula WRA also contains smaller bodies of water including Larson Slough and Adams Slough. Due to the large numbers of waterfowl observed during the fall survey, waterfowl mortality could result but should not have population level impacts because high rates of waterfowl mortality have not been documented at other wind energy facilities.

4.3 Listed and Sensitive Species

No federally listed threatened or endangered species were observed during fall avian surveys; however, five species (the American white pelican, Franklin's gull, Swainson's hawk, northern harrier, and sharp-tailed grouse) are North Dakota State Species of Conservation Priority. The North Dakota Game and Fish Department (NDGFD) defines Species of Conservation Priority as either Level I, II, or III. A Level I Species of Conservation Priority is described as "species having a high level of conservation priority because of declining status either in North Dakota or across their range; or a high rate of occurrence in North Dakota constituting the core of the species' breeding range, but are at-risk range wide, and non-State Wildlife Grant funding is not readily available to them" (NDGFD 2007).

The Swainson's hawk, American white pelican, Franklin's gull, and are Level I Species of Conservation Priority. A single Swainson's hawk and 3 Franklin's gulls were observed; therefore, expected mortality is low if these numbers are representative of use during other times of the year. The American white pelican had a low encounter rate (0.17 birds/20 min). Specific information regarding the interactions of American white pelicans and wind turbines is absent, but because of their large size, limited maneuverability, and propensity to fly within the RSA fatalities could result. Franklin's gull had a very low encounter rate (0.01 birds/20 min).

A Level II Species of Conservation Priority is described as a "species having a moderate level of conservation priority; or a high level of conservation priority, but a substantial amount of non-State Wildlife Grant funding is available to them" (NDGFD 2007). Level II Species of Conservation Priority detected in the Ashtabula WRA included northern harrier and sharp-tailed grouse. Post-construction mortality studies at existing wind farms have found lower than expected northern harrier fatalities (Orloff and Flannery 1992, Young et al. 2003). Therefore, population level impacts are unlikely to occur. Sharp-tailed grouse also had a very low encounter rate suggesting that direct mortality will be low; however, grouse have been shown to avoid tall vertical structures near the lek site, potentially resulting in decreased breeding success (Giensen and Connally 1993, USFWS 2004). Sharp-tailed grouse surveys (lek surveys) can be used to locate breeding areas. If leks are located, set-backs may be required by the state.

Although sandhill cranes are not state or federally threatened or endangered, the whooping crane, a federally listed endangered species, may travel with sandhill cranes during migration (Austin and Richert 2001). The USFWS indicated that there is a potential for federally endangered whooping crane to migrate through the Ashtabula WRA (Tetra Tech 2007). Cranes are at higher risk of collision with power lines and turbines if there is feeding or roosting habitat in the vicinity of these structures because flight height of cranes when moving between feeding and roosting areas is within the height of transmission lines and the RSA. The sandhill cranes observed at the Ashtabula WRA had an encounter rate of 0.38 birds/20 flying through the RSA and 100% of observations occurred within the RSA (between 32 and 128 m from the ground), suggesting that they were moving between feeding or roosting areas. Thus, crane surveys are recommended to determine if sandhill cranes use the Ashtabula WRA and surrounding area for roosting or foraging, which would indicate potential areas of whooping crane occurrence.

Two Level II Species of Conservation Priority, the northern pintail and prairie falcon, were recorded only as incidental observations. Because these species were only detected as incidentals and behavioral data was not recorded or analyzed, inferences regarding the potential for the Ashtabula WRA to affect their populations are limited. Spring surveys will clarify if these species regularly use the Ashtabula WRA during other times of the year.

4.4 Potential Impacts to Avian Species

The possible impacts to avian species from the construction and operation of the Ashtabula wind farm are direct morality and injury from collisions with wind turbines and/or guy wires, temporary or permanent habitat loss, and displacement of birds from habitats near turbines (Drewitt and Langston 2006). Historically, raptor mortality has received the most attention. Raptor mortality at newer generation wind projects has been low relative to previous generation wind farms (Erickson et al. 2002). A number of mortality monitoring studies at newer generation wind projects have found fewer than five individual raptor mortalities (e.g., Erickson et al. 2003, Jain et al. 2007, Johnson et al. 2002, Kerns and Kerlinger 2004), but one study at the Stateline Wind Project in Oregon and Washington found as many as 17 dead raptors within a 2.5 year monitoring period (Erickson et al. 2004). Although raptor mortality is reduced, mortality may not be eliminated by advances in turbine technology and local micro-siting and site evaluation efforts are still necessary.

At newer generation wind energy facilities outside of California, approximately 80 percent of documented mortalities have been passerines (e.g., songbirds); of which 50 percent were night migrants (Erickson et al. 2002). It is estimated that less than 0.01 percent of migrant songbirds that pass over wind farms are killed, based on radar data and mortality monitoring at wind farms in Oregon, Washington, and Minnesota (Erickson 2007). Resident species may have lower mortality than migrants because many songbirds do not fly within the RSA. However, some resident species have behaviors that increase the risk of collisions with turbines because they fly within the RSA. For example, horned larks have been commonly found as fatalities at wind farms (Erickson et al. 2002). Mortality may be partially attributed to the fact that male horned larks perform flight songs in which the male climbs into a strong wind to heights of 80 to 250 meters (Pickwell 1931).

In addition to mortality associated with wind farms, concerns have been raised that bird species may avoid areas near turbines after the wind farm is in operation (Drewitt and Langston 2006). For example, at the Buffalo Ridge wind energy facility in Minnesota, densities of male songbirds were significantly lower in Conservation Reserve Program (CRP) grasslands containing turbines than in CRP grasslands without turbines. It was suggested that the reduced density may be due to avoidance of turbine noise and maintenance activities, and reduced habitat quality due to the presence of access roads and large gravel pads surrounding the turbines (Leddy et al. 1999). Reduced abundance of grassland songbirds was found within 50 meters of a turbine pad for a wind farm in Washington and Oregon, but the investigators attributed displacement to the direct loss of habitat or reduced habitat quality and not the presence of the turbines (WEST and NWC 2004). Although breeding grassland songbirds have not shown strong avoidance to date, other species groups (e.g., prairie grouse) may respond differently based on avoidance of other anthropogenic features on the landscape (Pitman et al. 2005).

4.5 Ashtabula Project Area Conclusions and Recommendations

Non-raptor use at the Ashtabula WRA ranked first of 8 studies, and most non-raptors detected were songbirds and waterfowl. The most commonly observed species; the red-

winged blackbird, Canada goose, mallard, and common grackle are all widespread species and have relatively stable populations (Sauer et al. 2007, Cornell Laboratory of Ornithology 2007). Thus, local mortality of resident species is not expected to have population level consequences. Potential impacts to wetland associated species could be minimized if turbines are sited away from point count locations 5 and 10, which were located near Lake Ashtabula, and Larson and Adams Sloughs because these areas serve as wildlife attractants. Night migrants may pass through the Ashtabula WRA and would not be detected by the survey methods used in this study. Although nocturnal migrants were not surveyed, mortality of migrants at the Ashtabula WRA is not expected to have population implications because less than 0.01 percent of night migrants that fly through wind farms are killed (Erickson 2007).

Raptor use at the Ashtabula WRA was moderate when compared to other wind resource areas. The two principal species observed were the red-tailed hawk and northern harrier. Northern harriers generally have low mortality at wind farms because they fly below the RSA; however, red-tailed hawks have higher fatalities (Orloff and Flannery 1992, Kerlinger et al. 2005). Preliminary data also suggests that high raptor use at new generation wind farms is correlated with high fatalities (Erickson 2007). These impacts could be minimized if turbines are sited away from areas of high raptor use, active raptor nests, and saddles along ridgelines, and are offset from ridge edges. The following Best Management Practices and recommended studies should provide measures to minimize impacts to birds from the construction and operation of the Ashtabula wind facility.

Best Management Practices

Several best management practices can be implemented at wind farm facilities in order to avoid and minimize potential impacts to avian species and habitat. These practices are important not only to reduce the potential for individuals to be injured or killed by turbines, transmission lines, or other wind farm components, but to also protect and enhance habitat for species of concern.

Project Specific Recommendations

- Five North Dakota State the Species of Conservation Priority (American white pelican, Franklin's gull, Swainson's hawk, northern harrier, and sharp-tailed grouse) were observed during fall avian surveys. State wildlife personnel should be contacted to determine what mitigation measures, if necessary, are needed for these species.
- If possible, site turbines away from point count locations 5 and 10, which had the highest non-raptor use and were in close proximity to water.

Standard Best Management Practices

- Studies have shown that birds, including bald eagles, are susceptible to electrocution by power lines (APLIC 2006). Therefore, the use of overhead power lines should be minimized; when they are necessary, power poles should be fitted with bird perch guards to minimize bird use.
- The use of lights on turbines should be minimized when practicable in accordance with state, federal, and local requirements, because lights may attract migrating

birds to the vicinity of turbines, particularly during certain weather conditions (Evans et al. 2007).

- Active raptor nests may require timing restrictions for construction or operation activities, or alterations to the turbine design plan. Raptor nests discovered during construction should be mapped and flagged. Turbines should be placed as far away from raptor nests as project and engineering constraints permit and avoid removal of trees. If the nest is identified to belong to a species of concern, it may be designated a 'no disturbance zone' during the construction phase (APLIC and USFWS 2005, APLIC 2006). Turbines should be placed out of a direct line of sight of the nest.
- Habitat loss is typically the leading cause of population declines in a number of species of concern. Bird species are dependent on the native plants for food, cover, and breeding habitat. Degraded vegetative communities or the presence of invasive plant species can reduce the amount of available quality habitat for birds in these areas. In order to decrease the loss of bird habitat, the following practices are recommended:
  - To the greatest extent possible, minimize impacts to native vegetation and riparian areas during design and construction of turbines and associated infrastructure.
  - If native vegetation is disturbed or removed during construction of roads or turbines, these areas should be reseeded or planted with native material.
  - Where practical, existing degraded habitat could also be enhanced through the removal and replacement of invasive species with plants native to the site.
- To maintain high quality native habitats used by birds, a management plan should be developed to prevent the spread of noxious weeds throughout the Ashtabula WRA or adjacent areas during construction and ongoing operations. Any area that is disturbed or altered should be managed appropriately to avoid the introduction or spread of noxious species. This practice is important to reduce detrimental impacts to avian habitat. The appropriate weed control board should be consulted to develop this plan.

Additional Recommended Studies

- Spring avian surveys are recommended to determine the level of avian use during spring migration, as migration patterns differ between spring and fall.
- Raptor nest site identification surveys should be conducted after leaves have dropped from trees. Any raptor nest identified during the fall nest survey should be revisited in April to June to determine breeding activity.
- Crane surveys should be conducted in Spring 2008 to determine how cranes use the Ashtabula WRA. These surveys will help determine the likelihood that the federally endangered whooping crane would utilize the Ashtabula WRA.
- Lek surveys should be conducted in Spring 2008 to determine areas potentially used for breeding sharp-tailed grouse.
- Post-construction mortality monitoring is recommended to quantify impacts to avian species.

5.0 REFERENCES

Austin J.E. and A.L. Richert. 2001. A Comprehensive Review of Observational and Site Evaluation Data of Migrant Whooping Cranes in the United States, 1943–1999. U.S. Geological Survey, Northern Prairie Wildlife Research Center, Jamestown, North Dakota.

Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington,, D.C. and Sacramento, CA.

Avian Power Line Interaction Committee (APLIC) and U.S. Fish and Wildlife Service. 2005. Avian Protection Plan Guidelines. Edison Electric Institute, APLIC, and the U.S. Fish and Wildlife Service.

Ballam, J. M. 1984. The use of soaring by the red-tailed hawk (*Buteo jamaicensis*). Auk 3:519-524.

Birdnature.com (BNC) 2004, North American Migration Pathways (map). Available online at http://www.birdnature.com/flyways.html. Accessed December 11, 2007.

Cornell Laboratory of Ornithology. 2007. All About Birds 2007. Available online at http://www.birds.cornell.edu/AllAboutBirds. Accessed December 14, 2007.

Drewitt, A. L. and R. H. W. Langston. 2006. Assessing the impacts of wind farms on birds. Ibis 148:29-42.

Erickson, W.P. 2007. Summary of methods and results for prediction and estimation of impacts and risk. Presented at NWCC Probability of Impact Workshop, 13 November 2007, Golden, CO.

Erickson, W.P., G.D. Johnson, and D.P. Young, Jr. 2005. A summary and comparison of bird mortality from anthropogenic causes with an emphasis on collisions. USDA Forest Service Gen. Tech. Rep. PSW-GTR-191.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Final Report, July 2001 – December 2003. Technical report peer-reviewed by and submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Stateline Technical Advisory Committee.

Erickson, W., D. Young, G. Johnson, J. Jeffrey, K. Bay, R. Good, and H. Sawyer. 2003. Wildlife Baseline Study for the Wild Horse Wind Project, Summary of Results from 2002-2003 Wildlife Surveys. Prepared for Zilkha Renewable Energy, Portland, Oregon.

Erickson, W., G. Johnson, D. Young, D. Strickland, R. Good, M. Bourassa, K. Bay, K. Sernka. 2002. Synthesis and comparison of baseline avian and bat use, raptor nesting and mortality information from proposed and existing wind developments. Technical report prepared by WEST, Inc., for Bonneville Power Administration, Portland, Oregon.

Evans, W. R., Y. Akashi, N.S. Altman, and A. M. Manville II. January 2007. Response of night-migrating birds in cloud to colored and flashing light. A report to the Communications Tower Working Group.

Faanes, Craig A., and Robert E. Stewart. 1982. Revised checklist of North

Dakota birds. The Prairie Naturalist 14(3):81-92.

Hoover, S.L. and M.L. Morrison. 2005. Behavior of red-tailed hawks in a wind turbine development. Journal of Wildlife Management 69:150-159.

Jain, A. A. 2007. Bird and bat behavior and mortality at a northern Iowa windfarm. M.S. thesis, Iowa State University.

Jain, A. A., P. Kerlinger, R. Curry, and L. Slobodnik. 2007. Annual report for the Maple Ridge wind power project postconstruction bird and bat fatality study – 2006. Prepared by Curry and Kerlinger, LLC for PPM Energy, Horizon Energy, and Technical Advisory Committee for the Maple Ridge project.

Johnson, G.D., W. P Erickson, and J. D. Jeffrey. 2006. Analysis of potential wildlife impacts from the Windy Point wind energy project, Klickitat County, Washington. Technical Report prepared by Western EcoSystems Technology, Inc., for Ecology and Environment, Portland, Oregon.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2002. Collision mortality of local and migrant birds at a large-scale wind power development on Buffalo Ridge, Minnesota. *Wildlife Society Bulletin* 30: 879-887.

Johnson, G. D., D. P. Young Jr., W. P. Erickson, C. E. Derby, M. D. Strickland, and R. E. Good. 2000. Wildlife monitoring studies, SeaWest Windpower Project, Carbon County, Wyoming. 1995-1999. Technical Report prepared by Western EcoSystems Technology, Inc., for SeaWest Energy Corporation and Bureau of Land Management.

Kerlinger, P., L. Culp, R. Curry, 2005. Post construction avian monitoring study for the High Winds wind power project. Solano County, California. Prepared for High Winds, LLC. FPL Energy. 70 pgs.

