Application for a Certificate of Site Compatibility for the Ashtabula III Wind Energy Center in Barnes County, North Dakota

Case No. PU-10-147

Prepared for:
North Dakota Public Service Commission
600 E. Boulevard, Dept. 408
Bismarck, North Dakota 58505

ND PSC

Submitted by:
Ashtabula Wind III, LLC
700 Universe Boulevard
Juno Beach, Florida 33408

Prepared by:
Tetra Tech EC, Inc.
160 Federal Street, 3rd Floor
Boston, Massachusetts 02110

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ACRONYMS AND ABBREVIATIONS

AADT	Average Annual Daily Traffic
Act	North Dakota Energy Conversion and Transmission Facility Siting Act
APE	area of potential effect
ASTM	American Society for Testing and Materials
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
Certificate	Certificate of Site Compatibility
CFR	Code of Federal Regulations
CRP	Conservation Reserve Program
CWA	Clean Water Act
DOE	Department of Energy
EMF	electromagnetic fields
EPA	Environmental Protection Agency
EPC	engineering, procurement, and construction
ESA	Environmental Site Assessment or Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FSA	Farm Service Agency
GAP	Geographic Analysis Program
GIS	geographic information system
ISO	Organization for International Standardization
ITP	Incidental Take Permit
kV	kilovolt
LOI	Letter of Intent
MBTA	Migratory Bird Treaty Act
MDU	Montana Dakota Utilities Co.
met tower	meteorological tower
min	minute
MISO	Midwest Independent Transmission System Operator
mph	miles per hour
MW	megawatt
NDAC	North Dakota Administrative Code
NDCC	North Dakota Century Code
NDDOH	North Dakota Department of Health
NDDOT	North Dakota Department of Transportation
NDGFD	North Dakota Game and Fish Department
NDNHI	North Dakota Natural Heritage Inventory
NDPRD	North Dakota Parks and Recreation Department
NDSWC	North Dakota State Water Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act

NLCD	National Land Cover Dataset
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSA	Noise Sensitive Area
NTIA	National Telecommunications and Information Administration
NWI	National Wetlands Inventory
NWP	Nationwide Permit
OHWM	Ordinary High Water Mark
O&M	operation and maintenance
PCN	Pre-construction Notification
PLOTS	Private Lands Open to Sportsmen
Project	Ashtabula III Wind Energy Center
PSC	Public Service Commission
REC	recognized environmental condition
RPW	relatively permanent water
RSA	rotor swept area
SCADA	Supervisory Control and Data Acquisitions
SHPO	State Historic Preservation Office
SPCC	Spill Prevention Control and Countermeasure Plan
SWPPP	Storm Water Pollution Prevention Plan
Tetra Tech	Tetra Tech EC, Inc.
TNW	traditional navigable water
U.S.	United States
USACE	United States Army Corps of Engineers
USCB	United States Census Bureau
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WMA	Wildlife Management Area
WPA	Waterfowl Production Area
WRP	Wetland Reserve Program

1. INTRODUCTION

Ashtabula Wind III, LLC (Ashtabula III), a subsidiary of NextEra Energy Resources, LLC (NextEra Energy), respectfully submits this application to the North Dakota Public Service Commission (PSC or the Commission) for a Certificate of Site Compatibility (Certificate) for construction of the Ashtabula III Wind Energy Center (the Project). Ashtabula III initially submitted a Letter of Intent (LOI) to file this application to the PSC on May 5, 2010. The proposed Project would be located in Barnes County, North Dakota, and would provide a total of up to 68.8 megawatts (MW) of renewable wind energy.

NextEra Energy develops environmentally responsible electric generation projects throughout the United States. NextEra Energy is North America's largest producer of wind energy with 76 wind facilities in operation in 17 states and Canada, totaling more than 7,500 MW of wind power and a total of $11 billion invested. Currently, NextEra Energy's portfolio of more than 100 facilities totals more than 18,000 net MW of generating capacity from electrical plants operating in 27 states and Canada (NextEra Energy Resources 2010). For more information, see (**Appendix A**).

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

Under the North Dakota Energy Conversion and Transmission Facility Siting Act (the Act) (North Dakota Century Code [NDCC] 49-22), a proposed energy conversion facility requires a certificate of site compatibility from the PSC in order to be located, constructed, and operated. The Act specifies that 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).

Ashtabula III has considered exclusion and avoidance areas and selection and policy criteria set forth in the Act in the design of the Project. To the extent available, these key factors and criteria have been provided in this application. In addition, to facilitate thorough evaluation of the proposed site, sufficient Project design and technical information have also been provided. **Table 1-1** outlines the information required to fulfill the requirements for an application for a Certificate from the PSC (PSC 1979) and where these requirements are addressed in this document.

Table 1-1. Certificate Completion Checklist

State Authority	Description	Section
NDCC 49-22-08	PSC Guidelines: Energy Conversion and Transmission Facility Siting	
Section A	Description	
1.	Type: Describe the type of energy conversion facility proposed and provide a diagram of the major process system or a flow diagram.	4.0, Figures 5-6
2.	Product: Describe in general terms and technical terms the products to be produced by the proposed facility.	1.3, 1.3.2
3.	Size and Design: Provide the following description of the production capacity and design	
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, 5.3.2
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.	N/A
Section B	Studies	
	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	
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.	2.0
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.	N/A
Section D	Location	
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, Figures 2-3
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.	3.0, Figure 4
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

State Authority	Description	Section
5.	The criteria to be evaluated shall include at a minimum all of the following which are within the study area:	
	Exclusion areas;	3.1
	Avoidance areas;	3.2
	Selection criteria;	3.2
	Policy criteria;	3.4
	Design and construction limitations; and	3.5
	Economic considerations.	3.6
6.	Discuss the mitigative measures that will be taken to minimize adverse impacts which result from the location, construction, and operation of the proposed facility.	5.0
7.	List the qualifications of the people in the various disciplines that contributed to the facility site location study	9.0
8.	Maps	
	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.	Figure 4
	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.	3.0
NDCC 49-22-09	Factors to be considered in evaluating applications and designation of sites, corridors, and routes.	
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.	8.1
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.	5.0, 8.4
5.	Alternatives to the proposed site, corridor or route which are developed during the hearing process and which minimize adverse effects.	8.5
6.	Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designated.	8.6
7.	The direct and indirect economic impacts of the proposed facility	8.7
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.	8.8
9.	The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.	8.9
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	8.10
11.	Problems raised by federal agencies, other state agencies, and local entities	8.12

1.2 Flexibility in Siting

Wind facilities are sited through a process that incorporates numerous factors and input from several different entities, and therefore requires multiple modifications and revisions. As detailed in Section 3.0, Ashtabula III initially selected the location of the Project based on its energetic wind resource, proximity to the regional electric grid and positive community support. Through subsequent evaluation, meteorological studies, and communications, Ashtabula III determined that the Project site is favorable for wind energy development from the perspectives of wind resource, transmission interconnection, environmental issues, and economics. Using key findings from these studies and interactions, Ashtabula III has entered into agreements with landowners for the siting of wind turbines and ancillary facilities, and has thereby developed a refined Project Area, consisting of approximately 12,200 acres of private land on which the Project will be developed.

Within the Project Area, Ashtabula III has developed a preliminary Project layout; however, Ashtabula III is not seeking a permit for each individual Project component in a specific and fixed location at this time. Rather, Ashtabula III requests that the Certificate define the Project Area and the approximate number and location of turbines and ancillary structures related to wind generation to be located within the Project Area. An updated Project layout map will be provided to the PSC for review prior to the hearing for the permit. Within the permitted Project Area, Ashtabula III will configure Project turbines in a design which optimizes electrical generation and efficiency based on the existing wind resource. Ashtabula III will arrange the Project turbines and ancillary facilities within the approved Project Area subject to required and voluntary setbacks from environmentally sensitive areas, roads, residences, or other restricted areas defined in the landowner easement agreements, Certificate conditions, and other applicable local, state, or federal permit conditions. Ashtabula III believes that this approach would maximize their flexibility to design an optimized Project layout while also ensuring that the requirements of the Act are met.

Once the PSC issues the Certificate, Ashtabula III will complete any additional studies required by the Certificate, Ashtabula III's internal siting process, and any additional studies required by all other permits and regulatory agencies related to the Project. Ashtabula III will also further evaluate the Project Area based on engineering considerations, efficient construction of the Project, and additional input from landowners on micrositing of wind turbines and associated facilities on their property. Following completion of these additional studies and communications, microsited locations of Project components will be re-evaluated to confirm their conformance with the Certificate conditions and other constraints and setbacks. Prior to construction, a final site plan for the Project will be submitted to the PSC and a pre-construction meeting will be held with PSC staff to ensure that the site plan conforms to the Certificate requirements. Following completion of construction, as-built site plans will be furnished for PSC's Project files.