Kerns, J. and P. Kerlinger. 2004. A study of bird and bat collision fatalities at the Mountaineer Wind Energy Center, Tucker County, West Virginia: annual report for 2003. Technical report prepared by Curry and Kerlinger, LLC. For FPL Energy and Mountaineer Wind Energy Center Technical Review Committee.

Leddy, K. L., K. F. Higgins, and D. E. Naugle. 1999. Effects of wind turbines on upland nesting birds in CRP grasslands. Wilson Bulletin 111:100-104.

Mabee, T.J., B.A. Cooper, and C. Grinnell. 2005. Baseline Avian Use at the Klondike III Wind Project, Oregon, Winter 2004/2005. Prepared by ABR, Inc.—Environmental Research and Services for David Evans & Associates, Inc. 22 p.

North Dakota Game and Fish Department (NDGFD) 2007. North Dakota's 100 Species of Conservation Priority, What are they? Available online at http://gf.nd.gov/multimedia/ndoutdoors/issues/2004/jul/docs/species-intro.pdf. Accessed December 15, 2007.

Orloff, S., and A. Flannery. 1992. Wind turbine effects on avian activity, habitat use, and mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991. Final report prepared by Biosystems Analysis, Inc. for Alameda, Contra Costa, and Solano Counties and the California Energy Commission.

Pickwell, B. 1931. The Prairie Horned Lark. St. Louis Academy of Sciences Transactions 27: 1-153.

Pitman, J. C., C. A. Hagen, R. J. Robel, T. M. Loughin and R. D. Applegate. 2005. Location and success of lesser prairie-chicken nests in relation to vegetation and human disturbance. Journal of Wildlife Management 69:1259-1269.

Poole, A. (Editor). 2005. The Birds of North American Online. Available online at http://bna.birds.cornell.edu/BNA/. Cornell Laboratory of Ornithology, Ithaca, NY. Accessed December 15, 2007.

Sauer, J. R., J. E. Hines, and J. Fallon. 2007. The North American Breeding Bird Survey, Results and Analysis 1966 - 2006. Version 10.13.2007. USGS Patuxent Wildlife Research Center, Laurel, MD.

Tetra Tech. 2007. Critical Environmental Issues Analysis: Proposed Ashtabula Wind Generation Project, Barnes County, North Dakota. Prepared for FPL Energy.

Thompson, W. L. 2002. Towards reliable bird surveys: accounting for individuals present but not detected. Auk 119:18-25.

URS Corporation, WEST, and Northwest Wildlife Consultants. 2001. Final Report – Ecological Baseline Study for the Condon Wind Project. Prepared for Bonneville Power Administration and SeaWest Windpower, Inc.

URS Corporation and WEST. 2001. Avian Baseline Study for the Stateline Project. Prepared for ESI Vansycle Partners, L.P.

U.S. Department of the Interior, Bureau of Land Management, Twin Falls District, Burley Field Office (USDI). 2005. Draft Environmental Impact Statement for the Proposed Cotterel Wind Power Project and Draft Resource Management Plan Amendment, Burley, Cassia County, Idaho.

U.S. Fish and Wildlife Service (USFWS). 2004. Briefing Paper, Prairie Grouse Leks and Wind Turbines: U.S. Fish and Wildlife Service Justification for a 5-Mile Buffer from Leks; Additional Grassland Songbird Recommendations. Available online at www.fws.gov/southwest/migratorybirds/Prairie%20Grouse%20Lek%205%20Mile%20Public.doc. Accessed December 15, 2007.

Westerm EcoSystems Technology, Inc. (WEST). 2005. Wildlife and Habitat Baseline Study for the proposed Biglow Canyon wind power project, Sherman County, Oregon. Prepared for Orion Energy LLC. 66 p.

Western EcoSystems Technology Inc. (WEST) and Northwest Wildlife Consultants (NWC). 2004. Stateline Wildlife Monitoring Final Report. July 2001-December 2003. Prepared for FPLE, Stateline Technical Advisory Committee, and Oregon Department of Energy. 105 p.

Young, D.P. Jr., W.P. Erickson, R.E. Good, M.D. Strickland, and G.D. Johnson. 2003. Avian and bat mortality associated with the initial phase of the Foote Creek Rim Wind Power Project, Carbon County, Wyoming: November 1998 - June 2002. Technical Report prepared by WEST, Inc. for Pacificorp, Inc., SeaWest Windpower, Inc. and Bureau of Land Management. 35 pp.

Young, D., W. Erickson, K. Bay, R. Good, and K Kronner. 2002. Baseline Avian Studies for the Proposed Maiden Wind Farm, Yakima and Benton Counties, Washington. Final Report prepared for Bonneville Power Administration.

Table 1. Ashtabula Wind Resource Area, 2007 - Fall point count survey dates.

Survey number	Date
1	**August 30**
2	**September 4**
3	**September 9**
3	**September 10**
4	**September 19**
4	**September 20**
5	**September 25**
6	**October 2**
7	**October 9**
8	**October 14**
9	**October 23**
10	**October 28**
11	**November 4**

Table 2. Avian species observed during Fall point count surveys at the Ashtabula Wind Resource Area, 2007.

Species	Number of Birds	Number of Observations	Mean Use # birds per 20 min.	Frequency % of surveys detected	Percent Composition
red-winged blackbird	8845	108	67.01	34.1	29.6%
Canada goose	5499	71	41.66	31.1	18.4%
mallard	2926	29	22.17	15.9	9.8%
common grackle	2055	17	15.57	8.3	6.9%
unidentified duck	1457	26	11.04	15.2	4.9%
unidentified blackbird	1098	31	8.32	15.9	3.7%
horned lark	1007	39	7.63	15.9	3.4%
unidentified passerine	911	5	6.90	3.8	3.0%
ring-billed gull	906	5	6.86	3.0	3.0%
American coot	841	17	6.37	12.1	2.8%
double-crested cormorant	600	37	4.55	16.7	2.0%
tree swallow	577	15	4.37	7.6	1.9%
snow bunting	548	7	4.15	3.8	1.8%
ruddy duck	339	7	2.57	3.8	1.1%
ring-necked duck	282	6	2.14	3.8	0.9%
unidentified gull	272	22	2.06	6.8	0.9%
snow goose	250	3	1.89	2.3	0.8%
rock pigeon	247	9	1.87	6.8	0.8%
barn swallow	234	32	1.77	16.7	0.8%
European starling	115	1	0.87	0.8	0.4%
redhead	104	2	0.79	1.5	0.3%
Lapland longspur	104	7	0.79	4.5	0.3%
tundra swan	88	3	0.67	2.3	0.3%
lesser scaup	75	2	0.57	1.5	0.3%
green-winged teal	55	3	0.42	2.3	0.2%
sandhill crane	50	1	0.38	0.8	0.2%
blue-winged teal	46	5	0.35	3.8	0.2%
red-tailed hawk	37	33	0.28	19.7	0.1%
northern pintail	35	1	0.27	0.8	0.1%
mourning dove	31	21	0.23	9.1	0.1%
common redpoll	30	1	0.23	0.8	0.1%
killdeer	29	9	0.22	5.3	0.1%
unidentified sparrow	27	12	0.20	7.6	0.1%
American white pelican	23	3	0.17	2.3	0.1%
northern harrier	15	14	0.11	9.1	0.1%
western meadowlark	12	6	0.09	3.8	0.0%
vesper sparrow	12	9	0.09	6.8	0.0%
unidentified hawk	9	9	0.07	6.8	0.0%

Table 2. Avian species observed during Fall point count surveys at the Ashtabula Wind Resource Area, 2007.

Species	Number of Birds	Number of Observations	Mean Use # birds per 20 min.	Frequency % of surveys detected	Percent Composition
great blue heron	8	7	0.06	5.3	0.0%
yellow-headed blackbird	7	2	0.05	1.5	0.0%
unidentified tern	7	1	0.05	0.8	0.0%
sharp-tailed grouse	7	2	0.05	1.5	0.0%
savannah sparrow	7	4	0.05	1.5	0.0%
ring-necked pheasant	7	3	0.05	1.5	0.0%
American crow	6	4	0.05	3.0	0.0%
black-capped chickadee	5	3	0.04	2.3	0.0%
gadwall	4	2	0.03	1.5	0.0%
American robin	4	2	0.03	1.5	0.0%
American kestrel	4	4	0.03	3.0	0.0%
sora	3	3	0.02	2.3	0.0%
northern shoveler	3	2	0.02	1.5	0.0%
northern flicker	3	2	0.02	1.5	0.0%
Franklin's gull	3	3	0.02	2.3	0.0%
black tern	3	1	0.02	0.8	0.0%
brown-headed cowbird	3	1	0.02	0.8	0.0%
unknown bird	2	1	0.02	0.8	0.0%
merlin	2	2	0.02	0.8	0.0%
great horned owl	2	2	0.02	1.5	0.0%
common merganser	2	1	0.02	0.8	0.0%
American goldfinch	2	2	0.02	1.5	0.0%
white-throated sparrow	1	1	0.01	0.8	0.0%
upland sandpiper	1	1	0.01	0.8	0.0%
unidentified falcon	1	1	0.01	0.8	0.0%
Swainson's hawk	1	1	0.01	0.8	0.0%
rough-legged hawk	1	1	0.01	0.8	0.0%
pied-billed grebe	1	1	0.01	0.8	0.0%
Harris' sparrow	1	1	0.01	0.8	0.0%
eared grebe	1	1	0.01	0.8	0.0%
chipping sparrow	1	1	0.01	0.8	0.0%
black-crowned night-heron	1	1	0.01	0.8	0.0%
Grand Total	**29895**	**692**	**226.48**		

Table 3. Avian species, by species grouping, observed during Fall point count surveys at the Ashtabula Wind Resource Area, 2007.

Species Grouping Species	Number of Birds	Number of Observations	Mean Use # birds per 20 min.	Frequency % of surveys detected	Percent Composition
Songbirds					
red-winged blackbird	8845	108	67.01	34.1	29.6%
common grackle	2055	17	15.57	8.3	6.9%
unidentified blackbird	1098	31	8.32	15.9	3.7%
horned lark	1007	39	7.63	15.9	3.4%
unidentified passerine	911	5	6.90	3.8	3.0%
tree swallow	577	15	4.37	7.6	1.9%
snow bunting	548	7	4.15	3.8	1.8%
barn swallow	234	32	1.77	16.7	0.8%
European starling	115	1	0.87	0.8	0.4%
Lapland longspur	104	7	0.79	4.5	0.3%
common redpoll	30	1	0.23	0.8	0.1%
unidentified sparrow	27	12	0.20	7.6	0.1%
western meadowlark	12	6	0.09	3.8	0.0%
vesper sparrow	12	9	0.09	6.8	0.0%
yellow-headed blackbird	7	2	0.05	1.5	0.0%
savannah sparrow	7	4	0.05	1.5	0.0%
black-capped chickadee	5	3	0.04	2.3	0.0%
American robin	4	2	0.03	1.5	0.0%
brown-headed cowbird	3	1	0.02	0.8	0.0%
unknown bird	2	1	0.02	0.8	0.0%
American goldfinch	2	2	0.02	1.5	0.0%
white-throated sparrow	1	1	0.01	0.8	0.0%
Harris' sparrow	1	1	0.01	0.8	0.0%
chipping sparrow	1	1	0.01	0.8	0.0%
Group Total	**15608**	**308**	**118.24**		**52.2%**
Waterfowl					
Canada goose	5499	71	41.66	31.1	18.4%
mallard	2926	29	22.17	15.9	9.8%
unidentified duck	1457	26	11.04	15.2	4.9%
ruddy duck	339	7	2.57	3.8	1.1%
ring-necked duck	282	6	2.14	3.8	0.9%
snow goose	250	3	1.89	2.3	0.8%
redhead	104	2	0.79	1.5	0.3%
tundra swan	88	3	0.67	2.3	0.3%

Table 3. Avian species, by species grouping, observed during Fall point count surveys at the Ashtabula Wind Resource Area, 2007.

Species Grouping Species	Number of Birds	Number of Observations	Mean Use # birds per 20 min.	Frequency % of surveys detected	Percent Composition
lesser scaup	75	2	0.57	1.5	0.3%
green-winged teal	55	3	0.42	2.3	0.2%
blue-winged teal	46	5	0.35	3.8	0.2%
northern pintail	35	1	0.27	0.8	0.1%
gadwall	4	2	0.03	1.5	0.0%
northern shoveler	3	2	0.02	1.5	0.0%
common merganser	2	1	0.02	0.8	0.0%
Group Total	**11165**	**163**	**84.58**		**37.3%**
Raptors/Vultures/Owls					
red-tailed hawk	37	33	0.28	19.7	0.1%
northern harrier	15	14	0.11	9.1	0.1%
unidentified hawk	9	9	0.07	6.8	0.0%
American kestrel	4	4	0.03	3.0	0.0%
merlin	2	2	0.02	0.8	0.0%
great horned owl	2	2	0.02	1.5	0.0%
unidentified falcon	1	1	0.01	0.8	0.0%
Swainson's hawk	1	1	0.01	0.8	0.0%
rough-legged hawk	1	1	0.01	0.8	0.0%
Group Total	**72**	**67**	**0.55**		**0.2%**
Woodpeckers					
northern flicker	3	2	0.02	1.5	0.0%
Group Total	**3**	**2**	**0.02**		**0.0%**
Crows and Allies					
American crow	6	4	0.05	3.0	0.0%
Group Total	**6**	**4**	**0.05**		**0.0%**
Cranes/Rails					
sandhill crane	50	1	0.38	0.8	0.2%
sora	3	3	0.02	2.3	0.0%
Group Total	**53**	**4**	**0.40**		**0.2%**
Gamebirds					
sharp-tailed grouse	7	2	0.05	1.5	0.0%
ring-necked pheasant	7	3	0.05	1.5	0.0%
Group Total	**14**	**5**	**0.11**		**0.0%**
Waterbirds					
American coot	841	17	6.37	12.1	2.8%

Table 3. Avian species, by species grouping, observed during Fall point count surveys at the Ashtabula Wind Resource Area, 2007.

Species Grouping Species	Number of Birds	Number of Observations	Mean Use # birds per 20 min.	Frequency % of surveys detected	Percent Composition
double-crested cormorant	600	37	4.55	16.7	2.0%
American white pelican	23	3	0.17	2.3	0.1%
pied-billed grebe	1	1	0.01	0.8	0.0%
eared grebe	1	1	0.01	0.8	0.0%
Group Total	**1466**	**59**	**11.11**		**4.9%**
Gulls/Terns					
ring-billed gull	906	5	6.86	3.0	3.0%
unidentified gull	272	22	2.06	6.8	0.9%
unidentified tern	7	1	0.05	0.8	0.0%
Franklin's gull	3	3	0.02	2.3	0.0%
black tern	3	1	0.02	0.8	0.0%
Group Total	**1191**	**32**	**9.02**		**4.0%**
Pigeons/Doves					
rock pigeon	247	9	1.87	6.8	0.8%
mourning dove	31	21	0.23	9.1	0.1%
Group Total	**278**	**30**	**2.11**		**0.9%**
Shorebirds					
killdeer	29	9	0.22	5.3	0.1%
upland sandpiper	1	1	0.01	0.8	0.0%
Group Total	**30**	**10**	**0.23**		**0.1%**
Wadingbirds					
great blue heron	8	7	0.06	5.3	0.0%
black-crowned night-heron	1	1	0.01	0.8	0.0%
Group Total	**9**	**8**	**0.07**		**0.0%**
Grand Total	**29895**	**692**	**226.48**		

Table 4. Avian species observed by point during Fall point count surveys at the Ashtabula Wind Resource Area, 2007.

Species	Number of Birds	Number of Obs.	Points					
			1	2	3	4	5	6
red-winged blackbird	8845	108	542	26	101	191	7103	572
Canada goose	5499	71	41	0	24	136	23	86
mallard	2926	29	361	0	0	0	0	23
common grackle	2055	17	148	5	1	26	801	105
unidentified duck	1457	26	21	0	3	7	0	85
unidentified blackbird	1098	31	258	58	0	383	256	50
horned lark	1007	39	6	7	609	0	9	25
unidentified passerine	911	5	150	0	6	0	1	0
ring-billed gull	906	5	0	900	0	0	0	6
American coot	841	17	20	0	0	0	0	0
double-crested cormorant	600	37	27	10	23	0	5	43
tree swallow	577	15	35	66	0	25	0	12
snow bunting	548	7	0	0	0	0	100	35
ruddy duck	339	7	0	0	0	0	0	0
ring-necked duck	282	6	0	0	0	0	0	200
unidentified gull	272	22	27	0	0	0	0	1
snow goose	250	3	0	0	0	0	0	0
rock pigeon	247	9	0	9	0	0	0	238
barn swallow	234	32	0	27	18	4	5	24
European starling	115	1	0	0	0	0	0	0
redhead	104	2	4	0	0	0	0	0
Lapland longspur	104	7	38	16	15	0	0	0
tundra swan	88	3	0	0	0	0	0	0
lesser scaup	75	2	0	0	0	0	0	0
green-winged teal	55	3	0	0	0	0	0	50
sandhill crane	50	1	0	0	0	0	0	0
blue-winged teal	46	5	8	0	0	0	0	5
red-tailed hawk	37	33	2	7	2	3	3	3
northern pintail	35	1	0	0	0	0	0	35
mourning dove	31	21	1	0	0	13	2	7
common redpoll	30	1	0	0	0	0	30	0
killdeer	29	9	16	0	1	1	0	0
unidentified sparrow	27	12	0	0	1	2	0	0
American white pelican	23	3	0	0	0	0	0	1
northern harrier	15	14	0	0	0	0	2	2
western meadowlark	12	6	0	0	0	2	0	0
vesper sparrow	12	9	2	1	1	0	0	0
unidentified hawk	9	9	1	0	1	0	3	0
great blue heron	8	7	1	0	0	0	0	0

Table 4. Avian species observed by point during Fall point count surveys at the Ashtabula Wind Resource Area, 2007.

Species	Number of Birds	Number of Obs.	Points					
			1	2	3	4	5	6
yellow-headed blackbird	7	2	0	0	0	0	0	0
unidentified tern	7	1	0	0	0	0	0	0
sharp-tailed grouse	7	2	0	0	0	0	0	0
savannah sparrow	7	4	0	3	4	0	0	0
ring-necked pheasant	7	3	0	0	0	0	0	0
American crow	6	4	0	2	0	0	0	0
black-capped chickadee	5	3	0	0	0	3	1	0
gadwall	4	2	2	0	0	0	0	0
American robin	4	2	0	0	0	0	3	0
American kestrel	4	4	0	0	0	0	1	0
sora	3	3	0	0	0	0	0	0
northern shoveler	3	2	2	0	0	0	0	0
northern flicker	3	2	0	0	0	0	0	0
Franklin’s gull	3	3	1	0	0	0	0	1
black tern	3	1	3	0	0	0	0	0
brown-headed cowbird	3	1	0	0	0	0	3	0
unknown bird	2	1	0	0	0	0	0	0
merlin	2	2	0	0	0	0	0	0
great horned owl	2	2	1	0	0	0	0	0
common merganser	2	1	0	0	0	0	0	2
American goldfinch	2	2	0	0	0	0	1	0
white-throated sparrow	1	1	0	0	0	0	0	0
upland sandpiper	1	1	0	0	0	0	1	0
unidentified falcon	1	1	0	0	1	0	0	0
Swainson’s hawk	1	1	0	0	0	0	0	0
rough-legged hawk	1	1	0	0	0	0	0	0
pied-billed grebe	1	1	0	0	0	0	0	1
Harris' sparrow	1	1	0	0	0	0	0	0
eared grebe	1	1	0	0	0	0	0	0
chipping sparrow	1	1	0	0	0	0	0	0
black-crowned night-heron	1	1	0	0	0	0	0	1
Grand Total	**29895**	**692**	**1718**	**1137**	**811**	**796**	**8353**	**1613**

Table 4. Avian species observed by point during Fall point count surveys at the Ashtabula Wind Resource Area, 2007.

Species	Number of Birds	Number of Obs.	Points					
			7	8	9	10	11	12
red-winged blackbird	8845	108	28	46	159	27	28	22
Canada goose	5499	71	446	47	26	4476	126	68
mallard	2926	29	0	32	0	2332	26	152
common grackle	2055	17	950	15	4	0	0	0
unidentified duck	1457	26	15	9	0	1036	18	263
unidentified blackbird	1098	31	3	0	45	20	13	12
horned lark	1007	39	27	55	185	30	54	0
unidentified passerine	911	5	0	0	4	0	750	0
ring-billed gull	906	5	0	0	0	0	0	0
American coot	841	17	0	256	0	565	0	0
double-crested cormorant	600	37	0	2	385	59	46	0
tree swallow	577	15	1	4	14	1	0	419
snow bunting	548	7	0	145	253	0	15	0
ruddy duck	339	7	0	20	0	319	0	0
ring-necked duck	282	6	0	71	0	11	0	0
unidentified gull	272	22	0	11	0	226	0	7
snow goose	250	3	0	235	15	0	0	0
rock pigeon	247	9	0	0	0	0	0	0
barn swallow	234	32	1	46	16	41	0	52
European starling	115	1	0	0	0	115	0	0
redhead	104	2	0	0	0	100	0	0
Lapland longspur	104	7	0	0	0	10	0	25
tundra swan	88	3	0	0	0	88	0	0
lesser scaup	75	2	0	75	0	0	0	0
green-winged teal	55	3	0	5	0	0	0	0
sandhill crane	50	1	0	0	0	50	0	0
blue-winged teal	46	5	0	32	0	0	0	1
red-tailed hawk	37	33	2	5	3	1	6	0
northern pintail	35	1	0	0	0	0	0	0
mourning dove	31	21	1	3	0	0	4	0
common redpoll	30	1	0	0	0	0	0	0
killdeer	29	9	0	10	0	1	0	0
unidentified sparrow	27	12	5	5	10	0	2	2
American white pelican	23	3	17	0	0	5	0	0
northern harrier	15	14	1	3	3	0	1	3
western meadowlark	12	6	6	3	0	0	1	0
vesper sparrow	12	9	2	4	0	0	0	2
unidentified hawk	9	9	2	1	0	0	1	0
great blue heron	8	7	0	0	0	5	0	2

Table 4. Avian species observed by point during Fall point count surveys at the Ashtabula Wind Resource Area, 2007.

Species	Number of Birds	Number of Obs.	Points					
			7	8	9	10	11	12
yellow-headed blackbird	7	2	0	0	0	0	3	4
unidentified tern	7	1	7	0	0	0	0	0
sharp-tailed grouse	7	2	0	0	0	6	1	0
savannah sparrow	7	4	0	0	0	0	0	0
ring-necked pheasant	7	3	0	0	0	0	0	7
American crow	6	4	0	0	1	1	2	0
black-capped chickadee	5	3	0	0	0	0	1	0
gadwall	4	2	0	0	0	2	0	0
American robin	4	2	0	0	1	0	0	0
American kestrel	4	4	1	0	1	0	1	0
sora	3	3	0	0	1	0	0	2
northern shoveler	3	2	0	0	0	0	0	1
northern flicker	3	2	0	0	2	0	0	1
Franklin's gull	3	3	0	1	0	0	0	0
black tern	3	1	0	0	0	0	0	0
brown-headed cowbird	3	1	0	0	0	0	0	0
unknown bird	2	1	0	0	2	0	0	0
merlin	2	2	2	0	0	0	0	0
great horned owl	2	2	1	0	0	0	0	0
common merganser	2	1	0	0	0	0	0	0
American goldfinch	2	2	0	0	0	1	0	0
white-throated sparrow	1	1	0	0	1	0	0	0
upland sandpiper	1	1	0	0	0	0	0	0
unidentified falcon	1	1	0	0	0	0	0	0
Swainson's hawk	1	1	0	0	0	0	0	1
rough-legged hawk	1	1	0	1	0	0	0	0
pied-billed grebe	1	1	0	0	0	0	0	0
Harris' sparrow	1	1	0	0	1	0	0	0
eared grebe	1	1	0	0	0	1	0	0
chipping sparrow	1	1	0	1	0	0	0	0
black-crowned night-heron	1	1	0	0	0	0	0	0
Grand Total	**?**	**692**	**1518**	**1143**	**1132**	**9529**	**1099**	**1046**

Table 5. Summary of avian flight heights (includes flying birds only) in relation to the turbine rotor swept area (RSA) during Fall point count surveys at the Ashtabula Wind Resource Area, 2007 .

	Observations		Individuals	
	Number	**Percentage**	**Number**	**Percentage**
Non-raptors				
Above RSA (>128m)	6	1.4%	123	1.1%
Below RSA (<32m)	303	69.7%	6060	56.0%
Within RSA (between 32m and 128m)	126	29.0%	4648	42.9%
Raptors/Vultures/Owls				
Below RSA (<32m)	32	61.5%	33	57.9%
Within RSA (between 32m and 128m)	20	38.5%	24	42.1%

Table 6. Avian flight height characteristics in relation to the turbine rotor swept area (RSA) for species at risk of collision at the Ashtabula Wind Resource Area, during Fall 2007.

Species	Encounter Rate	Mean Use # birds/ 20 min.	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
ring-billed gull	6.82	6.86	100.0	0.7	99.3	0.0
unidentified passerine	5.71	6.90	100.0	17.2	82.8	0.0
Canada goose	5.21	41.66	33.0	59.9	37.9	2.2
double-crested cormorant	3.38	4.55	84.0	11.5	88.5	0.0
unidentified duck	2.89	11.04	28.3	7.0	92.3	0.7
snow bunting	2.65	4.15	100.0	36.1	63.9	0.0
horned lark	1.89	7.63	98.8	74.9	25.1	0.0
snow goose	1.63	1.89	100.0	0.0	86.0	14.0
red-winged blackbird	1.52	67.01	22.6	89.0	10.0	1.0
unidentified blackbird	0.92	8.32	93.3	88.2	11.8	0.0
mallard	0.84	22.17	15.4	69.6	24.7	5.8
tree swallow	0.50	4.37	30.7	62.7	37.3	0.0
sandhill crane	0.38	0.38	100.0	0.0	100.0	0.0
unidentified gull	0.26	2.06	24.3	48.5	51.5	0.0
American white pelican	0.17	0.17	95.7	0.0	100.0	0.0
common grackle	0.15	15.57	9.7	89.9	10.1	0.0
red-tailed hawk	0.14	0.28	78.4	37.9	62.1	0.0
Lapland longspur	0.11	0.79	100.0	85.6	14.4	0.0
rock pigeon	0.07	1.87	3.6	0.0	100.0	0.0
barn swallow	0.03	1.77	100.0	98.3	1.7	0.0
unidentified hawk	0.02	0.07	66.7	50.0	50.0	0.0
great blue heron	0.02	0.06	87.5	57.1	42.9	0.0
unknown bird	0.02	0.02	100.0	0.0	100.0	0.0
mourning dove	0.02	0.23	80.6	92.0	8.0	0.0
American crow	0.02	0.05	66.7	50.0	50.0	0.0
unidentified falcon	0.01	0.01	100.0	0.0	100.0	0.0

Table 6. Avian flight height characteristics in relation to the turbine rotor swept area (RSA) for species at risk of collision at the Ashtabula Wind Resource Area, during Fall 2007.

Species	Encounter Rate	Mean Use # birds/ 20 min.	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
American goldfinch	0.01	0.02	100.0	50.0	50.0	0.0
killdeer	0.01	0.22	96.6	96.4	3.6	0.0
Franklin's gull	0.01	0.02	66.7	50.0	50.0	0.0
American kestrel	0.01	0.03	75.0	66.7	33.3	0.0
northern harrier	0.01	0.11	100.0	93.3	6.7	0.0
yellow-headed blackbird	0.00	0.05	42.9	100.0	0.0	0.0
white-throated sparrow	0.00	0.01	0.0	0.0	0.0	0.0
western meadowlark	0.00	0.09	66.7	100.0	0.0	0.0
vesper sparrow	0.00	0.09	33.3	100.0	0.0	0.0
unidentified tern	0.00	0.05	100.0	100.0	0.0	0.0
upland sandpiper	0.00	0.01	0.0	0.0	0.0	0.0
unidentified sparrow	0.00	0.20	48.1	100.0	0.0	0.0
tundra swan	0.00	0.67	0.0	0.0	0.0	0.0
Swainson's hawk	0.00	0.01	100.0	100.0	0.0	0.0
sharp-tailed grouse	0.00	0.05	85.7	100.0	0.0	0.0
sora	0.00	0.02	0.0	0.0	0.0	0.0
savannah sparrow	0.00	0.05	0.0	0.0	0.0	0.0
ruddy duck	0.00	2.57	0.0	0.0	0.0	0.0
ring-necked pheasant	0.00	0.05	14.3	100.0	0.0	0.0
ring-necked duck	0.00	2.14	0.0	0.0	0.0	0.0
rough-legged hawk	0.00	0.01	0.0	0.0	0.0	0.0
redhead	0.00	0.79	0.0	0.0	0.0	0.0
pied-billed grebe	0.00	0.01	0.0	0.0	0.0	0.0
northern shoveler	0.00	0.02	33.3	100.0	0.0	0.0
northern pintail	0.00	0.27	0.0	0.0	0.0	0.0
northern flicker	0.00	0.02	66.7	100.0	0.0	0.0

Table 6. Avian flight height characteristics in relation to the turbine rotor swept area (RSA) for species at risk of collision at the Ashtabula Wind Resource Area, during Fall 2007.

Species	Encounter Rate	Mean Use # birds/ 20 min.	Percent Flying	Percent Below RSA	Percent Within RSA	Percent Above RSA
merlin	0.00	0.02	100.0	100.0	0.0	0.0
lesser scaup	0.00	0.57	0.0	0.0	0.0	0.0
Harris' sparrow	0.00	0.01	0.0	0.0	0.0	0.0
green-winged teal	0.00	0.42	0.0	0.0	0.0	0.0
great horned owl	0.00	0.02	0.0	0.0	0.0	0.0
gadwall	0.00	0.03	0.0	0.0	0.0	0.0
European starling	0.00	0.87	0.0	0.0	0.0	0.0
eared grebe	0.00	0.01	0.0	0.0	0.0	0.0
common redpoll	0.00	0.23	100.0	100.0	0.0	0.0
common merganser	0.00	0.02	0.0	0.0	0.0	0.0
chipping sparrow	0.00	0.01	0.0	0.0	0.0	0.0
blue-winged teal	0.00	0.35	2.2	100.0	0.0	0.0
black tern	0.00	0.02	100.0	100.0	0.0	0.0
brown-headed cowbird	0.00	0.02	0.0	0.0	0.0	0.0
black-crowned night-heron	0.00	0.01	100.0	0.0	0.0	0.0
black-capped chickadee	0.00	0.04	80.0	100.0	0.0	0.0
American robin	0.00	0.03	25.0	100.0	0.0	0.0
American coot	0.00	6.37	0.0	0.0	0.0	0.0

Table 7. Flight directions of birds observed during Fall point count surveys at the Ashtabula Wind Resource Area, 2007.