The siting process for wind facilities presents unique challenges due to the fact that these projects are sited over a physically large area and must be designed to not only conform to Certificate conditions but also optimize the wind resource at the site and be constructed in an economic fashion. In order to facilitate this balance, the Certificate will ideally provide parameters within which the Ashtabula III may optimize the Project layout. With Certificate conditions in place, Ashtabula III is then able to proceed with and finalize planning and development. Approval of a Certificate at this stage of development is not only consistent with circumstances unique to wind

Project siting, but it is also essential to the overall development schedule and Ashtabula III's commitments to be online by December 2010. Ashtabula III believes that the proposed siting process is consistent with North Dakota siting rules and provides them with the flexibility necessary to develop an environmentally responsible Project in a timely, cost-effective manner.

1.3 Project Summary

The proposed Project would be located in Barnes County, North Dakota, approximately eight miles (mi) north of the City of Valley City (**Figure 1**) and adjacent to the Ashtabula Wind Energy Center. The Project would consist of approximately 69 MW of renewable wind energy capacity. The Project Area is defined as the approximately 12,000-acre area of private land under easement with Ashtabula III for the construction and operation of the Project (**Figures 2-3**). The Project facilities will likely include:

- 43 1.6-MW GE Xle wind turbines
- New gravel access roads and improvements to existing roads
- Underground electrical collection lines
- A collection substation facility
- A temporary staging area for the construction phase of the Project

The Project will interconnect to the existing Minnkota Power Cooperative (Minnkota) Maple River 230-kV substation approximately 50 miles to the southeast via an existing transmission line that runs through the Project Area.

1.3.1 Proposed Area

The Project Area is comprised of the individual parcels of private land under lease agreement with Ashtabula III where the Project facilities will be located. The Project Area was selected to include all areas necessary to optimize the wind resource while avoiding and minimizing impacts to environmental resources. **Table 1-2** presents the townships, sections, and ranges within Barnes County containing the Project Area.

Table 1-2. Project Area Location

Township Name	Township	Range	Sections
Ashtabula	142N	58W	13, 22-27, 35, 36
Baldwin	143N	57W	2-5, 7-23
Ellsbury	143N	56W	7, 18
Getchell	141N	58W	1, 2
Grand Prairie	142N	57W	18, 19

The Project Area boundary line includes approximately 12,194 acres (19 square miles) of land under easement with Ashtabula III. Turbines and associated facilities will be placed throughout the leased portion of the Project Area; however, the total permanent footprint of the Project will occupy approximately 206 acres, or 1.7 percent of the total Project Area.

1.3.2 Projected Output

The Project will have a nameplate (gross) capacity of approximately 69 MW, with projected average annual output of 265,183 megawatt hours (MWh) per year (assuming net capacity factors of 44 percent). As with all wind projects, the actual Project output will be determined by wind resource, final design, site-specific features, and equipment.

1.4 Project Schedule

The commercial operation date of the Project is planned for December 31, 2010. This date is dependent upon permitting, equipment deliveries, and other development activities. Project construction is anticipated to begin in July 2010. A major milestone schedule for the Project is presented here:

- Land Acquisition: Complete
- Environmental Studies: Complete
    - Constraints mapping
    - Class I Cultural Resources Investigation
- Environmental Studies: Spring/Summer 2010 (see **Appendix E**)
    - Spring avian point count survey
    - Raptor nest survey
    - Prairie grouse lek survey
    - Native prairie survey
    - Wetland delineations
    - Class III archeological investigation
    - Acoustic modeling
    - Shadow flicker analysis
- Certificate of Site Compatibility Order: July 2010
- Other County/State Permits: June 2010
- Interconnection Agreement: Complete
- Equipment Procurement, Manufacture and Delivery: Summer/Fall 2010
- Construction Start: August 1, 2010
- Construction End: November 2010
- Test and Operations: Fall/Winter 2010
- Commercial Operation: End of 2010

1.4.1 Project Ownership

It is anticipated that Ashtabula III will manage the construction of all equipment and associated facilities related to the Project, as well as own and operate the Project. Ashtabula III will procure the turbine and tower package directly from an original equipment manufacturer, while a third-party contractor will perform all other engineering, procurement, and construction (EPC) of the Project.

2. NEED FOR FACILITY

2.1 Need Analysis

Due partly to high heating demand in winter, North Dakota's per capita energy consumption is among the highest in the nation. Nearly three-tenths of North Dakota households use electricity as their primary energy source for home heating. According to the Energy Information Administration (2009), 89 percent of electricity generated in the state of North Dakota is produced from coal-fired power plants. Most of the coal used for power generation is supplied by several large surface mines in the central part of the state. Energy sources such as coal are finite and their combustion has environmental consequences.