Species	Number Flying	Number of Observations	Percentage of Flights in Various Flight Directions								
			N	NE	E	SE	S	SW	W	NW	Variable
red-winged blackbird	2002	85	55.8	7.9	9.9	8.0	6.5	3.9	7.2	0.5	0.0
Canada goose	1813	57	4.2	0.1	46.0	1.4	8.1	15.1	12.4	12.7	0.0
unidentified blackbird	1024	28	11.5	0.3	48.0	5.8	2.0	30.5	1.2	0.8	0.0
horned lark	995	34	2.4	0.0	27.0	22.9	19.4	3.5	15.2	9.5	0.0
unidentified passerine	911	5	0.7	0.0	0.0	0.0	16.5	0.0	82.3	0.5	0.0
ring-billed gull	906	5	0.1	0.0	0.0	99.4	0.1	0.3	0.0	0.0	0.0
snow bunting	548	7	0.0	18.2	0.0	0.0	14.6	45.6	21.5	0.0	0.0
double-crested cormorant	504	28	1.0	0.4	0.0	83.3	14.3	0.2	0.6	0.2	0.0
mallard	450	15	16.2	7.6	0.0	0.9	29.8	1.8	0.4	43.3	0.0
unidentified duck	413	19	1.2	5.1	0.0	0.7	91.8	0.7	0.5	0.0	0.0
snow goose	250	3	0.0	0.0	0.0	14.0	6.0	80.0	0.0	0.0	0.0
barn swallow	234	32	13.7	8.1	20.5	21.4	11.5	3.4	9.8	11.5	0.0
common grackle	199	13	8.0	0.0	74.9	0.0	10.6	0.5	0.0	6.0	0.0
tree swallow	177	14	19.8	0.6	8.5	1.1	14.1	7.9	2.3	45.8	0.0
Lapland longspur	104	7	1.0	0.0	57.7	0.0	26.9	0.0	14.4	0.0	0.0
unidentified gull	66	18	3.0	28.8	13.6	1.5	50.0	1.5	0.0	1.5	0.0
sandhill crane	50	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
common redpoll	30	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
red-tailed hawk	29	25	10.3	10.3	10.3	6.9	41.4	13.8	0.0	6.9	0.0
killdeer	28	8	3.6	14.3	17.9	50.0	0.0	0.0	3.6	10.7	0.0
mourning dove	25	16	0.0	24.0	40.0	4.0	4.0	4.0	12.0	12.0	0.0
American white pelican	22	2	0.0	0.0	0.0	0.0	77.3	0.0	22.7	0.0	0.0

Table 7. Flight directions of birds observed during Fall point count surveys at the Ashtabula Wind Resource Area, 2007.

Species	Number Flying	Number of Observations	Percentage of Flights in Various Flight Directions								
			N	NE	E	SE	S	SW	W	NW	Variable
northern harrier	15	14	6.7	6.7	13.3	13.3	26.7	13.3	0.0	20.0	0.0
unidentified sparrow	13	6	23.1	15.4	15.4	0.0	30.8	15.4	0.0	0.0	0.0
rock pigeon	9	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
western meadowlark	8	2	0.0	0.0	0.0	75.0	0.0	0.0	25.0	0.0	0.0
unidentified tern	7	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
great blue heron	7	6	14.3	0.0	42.9	14.3	28.6	0.0	0.0	0.0	0.0
unidentified hawk	6	6	0.0	0.0	16.7	16.7	33.3	0.0	16.7	16.7	0.0
sharp-tailed grouse	6	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
vesper sparrow	4	3	0.0	0.0	0.0	0.0	25.0	0.0	50.0	25.0	0.0
black-capped chickadee	4	2	25.0	0.0	0.0	0.0	75.0	0.0	0.0	0.0	0.0
American crow	4	3	0.0	50.0	0.0	0.0	25.0	0.0	25.0	0.0	0.0
yellow-headed blackbird	3	1	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0
black tern	3	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
American kestrel	3	3	0.0	0.0	0.0	0.0	33.3	33.3	33.3	0.0	0.0
unknown bird	2	1	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
northern flicker	2	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
merlin	2	2	50.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0
Franklin's gull	2	2	0.0	0.0	0.0	50.0	50.0	0.0	0.0	0.0	0.0
American goldfinch	2	2	0.0	50.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0
unidentified falcon	1	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
Swainson's hawk	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ring-necked pheasant	1	1	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 7. Flight directions of birds observed during Fall point count surveys at the Ashtabula Wind Resource Area, 2007.

Species	Number Flying	Number of Observations	Percentage of Flights in Various Flight Directions								
			N	NE	E	SE	S	SW	W	NW	Variable
northern shoveler	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
blue-winged teal	1	1	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
black-crowned night-heron	1	1	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	0.0
American robin	1	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	0.0
Grand Total	**10889**	**488**	**14.4**	**3.5**	**19.3**	**17.6**	**13.9**	**11.0**	**14.0**	**6.3**	**0.0**

Table 8. Incidental observations of birds during Fall point counts at the AshtabulaWind Resource Area, 2007.

Species	Number of individuals
American coot	67
American crow	7
American kestrel	1
American pipit	26
black-crowned night-heron	1
blue jay	3
black tern	8
blue-winged teal	52
Canada goose	294
chipping sparrow	1
common grackle	525
double-crested cormorant	65
dark-eyed junco	19
European starling	15
Franklin's gull	105
gadwall	8
great blue heron	7
gray partridge	11
greater yellowlegs	2
green-winged teal	15
Harris' sparrow	1
horned lark	20
killdeer	1
Lapland longspur	115
mallard	337
mourning dove	2
northern flicker	14
northern harrier	12
northern pintail	2
northern shoveler	1
northern shrike	1
pied-billed grebe	4
prairie falcon	1
ring-billed gull	824
ring-necked duck	90
ring-necked pheasant	6

Table 8. Incidental observations of birds during Fall point counts at the AshtabulaWind Resource Area, 2007.

Species	Number of individuals
rock pigeon	17
red-tailed hawk	60
ruddy duck	1
red-winged blackbird	18000
semipalmated sandpiper	2
snow bunting	21
Swainson's hawk	5
unidentified duck	18
unidentified gull	52
unidentified hawk	2
unidentified warbler	2
unidentified sandpiper	27
white-crowned sparrow	1
western meadowlark	3
yellow-headed blackbird	20
Grand Total	**20894**

Table 9. Comparison of raptor and other bird use per 20-minute survey with other studies of western wind projects using the similar survey methodology.

Project Site	Mean Use by Raptors					Mean Use by Other Birds					Duration of Survey (minutes)	Plot Radius	Reference	Correction factor [a]
	Spr	Sum	Fall	Win	Ann	Spr	Sum	Fall	Win	Ann				
High Winds WRA, Montezuma Hills, CA					6.72					474[b]	20	800m	Kerlinger et al. (2005)	
Altamont Pass WEC, CA	3.8	3.0	4.6	3.0		N/A	N/A	N/A	N/A		10	800m	Orloff and Flannery (1992)	x 2
Cotterel Mountain, ID	1.69	1.89	1.49	0.18		14.26	11.22	7.65	8.86		20	800m	USDI, BLM (2005)	
Maiden, WA	0.295	0.348	0.623	0.154		4.576	4.71	11.93	8.576		30	800m	Young et al. (2002)	x 0.67
Klickitat County PEIS study area, WA	0.96	1.12	N/A	N/A		14.39	12.36	N/A	N/A		20	800m	Johnson et al. (2006)	
Foote Creek WEC, WY	0.49	0.755	0.965	0.205		N/A	N/A	N/A	N/A		40	800m	Johnson et al. (2000)	x 0.5
Buffalo Ridge Phase III	0.64	0.54	0.85	0.18		N/A	N/A	N/A	N/A		20	800m	Erickson et al. (2002)	
Klondike, OR Phase III				0.134					34.9		20	800m	Mabee et al. (2005)	
Buffalo Ridge Phase II	0.84	0.69	0.83	0.1		N/A	N/A	N/A	N/A		20	800m	Erickson et al. (2002)	
Windy Point, WA	0.79	N/A	N/A	0.77		16.41	N/A	N/A	13.55		20	800m	Johnson et al. (2006)	
Buffalo Ridge Phase I	0.65	0.43	0.76	0.13		N/A	N/A	N/A	N/A		20	800m	Erickson et al. (2002)	
Buffalo Ridge RA	0.68	0.52	0.69	0.44		N/A	N/A	N/A	N/A		20	800m	Erickson et al. (2002)	
Ashtabula, ND			**0.55**					**225.93**			**20**	**800m**	**THIS STUDY**	
Klondike, OR Phase I	0.47	0.39	0.38	0.56		N/A	N/A	N/A	N/A		20	800m	Erickson et al. (2002)	
Wild Horse, WA	0.456	0.456	0.308	0.141		5.782	5.782	4.02	3.591		30	800m	Erickson et al. (2003)	x 0.67
Stateline Wind Project EIS WRA	0.59	0.4	0.25	0.42		7.09	5.47	29.34	9.04		20	800m	URS and West (2001)	
Condon, OR	0.466	0.319	0.2	0.386		6.331	3.405	7.249	7.328		15	600m	URS Corporation et al. (2001)	x 1.33
Biglow Canyon, OR project area	0.308	0.389	0.188	0.315		10.17	3.343	7.182	11.66		30	800m	West (2005)	x 0.67
Stateline, OR/WA	0.28	0.26	0.16	0.02	0.22					23.08	10	800m	Erickson et al. (2004)	x 2
Biglow Canyon, OR RA	0.369	0.335	0.114	0.248		6.76	5.085	6.713	17.07		30	800m	West (2005)	x 0.67

[a] Multiplication factor to standardize mean use to birds/20 min.
[b] Mostly unidentified blackbirds.

Executive Summary – Wind Power GeoPlanner™

Licensed Microwave Search & Worst Case Fresnel Zone

Comsearch performed an analysis to evaluate the potential effects of the planned Valley City Wind project in Barnes County, ND on existing non-Federal Government microwave telecom systems.

Microwave Search Results: 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 topographic basemaps. Comsearch identified 20 microwave paths that intersect the project area (see Figure 1 and Table 1 below).

Comsearch then calculated a Worst Case Fresnel Zone (WCFZ) for each microwave path in the project area. The mid-point of a full microwave path is the location where the widest (or worst case) Fresnel zone occurs. Fresnel zones are calculated for each path using the following formula.

$$Rn \cong 17.3\sqrt{\frac{n}{F_{GHz}}\left(\frac{d1d2}{d1+d2}\right)}$$

Where,
R_n = First Fresnel Zone Radius, meters
n = The Number 1
F_{GHz} = Frequency of Microwave Link, GHz
d1 = Distance to Wind Turbine from Microwave Station 1, km
d2 = Distance to Wind Turbine from Microwave Station 2, km

note: For WCFZ calculation d1 = d2

The calculated WCFZ radius, giving the linear path an area or swath, buffers each microwave path in the project area. The distance unit is in meters and can be found in the column attribute "WCFZ." In general, this is the XY area where the planned wind turbines should be avoided, if possible. These areas are shown in Figure 2.

Please note that because the turbine locations were not provided, we could not determine if any potential obstruction cases exist between the planned wind turbines and the microwave systems. If the latitude and longitude values for turbine locations are provided, Comsearch can identify specific microwave telecom paths and turbines where a potential XY conflict exists. Additionally, when wind turbines need to be located inside a WCFZ, Comsearch can provide a detailed clearance study, which considers the vertical Z-height clearance objectives.

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) 726-5595
Email: dfinney@comsearch.com