North Dakota has been identified as having more available wind for development than any other state. In March 2007, North Dakota enacted legislation (H.B. 1506) adopting a voluntary renewable portfolio objective that aims to have ten percent of electricity generated from renewable sources by 2015. While the state leads the nation in potential wind power capacity, at the end of 2008, North Dakota had 714 MW of installed wind energy capacity -- 11th in the nation (Windustry 2009).

According to a March 2009 report prepared by the EmPower ND Commission, one of the state energy goals is to increase installed wind energy capacity to 5,000 MW by 2025 (EmPower ND 2009). 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, NextEra Energy is cooperating with regional utilities to add wind generation to their energy portfolios.

The Project is consistent with North Dakota's commitment to increasing the renewable energy portfolio of both the state and the nation. North Dakota has the greatest potential wind energy capacity of any state in the nation, and is theoretically capable of powering over a fourth of all U.S. electricity demand from this resource (AWEA 2009). The government of North Dakota has recognized the significance and value of the potential of the state's wind and other renewable resources, and has demonstrated a commitment towards fulfilling it. In his 2007 State of the State Address, North Dakota Governor John Hoeven stated:

> "…we have only begun to tap the true potential for our state's varied energy and energy-related agricultural industries. To realize our full potential, we must look beyond the borders of our state. Our real future in energy is not about what we consume in North Dakota – it's about what we can supply to the nation, a nation that needs more energy and more energy independence…By leveraging our enormous potential for both renewable and traditional energy resources, we can truly make North Dakota a powerhouse for America." (Hoeven 2007)

The State's emphasis on renewable energy began internally, with the enactment of the State Renewable and Recycled Energy Objective (NDCC 49-02-28), which established a goal of producing 10 percent of all of its electricity through renewable and recycled energy by 2015. As North Dakota has progressed towards this statewide objective, the State has expanded its policies to also focus on supporting the growing renewable energy portfolio of the entire U.S. This emphasis was formalized through the adoption of the "25x'25 Initiative" of the Midwestern Governor's Association in House Bill No. 1462 of the 2007 Legislative Assembly. The "25x'25 Initiative" endorsed the "vision of having 25% of all energy consumed in the U.S. come from renewable resources by 2025" (Midwestern Governors Association 2006). By adopting this initiative, North Dakota has signaled its recognition of a need for greater renewable energy generation throughout the U.S., and a desire to contribute to fulfilling that need.

2.2 Alternatives

Based on the stated need for the Project, reasonable alternatives to the proposed Project include other renewable energy sources, such as solar, geothermal, hydropower, and biomass. Solar, geothermal, and hydropower are not technologically feasible alternatives due to the lack of these natural resources in the Project Area. In comparison to wind energy, biomass would incur vastly greater environmental impacts to the Project Area. The Project Area does not currently produce sufficient biomass to fuel a large-scale biomass plant. Consequently, the proposed Project is the preferred alternative over other alternative renewable energy sources.

2.3 Ten-Year Plan

As required, Ashtabula III will file a Ten-Year Plan with the PSC and the Barnes County auditor on or before July 1, 2010.

3. SITE SELECTION CRITERIA

Ashtabula III selected the proposed Project Area on the basis of a number of factors, including: the energetic wind resources; the accessibility to the existing electrical grid; the receptiveness of the local community to wind energy development; and numerous environmental factors and economic considerations. This decision was informed by various desktop and field environmental studies and informal interactions with state agencies, local agencies, and local landowners. Although Ashtabula III has identified the proposed Project Area as favorable for wind energy development, Ashtabula III continues to evaluate it in order to identify the optimal Project layout. This process of Project site selection will be conducted in conformance with the Act, which specifies that an energy conversion facility must be sited "in an orderly manner compatible with environmental preservation and the efficient use of resources" (NDCC 49-22-02). Detailed guidance for this siting process is provided by the energy conversion facility siting criteria described in NDAC 69-06-08-01, which identifies "exclusion areas," "avoidance areas," "selection criteria," and "policy criteria." The following sections detail the conformance of the Project's site selection with these criteria, as well as other factors critical to site selection, including design and construction limitations and economic considerations.

3.1 Exclusion Areas

In accordance with NDAC 69-06-08-01-1, each geographical area listed in **Table 3-1** "shall be excluded in the consideration of a site for an energy conversion facility, and shall include a buffer zone of a reasonable width to protect the integrity of the area." Exclusion areas are mapped for the Project Area on **Figure 4**.