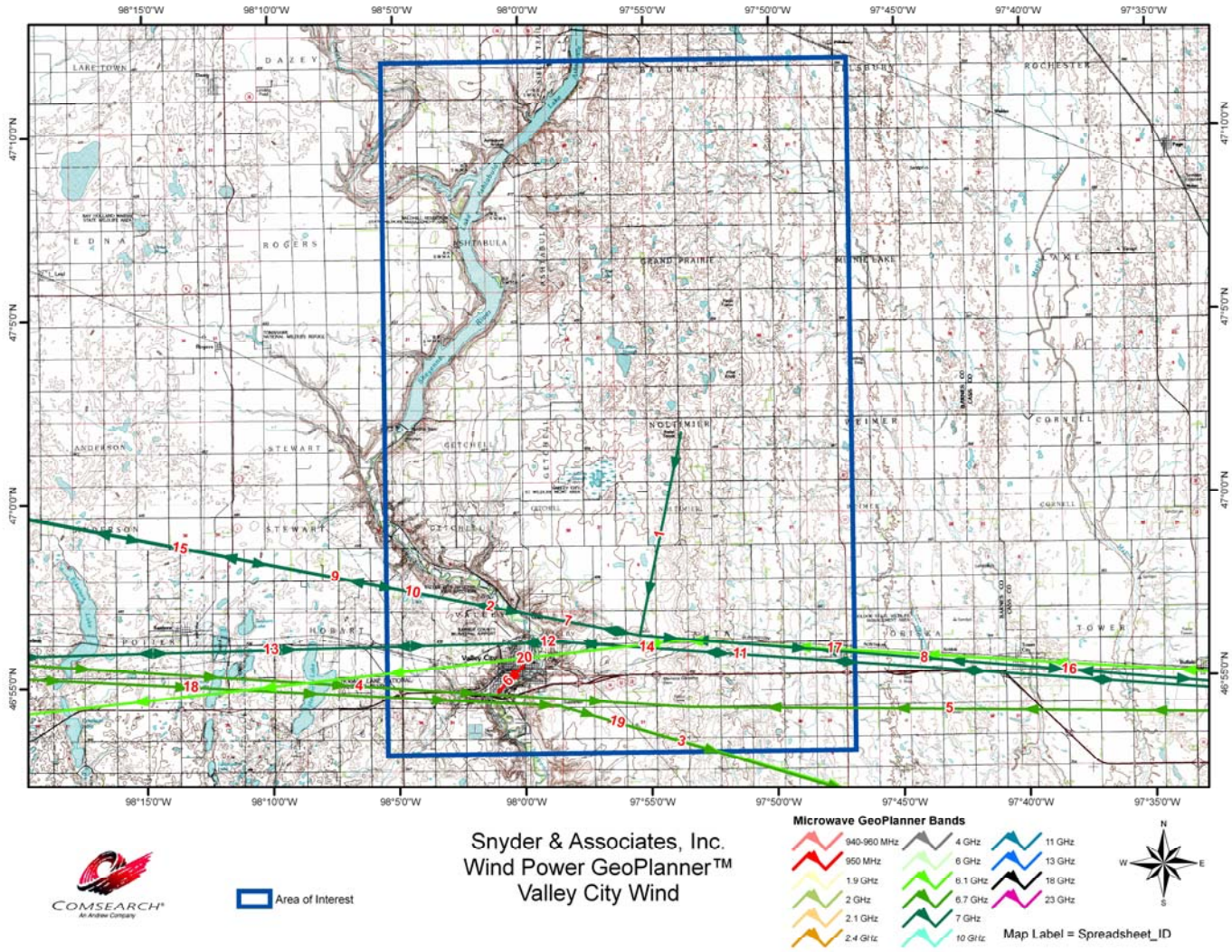


Figure 1 – Wind Power GeoPlanner™

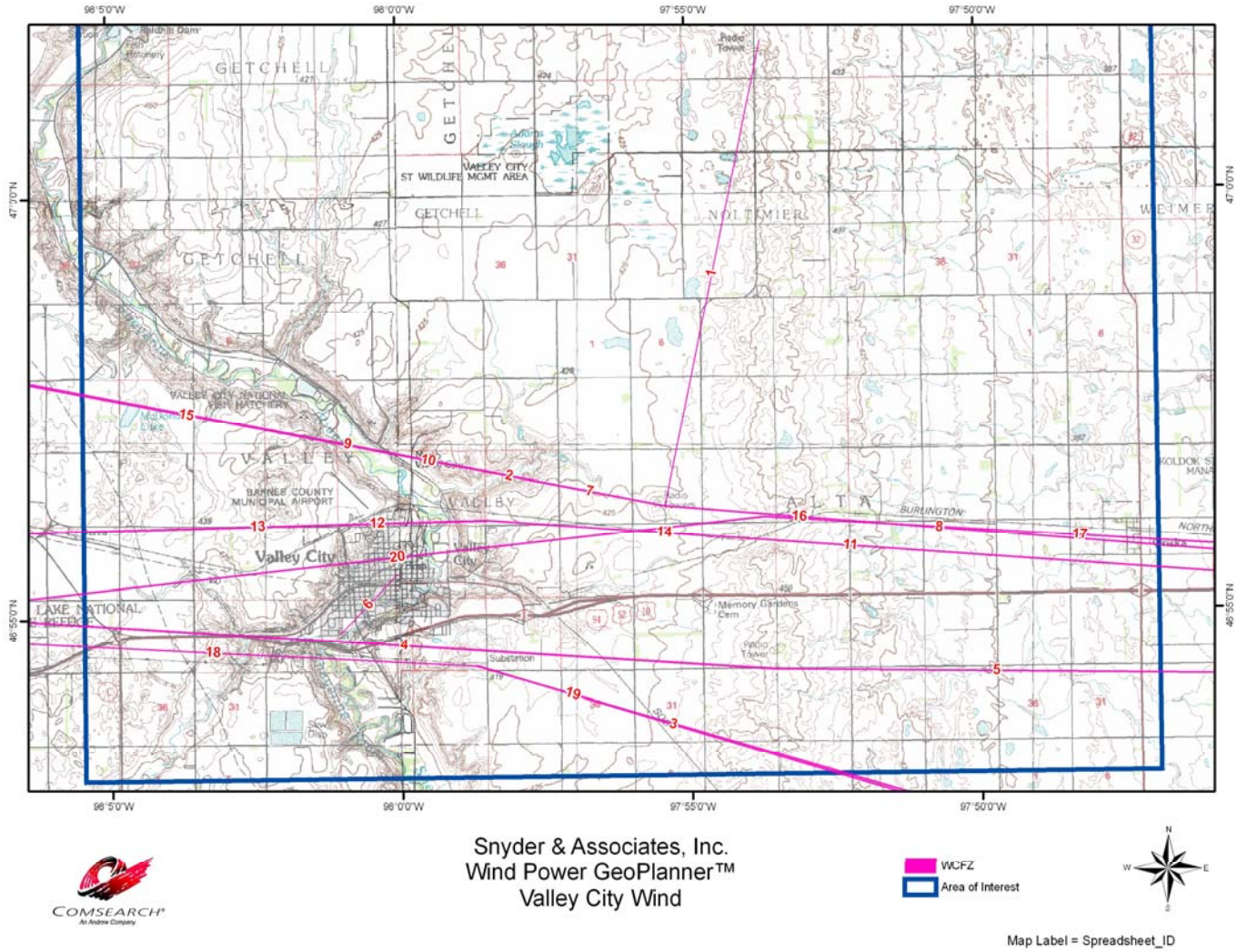
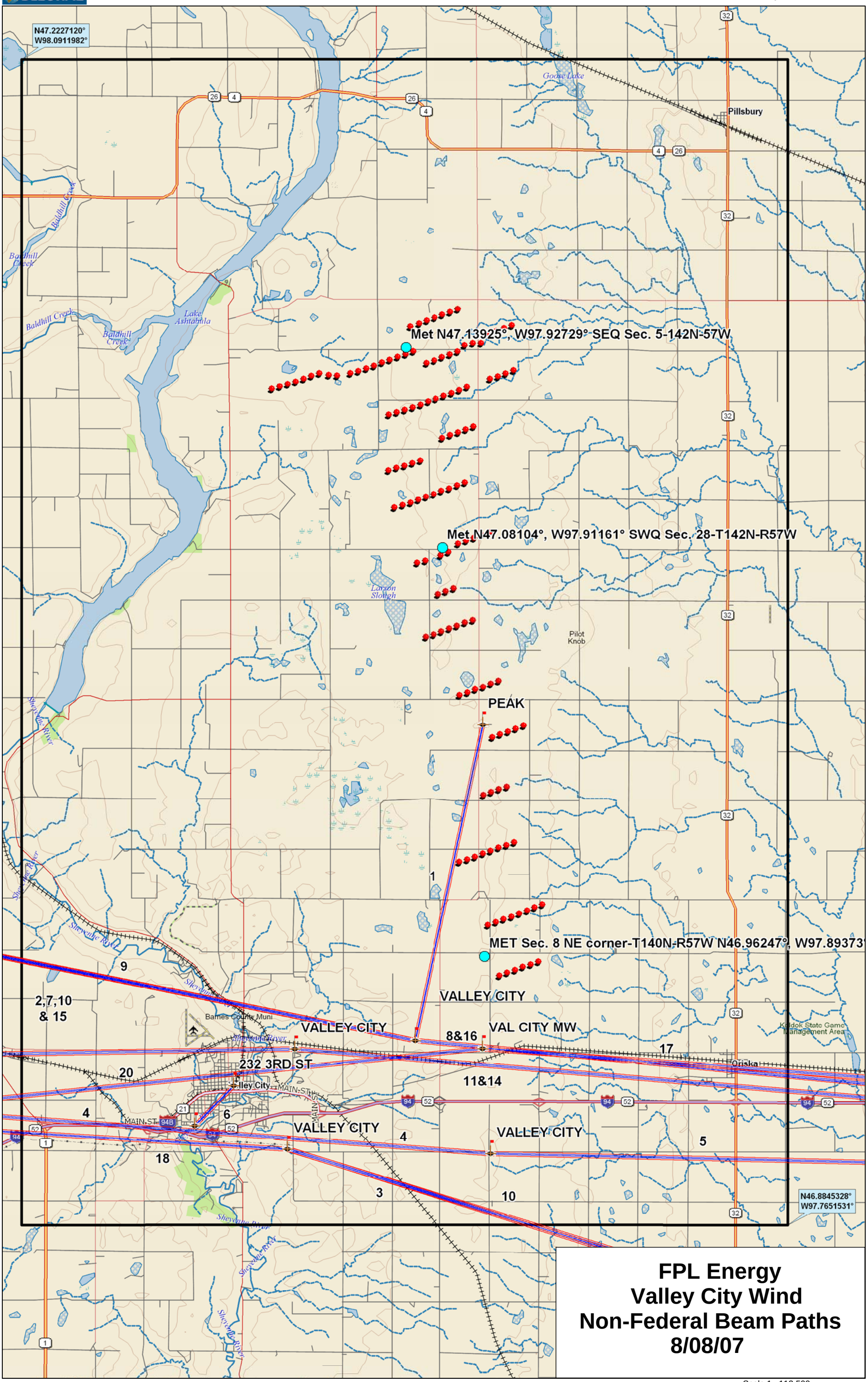


Figure 2 – Wind Power GeoPlanner™ & WCFZ

ID	Name Site 1	Name Site 2	Call Sign Site 1	Call Sign Site 2	BAND NAME	Licensee	WCFZ (m)
1	PEAK	VALLEY CITY	KAZ80	RXONLY	7 GHz	South Dakota Television, Inc	10.56
2	BARNES	CLEMENTSVILL	KBD40	RXONLY	7 GHz	HOAK MEDIA OF DAKOTA LICENSE, LLC	22.41
3	VALLEY CITY	CHAFFEE	KHP73	KIL52	Upper 6 GHz	MINNKOTA POWER COOPERATIVE INC	23.64
4	SPIRITWOOD	VALLEY CITY	KVY52	KVY71	Upper 6 GHz	BNSF Railway Company	22.46
5	WHEATLAND	VALLEY CITY	KVY70	KVY71	Upper 6 GHz	BNSF Railway Company	20.67
6	232 3RD ST	VALLEY CITY	WHM990	RXONLY	950 MHz	SIOUX VALLEY BROADCASTING, INC	11.96
7	VALLEY CITY	CLEMENTSVILL	WLD483	RXONLY	7 GHz	KBMY KMCY LLC (KBMY)	22.41
8	CASSELTON	VALLEY CITY	WLD484	RXONLY	7 GHz	KBMY KMCY LLC (KBMY)	23.13
9	BARNES	CLEMENTSVILL	WLF687	RXONLY	7 GHz	HOAK MEDIA OF DAKOTA LICENSE, LLC	22.41
10	STUTSMAN	VALLEY CITY	WLF690	RXONLY	7 GHz	HOAK MEDIA OF DAKOTA LICENSE, LLC	22.41
11	CASSELTON	VALLEY CITY	WLI369	RXONLY	7 GHz	RED RIVER BROADCAST CO., LLC	22.66
12	VALLEY CITY	JAMESTOWN	WLI370	RXONLY	7 GHz	RED RIVER BROADCAST CO., LLC	25.48
13	JAMESTOWN	VALLEY CITY	WLI701	RXONLY	7 GHz	RED RIVER BROADCAST CO., LLC	25.48
14	VALLEY CITY	CASSELTON	WLI705	RXONLY	7 GHz	RED RIVER BROADCAST CO., LLC	22.66
15	CLEMENTSVILL	VALLEY CITY	WPNF720	RXONLY	7 GHz	KBMY KMCY LLC (KBMY)	22.41
16	VALLEY CITY	CASSELTON	WPNF863	RXONLY	7 GHz	KBMY KMCY LLC (KBMY)	23.13
17	CASSELTON	VAL CITY MW	WPON209	WPYS527	Lower 6 GHz	WWC Holding Co., Inc	23.75
18	ECK MPC	VALLEY CITY	WPQS894	WPQS895	Upper 6 GHz	MINNKOTA POWER COOPERATIVE INC	17.37
19	VALLEY CITY	CHAFFEE	WPQS895	WPQS386	Lower 6 GHz	MINNKOTA POWER COOPERATIVE INC	24.70
20	VAL CITY MW	SANBORN	WPYS527	WPON204	Lower 6 GHz	WWC Holding Co., Inc	20.51

Table 1 – Microwave GeoPlanner Links Considered in Analysis
(See enclosed mw_geopl.xls for more detailed information and GP_dict_matrix_description.xls for field description)



TN
MN (4.9°E)

Scale 1 : 112,500
1" = 1.78 mi
Data Zoom 10-7

APPENDIX D
AGENCY LETTERS

TETRA TECH

January 21, 2008

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

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. Ness:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the Aeronautics Commission for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

This information will be used as an initial step to help guide project development in a manner that identifies and avoids impacts to sensitive resources where practicable. We have sent similar query letters to other agencies including the US Fish and Wildlife Service, US Army Corps of Engineers, and North Dakota Department of Natural Resources.

Tetra Tech
P.O. Box 30615, Billings, MT 59107
618 South 25th Street, Billings, MT 59101
Tel 406.248.9161 Fax 406.248.9282 www.tetratech.com

We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Attorney General Wayne Stenehjem
State Capitol
600 East Boulevard Avenue, Department 125
Bismarck, North Dakota 58505

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. Stenehjem:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the office of the Attorney General for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

This information will be used as an initial step to help guide project development in a manner that identifies and avoids impacts to sensitive resources where practicable. We have sent similar query letters to other agencies including the US Fish and Wildlife Service, US Army Corps of Engineers, and North Dakota Department of Natural Resources.

Tetra Tech
P.O. Box 30615, Billings, MT 59107
618 South 25th Street, Billings, MT 59101
Tel 406.248.9161 Fax 406.248.9282 www.tetratech.com

We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

N:\Typing\Env-fac\8551386\\Ashtabula Query Letters\AttorneyGeneral

TETRA TECH

January 21, 2008

Mr. Ben Jacob, Chair
Barnes County Soil Conservation District
575 10th Street Southwest
Valley City, North Dakota 58072-3906

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. Jacob:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting Barnes County Soil Conservation District for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

This information will be used as an initial step to help guide project development in a manner that identifies and avoids impacts to sensitive resources where practicable. We have sent similar query letters to other agencies including the US Fish and Wildlife Service, US Army Corps of Engineers, and North Dakota Department of Natural Resources.

Tetra Tech
P.O. Box 30615, Billings, MT 59107
618 South 25th Street, Billings, MT 59101
Tel 406.248.9161 Fax 406.248.9282 www.tetratech.com

We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Mr. Roger Johnson, Agriculture Commissioner
North Dakota Department of Agriculture
600 East Boulevard Avenue, Department 602
Bismarck, North Dakota 58505-0020

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. Johnson:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the North Dakota Department of Agriculture for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

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We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Mr. Wayne Kutzer, Director
North Dakota Department of Career and Technical Education
State Capitol 15th Floor
600 East Boulevard Avenue, Department 270
Bismarck, North Dakota 58505-0610

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. Kutzer:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the North Dakota Department of Career and Technical Education for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

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Tetra Tech
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618 South 25th Street, Billings, MT 59101
Tel 406.248.9161 Fax 406.248.9282 www.tetratech.com

We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Mr. Shane Goettle, Commissioner
North Dakota Department of Commerce
1600 East Century Avenue, Suite 2
P. O. box 2057
Bismarck, North Dakota 58503

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. Goettle:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the North Dakota Department of Commerce for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

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Tel 406.248.9161 Fax 406.248.9282 www.tetratech.com

We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Ms. Kim Christianson, Energy Program Manager
Energy Conservation and Renewable Energy
Division of Community Services
1600 East Century Avenue, Suite 2
P. O. box 2057
Bismarck, North Dakota 58502-2057

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Ms. Christianson:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the Division of Community Services for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

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We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Dr. Terry Dwelle, M.D.
State Health Officer
North Dakota Department of Health
600 East Boulevard Avenue
Bismarck, North Dakota 58505-0200

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Dr. Dwelle:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the North Dakota Department of Health for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

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We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Ms. Carol K. Olson, Executive Director
North Dakota Department of Human Services
600 East Boulevard Avenue, Department 325
Bismarck, North Dakota 58505-0250

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Ms. Olson:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the North Dakota Department of Human Services for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

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We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Ms. Lisa Fair McEvers, Commissioner of Labor
North Dakota Department of Labor
600 East Boulevard Avenue, Department 406
Bismarck, North Dakota 58505-0340

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Ms. McEvers:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the North Dakota Department of Labor for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

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We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Mr. Edward C. Murphy, State Geologist
North Dakota Geological Survey
600 East Boulevard Avenue
Bismarck, North Dakota 58505-0840

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. Murphy:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting North Dakota Geological Survey for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

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We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Governor John Hoeven
600 East Boulevard Avenue, Department 101
Bismarck, North Dakota 58505-000

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Governor Hoeven:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the governor's office for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
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Baldwin	143N	57W	20, 22, 27, 32-34

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We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Ms. Cheryl Kulas, Executive Director
North Dakota Indian Affairs Commission
600 East Boulevard Avenue
1st Floor – Judicial Wing, Room #117
Bismarck, North Dakota 58505

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Ms. Kulas:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the North Dakota Indian Affairs Commission for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

This information will be used as an initial step to help guide project development in a manner that identifies and avoids impacts to sensitive resources where practicable. We have sent similar query letters to other agencies including the US Fish and Wildlife Service, US Army Corps of Engineers, and North Dakota Department of Natural Resources.