Table 3-1. Exclusion Areas

Exclusion Area	Present within Project Area?	Description and 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.	Yes	The Goose Lake Waterfowl Production Area (WPA) and several USFWS wetland easements are located within the Project Area. No turbines will be located within 0.25 mile of a WPA. No Project facilities will be placed within wetland basins within wetland easement parcels (no buffer proposed for wetland easements).	5.3, Figure4, Figures 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.	Yes	Documented archaeological and historic sites and those encountered during surveys will be avoided. No buffer is proposed.	5.8, Figure 4, Figure 15

Exclusion Area	Present within Project Area?	Description and Proposed Buffer	Section Addressed
County parks and recreational areas; municipal parks; parks owned or administered by other governmental subdivisions; hardwood draws; and enrolled woodlands.	No	N/A	5.3, 5.9
Prime farmland and unique farmland, as defined by the land inventory and monitoring division of the soil conservation service, United States department of agriculture, in 7 C.F.R. part 657; provided, however, that if the Commission finds that the prime farmland and unique farmland that will be removed from use for the life of the facility is of such small acreage as to be of negligible impact on agricultural productions, such exclusion shall not apply.	Yes	Prime farmland is present within the Project Area, however the acreage to be removed from use for the life of the Project will arguably have a negligible impact on agricultural productions (96 acres). Based on this data and PSC's authority, Ashtabula III requests that the Commission deem that a prime farmland exclusion not apply to the Project.	5.10, Figure 4, Figure 12
Irrigated land	No	N/A	5.10
Areas critical to the life stages of threatened or endangered animal or plant species	No	N/A	5.16
Areas where animal or plant species that are unique or rare to this state would be irreversibly damaged	No	N/A	5.17

3.2 Avoidance Areas

In accordance with NDAC 69-06-08-01-2, the geographical areas listed in **Table 3-2** "shall not be approved as a site for an energy conversion facility unless the applicant shows that, under the circumstances there is no reasonable alternative." As with exclusion areas, avoidance areas shall include buffer zones of reasonable widths to protect the integrity of the areas. In determining whether an avoidance area should be designated for a facility, the PSC 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 3-2. Avoidance Areas

Avoidance Areas	Present within Project Area?	Description and Proposed Buffer	Section Addressed
Historical resources which are not designated as exclusion areas	Yes	Ashtabula III will avoid documented historic structures. No buffers are proposed.	Figure 4 and Figure 15
Areas within the city limits of a city or the boundaries of a military installation	No	N/A	5.3.1
Areas within known floodplains as defined by the geographical boundaries of the hundred-year flood	No	The entire Project Area is mapped as zone X, which is outside the 100 yr and 500 yr floodplains.	5.13
Areas that are geologically unstable	No	N/A	5.12
Woodlands and wetlands	Yes	Numerous prairie pothole wetlands are present in the Project Area; however Ashtabula III has	5.3, 5.14

Avoidance Areas	Present within Project Area?	Description and Proposed Buffer	Section Addressed
		designed the layout of the Project's turbines and above ground structures to minimize permanent impacts (as defined by United States Army Corps of Engineers) to them. No buffers are proposed.	
Areas of recreational significance which are not designated as exclusion areas	No	N/A	5.9

3.3 Selection Criteria

In accordance with NDAC 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 selection criteria listed in **Table 3-3**], will be at an acceptable minimum, or that those effects will be managed and maintained at an acceptable minimum."

Table 3-3. Selection Criteria

Selection Criteria	Potential Adverse Effects	Section Addressed
The impact upon agriculture:		
Agricultural production	The Project will not result in a significant loss of agricultural production. Based on the proposed layout, approximately 137 acres of cropland and 40 acres of pasture/hay land will be permanently impacted by the Project.	5.3, 5.10
Family farms and ranches	No turbines will be placed within 1,400 feet of residences, which will greatly reduce potential adverse effects to local family farms and ranches. Land owners under agreement with Ashtabula III for construction of the Project will receive a supplemental income which will offset any farming and ranching losses due to Project facilities on their land.	5.2, 5.3, 5.10
Land which the owner demonstrates has soil, topography, drainage, and an available water supply that cause the land to be economically suitable for irrigation	Landowners under agreement with Ashtabula III for development of the Project have not expressed concerns related to irrigation on their property. Currently no known irrigation is present in the Project Area.	5.3, 5.10, 5.11
Surface drainage patterns and ground water flow patterns	No adverse impacts to surface drainage patterns or groundwater flow patterns are anticipated from development of the Project. New access roads will be constructed at existing grade. Areas where concentrated natural surface water sheet flow may flow over the haul roads will be armored at grade with rock and/or may have a concrete cap placed to eliminate the potential for erosion. Ashtabula III intends to obtain a construction stormwater permit prior to breaking ground which will address this concern.	5.13
The agricultural quality of the cropland	No adverse impacts to the agricultural quality of the cropland are anticipated related to development of the Project. Should soil compaction or other agricultural concerns occur on cropland during construction, Ashtabula III and the land owners will work to remedy the situation.	5.3, 5.10, 5.11