Tetra Tech
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Tel 406.248.9161 Fax 406.248.9282 www.tetratech.com

We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Ms. Maren Daley, Executive Director
Job Service North Dakota
1000 East Divide Avenue
Bismarck, North Dakota 58502-5507

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Ms. Daley:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the Job Service of North Dakota for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

This information will be used as an initial step to help guide project development in a manner that identifies and avoids impacts to sensitive resources where practicable. We have sent similar query letters to other agencies including the US Fish and Wildlife Service, US Army Corps of Engineers, and North Dakota Department of Natural Resources.

Tetra Tech
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Tel 406.248.9161 Fax 406.248.9282 www.tetratech.com

We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Mr. Jesse Hanson, Division Director
North Dakota Parks and Recreation Department
1600 E. Century Avenue, Suite 3
Bismarck, ND 58503

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. Hanson:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

Tetra Tech has previously consulted with the North Dakota Parks and Recreation Department regarding this project. However, we are again consulting your department for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

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We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Mr. Michael G. McKenna, Chief
North Dakota Game and Fish Department
100 North Bismarck Expressway
Bismarck, North Dakota 58501-5095

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. McKenna:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

Tetra Tech has previously consulted with the North Dakota Game and Fish Department regarding this project. However, we are again consulting with your department for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
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Baldwin	143N	57W	20, 22, 27, 32-34

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We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Ms. Tina Wagner
North Dakota Highway Department, Valley City District
12th Street Northwest
Valley City, North Dakota 58072

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Ms. Wagner:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting North Dakota Highway Department for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

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We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Ms. Pam Sharp, Director
North Dakota Office of Management and Budget
600 East Boulevard Avenue, Department 110
Bismarck, North Dakota 58505-0400

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Ms. Pam Sharp:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the North Dakota Office of Management and Budget for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

This information will be used as an initial step to help guide project development in a manner that identifies and avoids impacts to sensitive resources where practicable. We have sent similar query letters to other agencies including the US Fish and Wildlife Service, US Army Corps of Engineers, and North Dakota Department of Natural Resources.

Tetra Tech
P.O. Box 30615, Billings, MT 59107
618 South 25th Street, Billings, MT 59101
Tel 406.248.9161 Fax 406.248.9282 www.tetratech.com

We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Mr. Merl Paaverud, ND SHPO
North Dakota Historical Society
612 East Boulevard Avenue
Bismarck, ND 58505-0830

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. Paaverud:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

Tetra Tech has previously consulted with the North Dakota State Historical Preservation Office (SHPO) regarding this project. However, we are again consulting with SHPO for assistance in identifying any historical sites within the boundaries of the tracts listed below that would influence a decision regarding the use of the land. We, of course, are not requesting the name or exact location of the site(s) beyond that which you would normally provide to the public, just an indication of the location and whether the site would preclude development in a particular location. At a minimum, a Class I File and Literature Review will be conducted with additional site investigations to be determined.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

This information will be used as an initial step to help guide project development in a manner that identifies and avoids impacts to sensitive resources where practicable. We have sent similar query letters to other agencies including the US Fish and Wildlife Service, US Army Corps of Engineers, and North Dakota Department of Natural Resources.

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618 South 25th Street, Billings, MT 59101
Tel 406.248.9161 Fax 406.248.9282 www.tetratech.com

We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Mr. Rick Larson, Director of Minerals Management
North Dakota State Land Department
Energy Development Impact Office
P. O. Box 5523
Bismarck, North Dakota 58506-5523

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. Larson:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the North Dakota State Land Department for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

This information will be used as an initial step to help guide project development in a manner that identifies and avoids impacts to sensitive resources where practicable. We have sent similar query letters to other agencies including the US Fish and Wildlife Service, US Army Corps of Engineers, and North Dakota Department of Natural Resources.

Tetra Tech
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618 South 25th Street, Billings, MT 59101
Tel 406.248.9161 Fax 406.248.9282 www.tetratech.com

We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Mr. Thomas Christensen, Chairman
North Dakota State Soil Conservation Committee
2718 Gateway Avenue, Unit #104
Bismarck, North Dakota 58503

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. Christensen:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the North Dakota State Soil Conservation Committee for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

This information will be used as an initial step to help guide project development in a manner that identifies and avoids impacts to sensitive resources where practicable. We have sent similar query letters to other agencies including the US Fish and Wildlife Service, US Army Corps of Engineers, and North Dakota Department of Natural Resources.

Tetra Tech
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618 South 25th Street, Billings, MT 59101
Tel 406.248.9161 Fax 406.248.9282 www.tetratech.com

We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Mr. Dan Cimarofti, State Program Manager
US Army Corps of Engineers
Regulatory Division
1513 S. 12th Street
Bismarck, ND 58504

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. Cimarofti:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

Tetra Tech has previously consulted with the US Army Corps of Engineers regarding this project. However, we are again consulting with the Corps for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office. We are specifically interested in such information as the location of jurisdictional wetland resources and any other special or sensitive environmental conditions that exist in or near the study area.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

This information will be used as an initial step to help guide project development in a manner that identifies and avoids impacts to sensitive resources where practicable. We will also conduct a site survey of areas proximal to proposed facilities in order to preliminarily determine the presence of wetlands. We have sent similar query letters to other agencies including the US Fish and Wildlife Service, North Dakota Game and Fish, and North Dakota Department of Natural Resources.

Tetra Tech
P.O. Box 30615, Billings, MT 59107
618 South 25th Street, Billings, MT 59101
Tel 406.248.9161 Fax 406.248.9282 www.tetratech.com

We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Mr. Dale Frink, State Engineer
North Dakota State Water Commission
900 East Boulevard
Bismarck, North Dakota 58505-0850

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. Frink:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

We are consulting the North Dakota State Water Commission for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

This information will be used as an initial step to help guide project development in a manner that identifies and avoids impacts to sensitive resources where practicable. We have sent similar query letters to other agencies including the US Fish and Wildlife Service, US Army Corps of Engineers, and North Dakota Department of Natural Resources.

Tetra Tech
P.O. Box 30615, Billings, MT 59107
618 South 25th Street, Billings, MT 59101
Tel 406.248.9161 Fax 406.248.9282 www.tetratech.com

We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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TETRA TECH

January 21, 2008

Mr. Jeff Towner, Field Supervisor
U. S. Fish and Wildlife Service
North Dakota Field Office
3425 Miriam Avenue
Bismarck, ND 58501-7926

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. Towner:

Tetra Tech is conducting an investigation of property in Barnes County north of Valley City, North Dakota as a potential location for development of an approximately 200 megawatt (MW) wind energy center and an associated 230 kilovolt (kV) transmission line approximately five miles in length. The area shown in the attached figure is the primary focus of our investigation.

Tetra Tech has previously consulted with the US Fish and Wildlife Service (USFWS) regarding this project. However, we are again consulting with the USFWS for assistance in identifying environmental properties, concerns or issues within the boundaries of the tracts listed below that would influence a decision regarding the use of the land or applicable permits that may be required from your office. We are specifically interested in such information as the location of wetland resources or easements and any other special or sensitive environmental conditions that exist in or near the study area.

The project area includes portions of the following tracts:

Township Name	Township	Range	Sections
Noltimier	141N	57W	2, 4, 8-9, 11, 22-23
Grand Prairie	142N	57W	4-10, 17, 20-21, 27-29, 31-33
Baldwin	143N	57W	20, 22, 27, 32-34

This information will be used as an initial step to help guide project development in a manner that identifies and avoids impacts to sensitive resources where practicable. We will also conduct a site survey of areas proximal to proposed facilities in order to preliminarily determine the presence of wetlands. We have sent similar query letters to other agencies including the US Fish and Wildlife Service, North Dakota Game and Fish, and North Dakota Department of Natural Resources.

Tetra Tech
P.O. Box 30615, Billings, MT 59107
618 South 25th Street, Billings, MT 59101
Tel 406.248.9161 Fax 406.248.9282 www.tetratech.com

We would appreciate a response by February 15, 2008. Please contact me at 406-248-9161 if you have any questions.

Thank you for your assistance.

Respectfully submitted,

Tetra Tech

Jeffrey R. Rice
Project Manager, Natural Resources

HMW/JRR/ba

cc: Tracey Martorano (TtEC, Boston)

Enclosure

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
3425 Miriam Avenue
Bismarck, North Dakota 58501

SEP 13 2007

RECEIVED SEP 17 2007

Mr. John Crookston, Assistant Biologist
Tetra Tech EC, Inc.
1750 SW Harbor Way, Suite 400
Portland, Oregon 97201

Dear Mr. Crookston:

This letter is in response to your August 23, 2007, request for a current list of threatened and endangered species in Barnes County, North Dakota. A list of federally endangered, threatened, and candidate species and designated critical habitat that may be present within the area proposed for construction of a wind energy facility near Valley City, North Dakota, is enclosed. This list fulfills requirements of the U.S. 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. If the Federal agency determines the action "may affect" listed species, then the responsible Federal agency shall request formal section 7 consultation with this office. If the evaluation shows a "no effect" determination on listed species, further consultation is not necessary. If a private entity receives Federal funding for a construction project, or if any Federal permit is required, the Federal agency may designate the fund recipient or permittee as its agent for purposes of section 7 consultation.

If you require further information, please contact Terry Ellsworth of my staff at (701) 250-4481, or at the letterhead address above.

Sincerely,

Jeffrey K. Towner

Jeffrey K. Towner
Field Supervisor
North Dakota Field Office

Enclosure

FEDERAL ENDANGERED SPECIES
FOUND IN BARNES COUNTY
NORTH DAKOTA
September 2007

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.

"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

September 24, 2007

John Crookston
Assistant Biologist
Tetra Tech EC Inc.
1750 SW Harbor Way, Suite 400
Portland, OR 97201

Dear Mr. Crookston:

RE: Proposed Wind Energy Facility - Ashtabula Area
Barnes County, North Dakota

The North Dakota Game and Fish Department has reviewed this project for wildlife concerns. We have no data available regarding threatened or endangered species and sensitive habitats in the project area.

The department manages the Valley City Wildlife Management Area located in parts of sections 19 & 20, T141N, R57W, and 24, T141N, R58W. A special use permit would be required if any activity were to be allowed on these lands. Mr. Brian Kietzman, Wildlife Resource Management Supervisor for the area, can be contacted at 701-253-6483 for additional information on permitting requirements.

Our primary concern with wind farm 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, and that US Fish and Wildlife Service wind turbine siting guidelines be implemented as appropriate in an effort to reduce these impacts.

National Wetland Inventory maps indicate numerous wetlands within the project area. We recommend that steps be taken to protect any wetlands that cannot be avoided, above-ground appurtenances not be placed in wetland areas, and no alterations be made to existing drainage patterns.

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,

Michael G. McKenna
Chief
Conservation & Communication Division

js

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.state.nd.us

Wayne Stenehjem
ATTORNEY GENERAL

January 25, 2008

Jeffrey R. Rice
Project Manager, Natural Resources
Tetra Tech
PO Box 30615
Billings MT 59107

Dear Mr. Rice:

I am responding on behalf of the Attorney General to your most recent letter, regarding an investigation of property in Barnes County as a potential location for development of a wind energy center. You ask that this office identify environmental properties, concerns, or issues within the boundaries of certain tracts of land.

As we informed you in December 2007, the Attorney General and members of his staff are prohibited by statute from giving legal advice, opinions, or assistance to private businesses or members of the public. We may only serve as legal advisors to state officials, state's attorneys, and certain city officials.

Accordingly, we cannot provide the information or assistance you requested. If you need assistance in identifying any issues that may impact this project, you should consult an attorney in private practice licensed in North Dakota. If you need assistance finding an attorney, you can contact the State Bar Association at (701) 255-1404.

You may wish to note our response for your file, to avoid making similar requests to this office in the future.

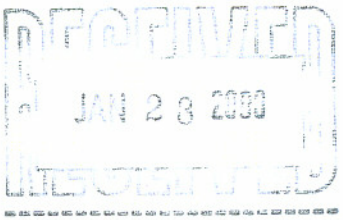
Sincerely,

Liz Brocker

Liz Brocker
Executive Assistant

North Dakota
DEPARTMENT OF COMMERCE

Community Services Economic Development & Finance Tourism Workforce Development



January 25, 2008

Jeffrey R. Rice
Project Manager, Natural Resources
Tetra Tech
PO Box 30615
Billings, MT 59107

RE: Project Area Environmental Scan Barns County, ND Tetra Tech Project No. 11585513686.100

Dear Mr. Rice:

This office supports the development of the proposed wind energy center and transmission line for the above referenced project.

While we are not aware of any environmental property, concerns, or issues within the boundaries of the proposed project, we would defer to the North Dakota Game & Fish Department, the ND Parks & Recreation Department, the State Historical Society of North Dakota, and the North Dakota Health Department for their input. According to your letter it appears you have already initiated this process.

The North Dakota Public Service Commission is the authority which issues permits for locating power plant and transmission lines within the state.

With regards to land use, approvals are granted by the local land use/zoning authorities.