Selection Criteria	Potential Adverse Effects	Section Addressed
The impact upon the availability and adequacy of:		
Law enforcement	No adverse impacts are anticipated to the availability and adequacy of existing law enforcement resources due to the development of the Project.	5.4
School systems and education programs	No adverse impacts are anticipated to the availability and adequacy of existing schools and education programs due to the development of the Project.	5.4
Governmental services and facilities	No adverse impacts are anticipated to the availability and adequacy of existing government services and facilities due to the development of the Project.	5.4
General and mental health care facilities	No adverse impacts are anticipated to the availability and adequacy of existing general and mental health care facilities due to the development of the Project.	5.4
Recreational programs and facilities	No adverse impacts are anticipated to the availability and adequacy of existing recreational programs and facilities due to the development of the Project.	5.4
Transportation facilities and networks	During construction, the Project Area will see a temporary increase in vehicle use of the existing public transportation facilities and networks. During operation, no adverse impacts are anticipated to the availability and adequacy of these resources. Ashtabula III will operate under the same road agreement as Ashtabula Wind Energy Center has with the Barnes County Commissioners to ensure that following the completion of construction roads are returned to as good or better condition than they were in pre-construction.	5.4
Retail service facilities	No adverse impacts are anticipated to the availability and adequacy of existing retail service facilities due to the development of the Project; due to the influx of personnel during construction, local retailers will likely see a positive impact from the Project.	5.4
Utility services	No adverse impacts are anticipated to the availability and adequacy of existing utility services due to the development of the Project. The Project will complete an interconnection process with Minnkota Power Cooperative, Inc. and any other affected utilities to ensure the continuity of utility services and to interconnect the Project in accordance with FERC, NERC, and MISO standards.	5.4
The impact upon:		
Local institutions	No adverse impacts to existing local institutions are anticipated resulting from the development of the Project.	5.4
Noise-sensitive land uses	No adverse impacts to existing noise-sensitive land uses are anticipated resulting from the development of the Project. The majority of noise-sensitive receptors are under agreement with Ashtabula III and turbines will be setback at least 1,400 ft from these residences. Additionally, other than a height maximum, Barnes County does not have zoning or noise standards for turbines.	5.7
Rural residences and businesses	No adverse impacts to existing rural residences and business are anticipated resulting from the development of the Project. Turbines will be setback at least 1,400 ft from occupied residences.	5.2, 5.3, 5.10
Aquifers	No adverse impacts to aquifers are anticipated from development of the Project. With regard to potential ground infiltration, construction storm water runoff will be managed under the appropriate permit.	5.13

Selection Criteria	Potential Adverse Effects	Section Addressed
The impact upon:		
Human health and safety	No adverse impacts to human health and safety to the community at large are anticipated from the development of the Project; however, potential concerns resulting from any large construction project include construction safety, transportation safety, and safe O&M procedures. Ashtabula III intends to construct and operate the Project using best industry standard management safety procedures to protect personnel and the community.	5.5
Animal health and safety.	No adverse impacts to domestic animals including livestock are anticipated due to development of the Project. With regard to wild animal species, there exists the potential for adverse effects (displacement, injury, or mortality) to animals but it is not anticipated to be at a significant level and not for federally or state listed species. Ashtabula III will implement a Wildlife Response and Reporting System (WRRS) in order to monitor animal health and safety issues with the Project.	5.16, Appendix C
Plant life	The Project as proposed will permanently convert approximately 206 acres of vegetative cover for the turbines and associated facilities. No adverse impacts to federal or state-listed plant species are anticipated.	5.15
Temporary and permanent housing.	The Project may utilize temporary housing during construction. During operation, there is unlikely to be an adverse affect on temporary and permanent housing due to the small number of O&M employees required. It is likely that O&M employees will live near the Project and create a positive affect by renting or purchasing then available housing.	5.2, 5.4
Temporary and permanent skilled and unskilled labor.	No adverse effects are anticipated to temporary and permanent skilled and unskilled labor due to development of the Project. Project construction and operations should yield a benefit to the labor community, both short- and long-term.	5.2
The cumulative effects of the location of the facility in relation to existing and planned facilities and other industrial development.	The Project would be constructed adjacent to the Ashtabula Wind Energy Center. Ashtabula III is unaware of other existing or planned industrial development in the vicinity of the Project. There are no adverse cumulative effects due to the location of the Project in relation to existing or planned facilities and other industrial development that is anticipated.	8.11

3.4 Policy Criteria

In accordance with NDAC 69-06-08-01-4, the PSC "may give preference to an applicant that will maximize benefits that result from the adoption of the following policies and practices and in a proper case may require the adoption of such policies and practices." These policy criteria are presented in **Table 3-4**.