Sincerely,

James R Boyd

James R. Boyd
Acting Energy Program Manager
ND Division of Community Services

sk

STATE HISTORICAL SOCIETY OF NORTH DAKOTA

January 25, 2008

Jeffrey R. Rice, Project Manager, Natural Resources
Tetra Tech
618 South 25th Street
PO Box 30615
Billings, MT 59107

NDSHPO REF. : 08-0310 PSC/Tetra Tech **200 Mega Watt (MW) Barnes County Wind Farm & 230 kV Transmission Line**

Dear Mr. Rice:

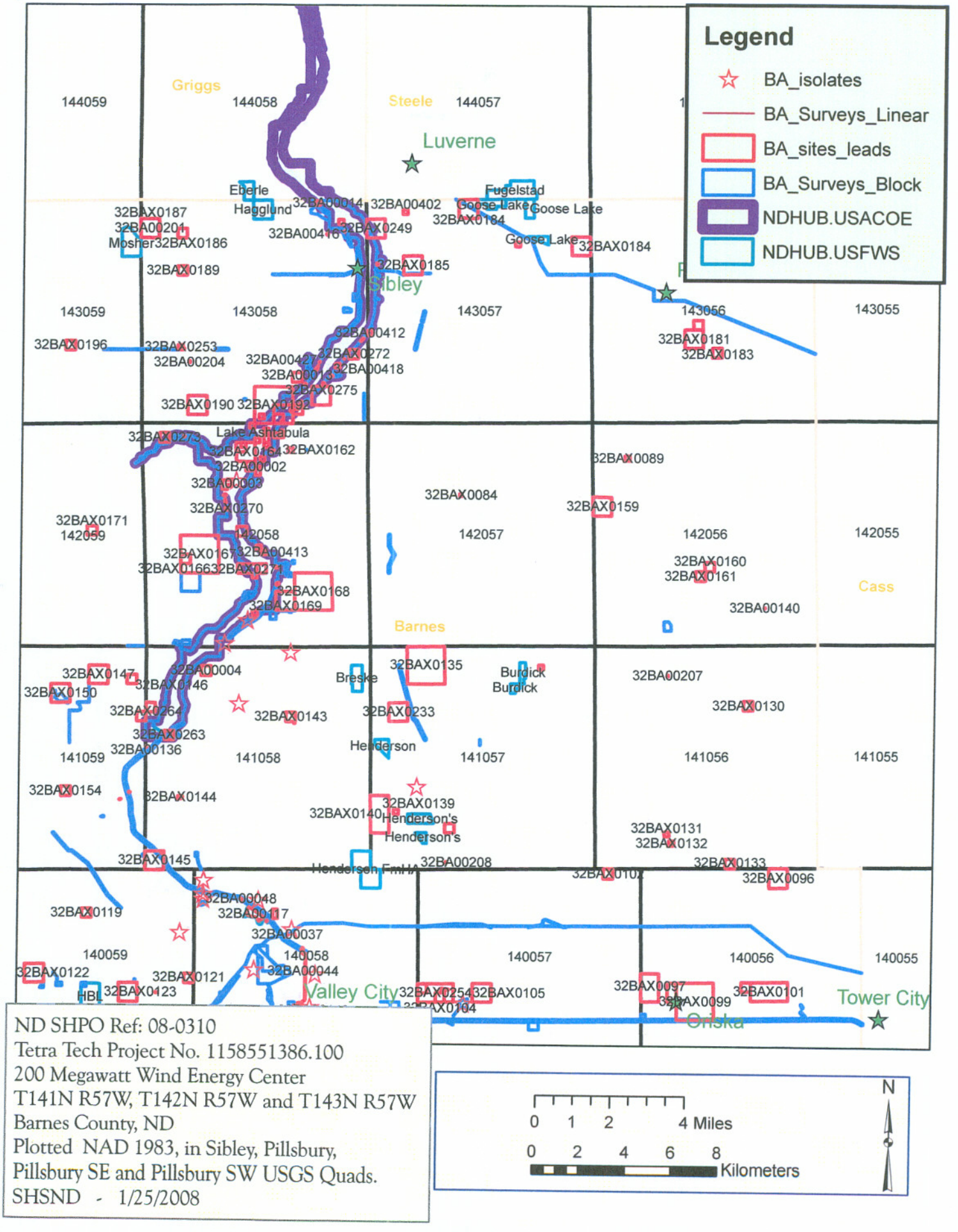
We have reviewed: **08-0310:** PSC/Tetra Tech **"200 Mega Watt (MW) Barnes County Wind Farm & 230 kV Transmission Line"** correspondence. There is potential for unrecorded and recorded properties in a variety of physiographic settings in the overall study area north of Valley City, as indicated on the attached map.

If the project requires permits issued by a federal and/or state agency (e.g., WAPA, RUS, COE, USFWS, BOR, PSC) then the respective agency(ies) are to be consulted regarding their recommendations on the project. As a potential federal undertaking, we encourage agency consultation as part of the Environmental Assessment process, as you indicated you have initiated in the correspondence. At this point, we encourage that a Class I CRI (file and records search) be prepared and submitted for review to the appropriate agencies, as delineated from the map coverage you provided.

Thank you for the opportunity to review the project, and to further consultation on it. If you have questions please contact either Susan Quinnell at (701) 328-3576 or Paul Picha at (701) 328-3574. Please include the **NDSHPO REF.: 08-0310** in correspondence regarding the project.

Sincerely,

Merlan E. Paaverud, Jr.
State Historic Preservation Officer (North Dakota)
and
Director, State Historical Society of North Dakota
c: Susan E. Wefald, Commissioner, PSC, with 2 map enc.



ND SHPO Ref: 08-0310
Tetra Tech Project No. 1158551386.100
200 Megawatt Wind Energy Center
T141N R57W, T142N R57W and T143N R57W
Barnes County, ND
Plotted NAD 1983, in Sibley, Pillsbury, Pillsbury SE and Pillsbury SW USGS Quads.
SHSND - 1/25/2008

JOB SERVICE North Dakota
www.jobsnd.com

John Hoeven, Governor • Maren L. Daley, Executive Director

PO Box 5507 • Bismarck, ND 58506-5507

January 25, 2008

Mr. Jeffrey R. Rice
Project Manager, Natural Resources
Tetra Tech
618 South 25th Street
Billings, Montana 59101

RE: Project Area Environmental Scan
Barnes County, North Dakota
Tetra Tech Project No. 1158551386.100

Dear Mr. Rice:

Job Service North Dakota administers the employment service and unemployment insurance programs.

We have no information regarding the boundaries of the tracts listed in your letter dated January 21, 2008 that would influence a decision regarding the use of the land or applicable permits.

Sincerely,

Maren Daley

Maren Daley
Executive Director

John Hoeven
Governor

Lisa K. Fair McEvers
Commissioner

NORTH DAKOTA
Department of
LABOR

State Capitol - 13th Floor
600 E Boulevard Ave Dept 406
Bismarck, ND 58505-0340

nd.gov/labor
nd.gov/humanrights

January 25, 2008

Mr. Jeffrey R. Rice
Project Manager, Natural Resources
Tetra Tech
P.O. Box 30615
Billings, MT 59107

Dear Mr. Rice,

Thank you for your letter of January 21, 2008, inquiring about assistance from the North Dakota Department of Labor in identifying environmental properties or other concerns the department may have for your Barnes County project. As noted in previously correspondence, the Department of Labor enforces wage and hours laws, investigates allegations of discrimination in employment, housing, public services, public accommodations and credit transactions.

The Department of Labor has no authority to issue any permits regarding land or environmental concerns. Your questions may more appropriately be addressed to the North Dakota Public Service Commission, located at 600 E. Boulevard Avenue, Dept. 408, Bismarck, ND 58505-0480. It is my understanding that inquiries of this type may be brought to either Jerry Lien or Pat Pahn at the aforementioned address or by telephone at (701) 328-2400.

Sincerely yours,

Lisa K. Fair McEvers
Commissioner

NORTH DAKOTA
DEPARTMENT of HEALTH

ENVIRONMENTAL HEALTH SECTION
Gold Seal Center, 918 E. Divide Ave.
Bismarck, ND 58501-1947
701.328.5200 (fax)
www.ndhealth.gov

January 31, 2008

Mr. Jeffrey R. Rice
Project Manager, Natural Resources
Tetra Tech, Inc.
P.O. Box 30615
Billings, MT 59107

Re: Project No 1158551386.100, Wind Energy Center & Transmission Line
Barnes County, North Dakota

Dear Mr. Rice:

This department has reviewed the information concerning the above-referenced project submitted to Dr. Terry Dwelle under date of January 21, 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 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.

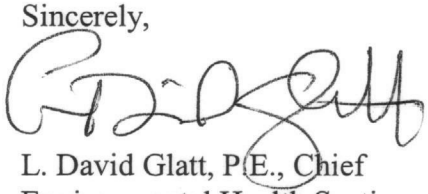
4. Noise from construction activities may have adverse effects on persons who live near the construction area. Noise levels can be minimized by ensuring that construction equipment is equipped with a recommended muffler in good working order. Noise effects can also be minimized by ensuring that construction 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,



L. David Glatt, P.E., Chief
Environmental Health Section

LDG:cc
Attach.

NORTH DAKOTA
DEPARTMENT *of* HEALTH

ENVIRONMENTAL HEALTH SECTION
Gold Seal Center, 918 E. Divide Ave.
Bismarck, ND 58501-1947
701.328.5200 (fax)
www.ndhealth.gov

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.

North Dakota Geological Survey

Edward C. Murphy - State Geologist

Department of Mineral Resources

Lynn D. Helms - Director

North Dakota Industrial Commission

www.state.nd.us/ndgs

February 1, 2008

Jeffery R. Rice
Tetra Tech
P.O. Box 30615
Billings, MT 59107

Re: Project Area Environmental Scan – Barnes County, North Dakota
(TTP# 1158551386.100)

The North Dakota Geological Survey (NDGS) appreciates the opportunity to provide comment regarding your proposed project. No environmental properties of interest or related concerns or issues were identified at this time. The NDGS does not currently require any specific permits for the proposed project area as described in your January 21, 2008 letter.

Please feel free to contact our offices at (701) 328-8000 at any time if there are any additional comments, questions, or concerns.

Sincerely:

North Dakota Geological Survey:

Fred J. Anderson
Geologist

FJA\

North Dakota Department of Transportation

Francis G. Ziegler, P.E.
Director

John Hoeven
Governor

February 5, 2008

Jeffrey R. Rice
Project Manager
Tetra Tech
P.O. Box 30615
Billings, MT 59107

POTENTIAL LOCATION FOR 200 MEGAWATT (MW) ENERGY CENTER ASSOCIATED WITH 230 KILOVOLT (kV) TRANSMISSION APPROXIMATELY FILE MILES IN LENGTH, BARNES COUNTY, NORTH DAKOTA

We have reviewed your January 21, 2008, letter.

Kerry Johnson, Barnes County Road Superintendent, should be contacted if it is necessary to cross any county roads with utilities or do any road on the county right-of-way. Kerry's contact number is 701-845-8598.

Additionally, if because of this project any state highways need to be crossed or work needs to be done on highway right-of-way, appropriate permits and risk management documents will need to be obtained from the Department of Transportation District Engineer, John Thompson at 701-845-8800.

RONALD J. HENKE, P.E - DIRECTOR, OFFICE OF PROJECT DEVELOPMENT

57:rjh:js

c: John Thompson, Valley City District Engineer

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
www.parkrec.nd.gov

February 6, 2008

Jeffrey R. Rice
Tetra Tech
PO Box 30615
Billings, MT 59107

Re: Wind Energy Center Project
Barnes County, North Dakota
Project No. 1158551386.100

Dear Mr. Rice:

The North Dakota Parks and Recreation Department (the Department) has reviewed the above referenced project to investigate a potential site for a wind energy center in areas located in Sections 2, 4, 8-9, 11, 22, and 23, T141N, R57W; Sections 4-10, 17, 20, 21, 27-29, and 31-33, T142N, R57W; and Sections 20, 22, 27, and 32-34, T143N, R57W, Barnes County.

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 or Land and Water Conservation Fund recreation projects that we coordinate.

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 occurrences have been identified within or adjacent to the project area including: *Pascopyrum smithii – Stipa comata prairie* (Central mixed grass prairie), *Spartina pectinata – Calamagrostis stricta – Carex spp. herbaceous vegetation* (wet prairie), *Andropogon gerardii – Schizachyrium scoparium transition tallgrass prairie* (Central mesic tallgrass prairie), and *Schizachyrium scoparium – Bouteloua curtipendula – Stipa spartea prairie* (dry mesice tallgrass prairie). Please see attached spreadsheet and map for more specific information on these communities.

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.

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.

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 Duttenhefner (701-328-5370 or kgduttenhefner@nd.gov) of our staff if additional information is needed.

Sincerely,

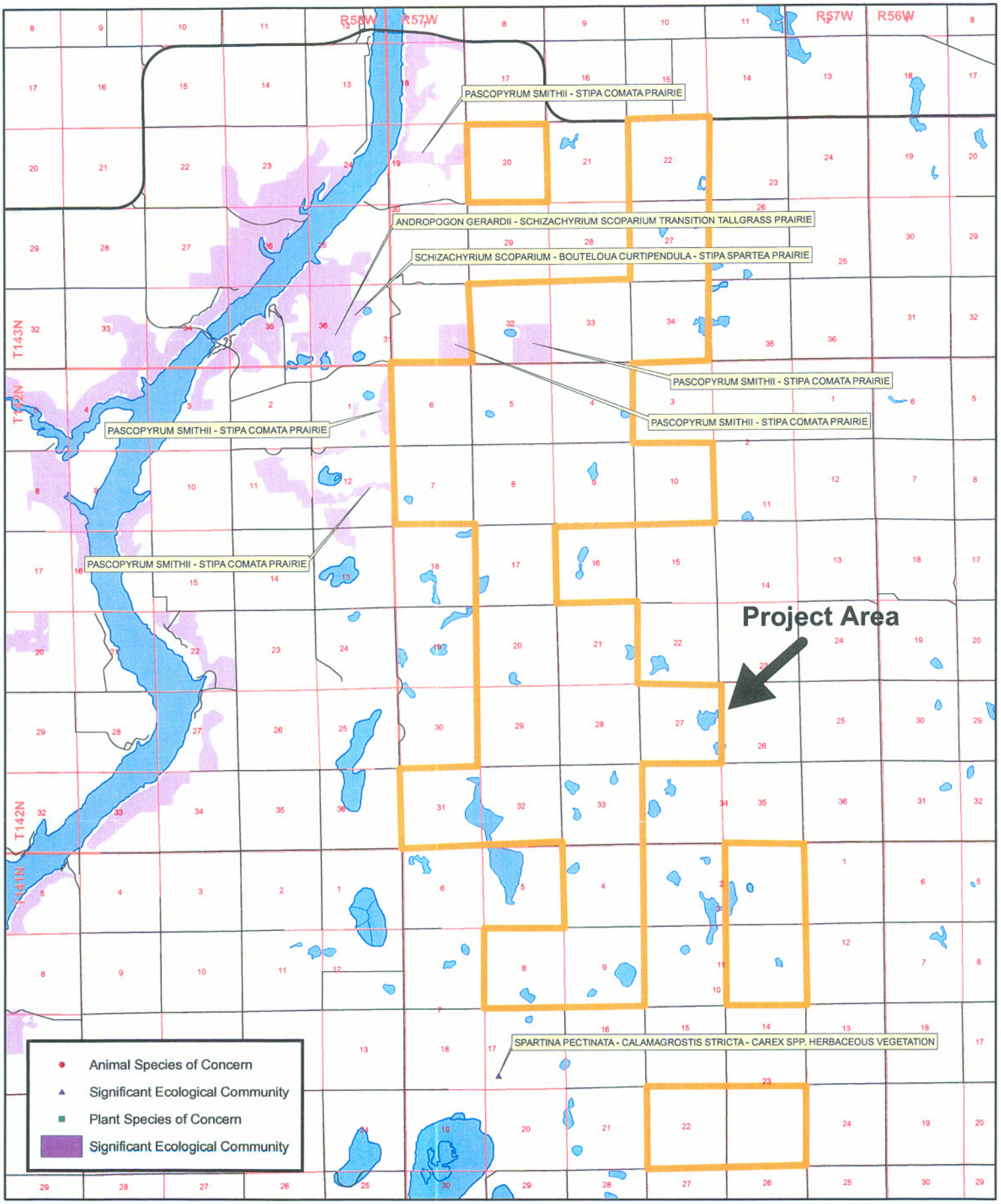
Jesse Hanson

Jesse Hanson, Coordinator
Planning and Natural Resources Division

R.USNDNHI*1919

Play in our backyard!

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



North Dakota Parks & Recreation Department
North Dakota Natural Heritage Inventory
February 2008

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
SPARTINA PECTINATA - CALAMAGROSTIS STRICTA - CAREX SPP. HERBACEOUS VEGETATION	WET PRAIRIE	141N057W	17	W2SW4	S2S3			9/14/1985
PASCOPYRUM SMITHII - STIPA COMATA PRAIRIE	CENTRAL MIXED GRASS PRAIRIE	142N058W	1		S2			9/22/1998
PASCOPYRUM SMITHII - STIPA COMATA PRAIRIE	CENTRAL MIXED GRASS PRAIRIE	142N058W	12	11; 13	S2			9/24/1998
PASCOPYRUM SMITHII - STIPA COMATA PRAIRIE	CENTRAL MIXED GRASS PRAIRIE	143N057W	19	18; 7	S2			8/28/1998
PASCOPYRUM SMITHII - STIPA COMATA PRAIRIE	CENTRAL MIXED GRASS PRAIRIE	143N057W	31		S2			8/28/1998
PASCOPYRUM SMITHII - STIPA COMATA PRAIRIE	CENTRAL MIXED GRASS PRAIRIE	143N057W	32	SE4	S2			8/28/1998
ANDROPOGON GERARDII - SCHIZACHYRIUM SCOPARIUM TRANSITION TALLGRASS PRAIRIE	CENTRAL MESIC TALLGRASS PRAIRIE	143N058W	36		S1			8/28/1998
SCHIZACHYRIUM SCOPARIUM - BOUTELOUA CURTIPENDULA - STIPA SPARTEA PRAIRIE	DRY MESIC TALLGRASS PRAIRIE	143N058W \ 142N058W	36 \ 3	35; 25; 34	S1			8/28/1998

2/5/2008

North Dakota State Water Commission

900 EAST BOULEVARD AVENUE, DEPT 770 • BISMARCK, NORTH DAKOTA 58505-0850
701-328-2750 • TDD 701-328-2750 • FAX 701-328-3696 • INTERNET: http://swc.nd.gov

February 15, 2008

Jeffrey Rice
Tetra Tech
PO Box 30615
Billings, ND 59107

Dear Mr. Rice:

This is in response to your request for review of environmental impacts associated with the Project Area Environmental Scan, Barnes County, ND, Tetra Tech Project No. 1158551386.100.

The proposed project have been reviewed by State Water Commission staff and the following comments are provided:

- The property is not located in an identified floodplain and it is believed the project will not affect an identified floodplain.

- All waste material associated with the project must be disposed of properly and not placed in identified floodway areas.

- No sole-source aquifers have been designated in ND.

There are no other concerns associated with this project that affect State Water Commission or State Engineer regulatory responsibilities.

Thank you for the opportunity to provide review comments. If you have any questions, please call me at 328-4969.

Sincerely,

Larry Knudtson
Research Analyst

LJK:ds/1570

APPENDIX E

PRE-CONSTRUCTION PROTOCOLS

Protocols for Pre-Construction Avian Studies
Ashtabula Wind Energy Center
Barnes County, North Dakota

- ***Spring Avian Point Count Surveys***

Objective: *To avoid and minimize potential adverse effects on avian use within the project area.*

The avian point count surveys will be conducted weekly in the spring from late March (weather permitting) through the end of May. Fixed point count surveys will be conducted at circular plots in the study area, with in-transit observations of birds made while traveling between survey points. Surveys will be conducted during daylight hours. A series of observation points will be established in the area identified by FPL Energy as the likely locations of turbine strings. Points that provide the best views and coverage of as much of the area where turbine strings are proposed will be selected. The number of points selected will be limited to those that can be covered in a single field day. Avian observations will be focused on recording all birds within an 800-meter radius circle centered on the observation point location, although birds beyond 800 meters will also be recorded. The duration of the survey at each point will be 20 minutes. The UTM coordinates will be documented in the field using a GPS unit. Final data sheets will be prepared after the initial project setup.

The Project Area is utilized by migratory species, including grassland birds and waterfowl. Several USFWS wetland easements and Waterfowl Production Areas (WPAs) are within the Project Area and in the vicinity. During spring avian point counts, all birds observed will be recorded and special note of any shorebirds, waterbirds, and waterfowl observed within 0.5 mile of the Project Area will be noted. If large numbers of shorebirds, waterfowl, or waterbirds are observed migrating over or stopping in the Project Area, available information on the habitats that shorebirds are likely to use during the return southward migration, which begins in mid-July, will be reviewed. This review will include contacting USFWS personnel to gather background information on habitat requirements in the area. A recommendation as to whether July and August point counts are warranted during the construction phase of the project will be made.

- ***Raptor Nest Surveys***

Objective: *Surveys of raptor nests throughout the Project Area to document the intensity of resident raptor use will identify sites where effects may be further minimized.*

At the same time as initiation of point counts, an initial ground survey for raptor nests in the study area will be conducted. These surveys will consist of driving the roads and/or walking (if there are areas not visible from roads and the landowner allows access) throughout the study area, searching for evidence of raptor tree stick nests. The first surveys will be conducted prior to leaf-on when nests are visible. Presence/absence of

raptor activity in and near potentially suitable nesting habitat will be recorded during these (and all other) surveys. Whenever possible, the sex and age class of all raptors observed will be determined. If an adult exhibiting nesting behavior (courtship or carrying food, for example) is observed, the area will be searched for a nest if one has not already been located. Without creating a disturbance, the UTM coordinates of each nest will be recorded in the field with a GPS unit so that it can easily be found for future monitoring. The location of each nest will be plotted on a field map of the WRA. Where feasible and without disturbing nesting birds, each nest will be photographed from at least one direction and recorded. Any nests found will be classified according to following nesting status: incubating adult, tended, or of special interest; and will be re-visited in May to determine subsequent activity status. Nests determined to be active in May may be revisited in the June-July time period to determine nest productivity. Results of field monitoring will be included in the pre-construction avian monitoring report.

- ***Post-Construction Monitoring***

Objective: *Identify any avian mortalities that might occur from collisions with wind turbines.*

FPL Energy's post-construction monitoring plan includes the Wildlife Response Reporting System (WRRS). FPL Energy field technicians, during routine maintenance operations, are required to walk three concentric circles around the base of the turbine and report and document avian mortalities. These records will be kept for review and monitoring purposes.

According to the USFWS, additional post-construction monitoring is not likely to be necessary; however, a final determination on the need for additional monitoring will be made based on the results of spring avian studies.

Protocol for Pre-Construction Cultural Inventory
Ashtabula Wind Energy Center
Barnes County, North Dakota

- ***Class II Cultural Inventory***

Objective: *Class II surveys will be conducted to identify cultural resources that could be affected by project facilities within the Project Area and proposed transmission line corridor.*

On September 6, 2007 Beaver Creek Archaeology, Inc. (BCA) conducted a Class I inventory of the area in which the wind farm is proposed. This inventory covered approximately 123 sections of land north of Valley City, North Dakota. The results of the Class I inventory (file search of sites and previous investigations) were plotted on USGS 7.5' quadrangle maps so that known cultural resources could be avoided during preliminary planning. The maps were also used in deciding upon the level of further investigations needs for the project.

Based on the results of the file search, seven manuscripts, nine archaeological site leads, one architectural site, and one architectural site lead were found within the records. The project area contains relatively few archaeological, historic, and architectural sites. However, this is likely due to the lack of cultural resource inventories performed in the project area. In addition, the rolling prairie landscape with hills, knolls, and bluffs combined with an abundance of water indicate that the project area may contain archaeological sites. A qualified archaeologist will perform a Class II/III pedestrian survey, the results of which will be used to microsite turbines to avoid resources. This survey will be conducted when weather permits. During the survey, blocks (150 x 150 meter) around the proposed turbine locations will be inventoried if field observations indicate they are warranted. Based on professional judgment, these areas would have a relatively high potential to contain cultural resources. The inventory will use pedestrian transects spaced at 20 meter (or less) intervals and will adhere to the guidelines outlined in *North Dakota SHPO Manual for Cultural Resource Inventory Projects Revised Edition* (SHSND 2004).

Protocol for Pre-Construction Wetlands Inventory
Ashtabula Wind Energy Center
Barnes County, North Dakota

Objective: *Wetland field surveys will be conducted to identify wetlands and other aquatic resources that could be affected by project facilities within the project area and proposed transmission line corridor.*

Off-site (desktop) determination methods will first be used to identify probable locations of wetlands and waterbodies, while on-site methods will be employed to verify wetland identifications and gather information to assess probable jurisdictional determinations.

The desktop determination activities will also be used to identify potential impacts to wetland areas resulting from construction of the project, access roads, underground electrical (UE) collection lines, other project features (met towers, operations building, and construction laydown areas), and the transmission line corridor. Results will be used to estimate potential impacts to wetlands and waterbodies, provide an opinion of federal jurisdiction, and offer alternatives to project design and activities to avoid and minimize impacts to jurisdictional areas.

The on-site (field) visit will be conducted to verify wetland identifications and gather information to assess probable jurisdictional determinations. During this effort, sufficient information will be gathered to allow for preparations of Department of the Army (DA) Clean Water Act Section 404 Nationwide Permit (NWP) application, if the proposed impacts from the project eclipse the notification threshold of the NWP #12 for Utility Line Activities in wetlands deemed subject to U.S. Army Corps of Engineers (USACE) jurisdiction. Wetland information coupled with project specific details such as turbine layout will be used to guide personnel to the most sensitive areas during on-site activities.

Personnel experienced in the identification of wetlands and wetland functions and values as they relate to jurisdictional status will conduct a field survey of wetlands and other aquatic resources along the proposed transmission corridor. Biological and hydrological resources of note will be identified and documented in field notes. Description of resources along the corridors will be specified.

Wetlands within the project area will be delineated using the methods described in the 1987 USACE Wetland Delineation Manual (Environmental Laboratory, 1987) and supplemental delineation guidance by the USACE contained in the field memoranda dated February 20, 1992 and March 6, 1992, as well as the Questions and Answer memoranda dated October 7, 1991. These methods incorporate a three-parameter approach using vegetation, soils, and hydrology to identify the presence of freshwater wetlands. The extent of waterbodies, other than wetlands, will be determined by applying the USACE definition of Ordinary High Water Mark (OHWM). The OHWM refers to a line on the shore established by fluctuations of water and is indicated by the following physical characteristics: presence of a clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; presence of litter and debris; or other appropriate means that consider characteristics of surrounding areas.

Information to be collected in the field includes vegetative characteristics, geographic location, hydrologic setting, characteristics of soils, and field observations as they relate to wetland functions and values.

Concurrent with wetlands surveys, biologists will identify those areas meeting the definition of waters of the U.S. The current definition of waters of the U.S. can be found in the Corps/EPA CWA regulations (33 CFR 328.3(a)), the term “waters of the U.S.” is defined as follows:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

2. All interstate waters including interstate wetlands;

3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

    (i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    (ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    (iii) Which are used or could be used for industrial purpose by industries in interstate commerce.

4. All impoundments of waters otherwise defined as waters of the U.S. under the definition;

5. Tributaries of waters identified in paragraphs (a)(1)-(4) of this section;

6. The territorial seas;

7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a)(1)-(6) of this section.

In the USACE RHA regulations (33 CFR Part 329.4 (RHA)), the term “navigable waters of the U.S.” is defined to include all those waters that are subject to the ebb and flow of the tide, and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

Jurisdictional waters of the U.S., including wetlands, will be identified in accordance with the USACE Jurisdiction Determination Form Instructional Guidebook (Corps JD Guidebook) revised on June 5, 2007, pursuant to the Rapanos Guidance.

Based on this guidance the USACE and United States Environmental Protection Agency (USEPA) will assert jurisdiction over the following types of waters:

- Traditional Navigable Water (TNWs) and wetlands adjacent to TNWs
- Non-navigable tributaries of TNWs that are relatively permanent (flow year-round or have continuous flow at least seasonally) and wetlands that directly abut these tributaries

In addition, the following waters are also considered jurisdictional based on a fact-specific analysis indicating they have a significant nexus with a TNW:

- Non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to, but do not directly abut, a relatively permanent non-navigable tributary

Application of a significant nexus evaluation will include:

1. An assessment of the flow characteristics and functions of the tributary, itself, in combination with the functions performed by any wetlands adjacent to the tributary to determine if they have more than an insubstantial or speculative effect on the chemical, physical and/or biological integrity of TNWs. This assessment includes consideration of hydrologic factors such as:
    - volume, duration, and frequency of flow, including consideration of certain physical characteristics of the tributary
    - proximity to the traditional navigable water
    - size of the watershed
    - average annual rainfall
    - average annual winter snow pack

2. A consideration of ecologic factors such as:
    - the ability of the tributary and its adjacent wetlands (if any) to carry pollutants and flood waters to traditional navigable waters;
    - the ability of the tributary and its adjacent wetlands (if any) to provide aquatic habitat that supports biota of a traditional navigable water;
    - the ability of the adjacent wetlands to trap and filter pollutants or store flood waters; and/or,
    - the ability of tributary and its adjacent wetlands to maintain water quality.

Other waters or features which may be considered jurisdiction in accordance with the *Rapanos* Guidance are:

- Certain ephemeral waters in the arid west are distinguishable from the geographic features described below where such ephemeral waters are tributaries and may have a significant nexus to TNWs.
- Certain geographical features (e.g., ditches, canals) that transport relatively permanent (continuous at least seasonally) flow directly or indirectly into TNWs or between two (or more) waters of the U.S., including wetlands, are jurisdictional waters regulated under the CWA.
- Certain geographic features (e.g., swales, ditches, pipes) may contribute to a surface hydrologic connection where the features:
- replace or relocate a water of the U.S., or
- connect a water of the U.S. to another water of the U.S., or
- provide relatively permanent flow to a water of the U.S.

The following geographic features are generally are not considered to be jurisdictional waters:
- swales, erosional features (e.g. gullies) and small washes characterized by low volume, infrequent, and short duration flow
- ditches (including roadside ditches) excavated in and draining only uplands and that do not carry a relatively permanent flow of water
- uplands transporting over land flow generated from precipitation

For all areas which are identified to be wetlands or waters of the U.S., UTM coordinates will be collected in the field with a GPS unit. Locations will then be graphically depicted on maps presented in the Section 404 permit application, if required. Wetlands and waters of the U.S. will also be flagged during this task to facilitate avoidance during construction.

A formal wetland delineation report, suitable for submittal to the USACE, will be prepared and will detail the findings of the review and field investigation. Information included in this report will include: a description of the project areas including figures and acreage calculations, soil and vegetation conditions, an assessment of the jurisdictional status based on field observations of hydrologic, vegetative conditions, and soil conditions, including wetland delineation data sheets. This report will focus on those wetlands which may be impacted by the proposed array, access roads, laydown areas, other project features and transmission line.