Table 3-4. Policy Criteria

Policy Criteria	Suitable Policy or Practice of Applicant	Section Addressed
Recycling of the conversion byproducts and effluents	Not applicable.	N/A
Energy conservation through location, process, and design	Ashtabula III is refining the Project layout to maximize the efficiency of the operations while avoiding or minimizing the environmental impacts. Ashtabula III is utilizing underground collection lines for all of the Project collection system and is minimizing the amount of these underground collection lines to the extent practicable to reduce energy line losses between the generation point and the substation.	4.0, 8.2
Training and utilization of available labor in this state for the general and specialized skills required	Ashtabula III has utilized North Dakota companies and personnel for local expertise during development of the Project and intends to use local labor to the extent practicable during construction and operation as well.	5.2
Use of a primary energy source or raw material located within the state	Wind, the sole energy source/raw material required for the Project, is a plentiful and renewable energy source within North Dakota.	3.5.1
Non-relocation of residents	No residents will be re-located as a result of the Project.	5.2, 5.3
The dedication of an area adjacent to the facility to land uses such as recreation, agriculture, or wildlife management	Ashtabula III does not propose the dedication of an adjacent area to the Project for such land uses; the Project is compatible with existing land uses.	N/A
Economies of construction and operation	Where feasible, Ashtabula III will utilize local contractors, materials, equipment, and personnel during construction and operation. The Project will positively impact local and state economies through tax revenues and payments to landowners.	5.2
Secondary uses of appropriate associated facilities for recreation and the enhancement of wildlife	None are proposed; the Project will be constructed on privately owned lands which cannot be open to the public for recreation. Wildlife enhancement is not proposed.	5.9
Use of citizen coordinating committees	No citizen coordinating committee is proposed. Ashtabula III will work directly with the land owners under easement agreement for the Project.	6.0
A commitment of a portion of the energy produced for use in this state	The 69 MW of energy generated by the Project will interconnect with the local utility transmission line and grid.	4.3
Labor relations	Ashtabula III will use qualified subcontractors for the construction of the facility, but will employ its own staff for operation and maintenance of the Facility. The subcontractors will have an employment policy consistent with industry practices and be responsible for determining working hours, rates of compensation, and all other matters relating to labor and employment of site personnel during construction.	5.2
The coordination of facilities	Ashtabula III will coordinate Project development with numerous contractors, the turbine manufacturer, Project landowners, local interest groups, and state and federal regulatory agencies. The construction and operation of the Project will be coordinated with available resources, delivery of components, permits and their conditions, and landowner input. Existing facilities were, and will continue to be, considered in the location of the Project facilities.	3.0, 4.0
Monitoring of impacts	Ashtabula III will monitor impacts resulting from the Project. Monitoring efforts will include implementation of a WRRS.	4.0

3.5 Design and Construction Limitations

In general, three predominant design and construction limitations apply to all wind farms: wind resources; capability of interconnection to the electric grid; and landowner easements.

3.5.1 Wind Resource

The Department of Energy (DOE)'s Wind Program and the National Renewable Energy Laboratory (NREL) published a new wind resource map for the state of North Dakota. The new wind resource map shows the predicted mean annual wind speeds at 80-m height presented at a spatial resolution of 2.5 km. Areas with annual average wind speeds around 6.5 m/s and greater at 80-m height are generally considered to have suitable wind resource for wind development. The Ashtabula III Project Area has annual average wind speeds of 8-8.5 m/s (DOE 2010).

Ashtabula III utilized wind data from meteorological towers in the Project Area. The data from the Project Area were supplemented using NDAWN and NOAA data. Ashtabula III 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 Area effects to predict the spatial wind variations in the Project Area. 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-specific wind measurements.

3.5.2 Electrical Transmission

Capability for interconnection to the existing electric grid is a significant factor in Project design due to the fact that development of new, extensive transmission facilities is extremely costly from both environmental and economic perspectives. As noted, the Project location was selected due to its proximity to the existing Minnkota Maple River 230-kV substation. The Project will interconnect to this substation via an existing transmission line that runs through the Project Area, thereby reducing the environmental impacts of the Project and improving its economic viability.

3.5.3 Land Easements

Easements for the construction of turbine towers and transmission facilities are also critical to the Project. Ashtabula III has secured voluntary land easement agreements with landowners in order to develop the Project. Land easements will encompass all proposed Project facilities, including but not limited to wind turbines and associated buffers, access roads, underground collection and communication lines, and a collection substation.

3.6 Economic Considerations

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 an income tax credit of 2.1 cents/kilowatt-hour allowed for the production of electricity from utility-scale wind turbines. This incentive was created under the Energy Policy Act of 1992. Through the American Recovery and Reinvestment Act (passed in February 2009), Congress acted to provide a three-year extension of the PTC through December 31, 2012. Additionally, wind project developers can choose to receive a 30 percent investment tax credit (ITC) in place of the PTC for facilities placed in service in 2009 and 2010, and also for facilities placed in service before 2013 if construction begins before the end of 2010 (AWEA 2009). 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 PTC available for wind project development.

4. DESCRIPTION OF THE PROPOSED FACILITY

This section provides a summary of the Project layout and design, including turbines, electrical system, and associated facilities. Additional details are included in the Design Data Report (**Appendix B**). Specific design components addressed in this section are Project construction, schedule, operation, and decommissioning of the site.

4.1 Wind Energy Project Layout

The Project will consist of an array of wind turbines and associated facilities. The turbines will be interconnected by fiber optic communication cables, 34.5-kV power collection cables, and access roads within the Project Area.

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

Ashtabula III will develop a Project layout that optimizes wind resource, minimizes the impact on land resources and potentially sensitive areas, and complies with the energy conversion facility siting criteria described in NDAC 69-06-08-01.

Analysis of meteorological data collected at the Project Area suggests that turbine strings should optimally be aligned in strings generally running southwest to northeast. Turbines within strings are typical separated by approximately 0.25 mile, while strings are separated by approximately 0.75 to 1.25 mile. Design of the turbine array and collection system will seek to follow this general alignment, while minimizing energy loss due to wind turbine wakes and turbulence, and electrical line losses.

Barnes County has no specific setbacks or standards for wind energy facilities. **Table 4-1** identifies the minimum setbacks Ashtabula III is applying to the Project.

Table 4-1. Setback Distances for Wind Turbines

Setback Type	Distance
Non-participating property boundaries, public roads, and overhead transmission lines*	440 feet (1.1 times blade tip height)
Occupied Residence*	1,400 feet
Waterfowl Production Area*	1,320 feet

*Setback is only applicable to turbines. This setback distance will not apply to substation, roads, underground collection lines, and other near-ground activities.

4.2 Wind Turbines

The Project is currently designed to include GE Xle 1.6-MW turbines. Ashtabula III reserves the right 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.

The GE Xle 1.6-MW utility-grade wind turbine will have an 82.5-meter (271 feet) rotor diameter (RD) (**Figure 5**). The GE Xle 1.6-MW turbine begins operation in wind speeds of 3.5 meters per second (m/s), or 7.8 mph, and reaches its rated capacity (1.6 MW) at a wind speed of 12.5 m/s (28 mph). The turbine is designed to operate in wind speeds of up to 20 m/s (45 mph).

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. Access to the turbine is through a lockable steel door at the base of the tower.

Each turbine tower will be constructed upon a dedicated concrete foundation. The design of this foundation may vary upon local soil and other geotechnical conditions, as well as the turbine model selected. 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 will be prepared by a registered professional engineer licensed to practice in the State of North Dakota.

A control panel containing communication and electronic circuitry will be housed within each turbine tower. Each turbine will be equipped with sensors for wind speed and direction, which will signal to the turbine's control system when winds are adequate for operation. Turbines feature variable-speed control and independent blade pitch to assure aerodynamic efficiency.

Each 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.

4.3 Associated Facilities

The electricity generated by each turbine is brought to a pad-mounted transformer where the voltage is raised (stepped up) to power collection line voltage of 34.5 kV. The electricity is collected by a system of underground power collection lines within the Project Area. Both power collection lines and communication cables will be direct-buried on private property or public right-of-way. Typically, this infrastructure is run adjacent to the Project access roads or along public right-of-way 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 III will obtain easements for the necessary property.

All-weather, permanent gravel access roads approximately 32 feet wide will connect wind turbines to the existing county and local road network. 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 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.

At the Project substation, which will likely be constructed in the northwest quadrant of Section 15 of Township 142 North, Range 57 West, the power will again be stepped up to 230 kV and transmitted via an existing 230-kV transmission line to the Minnkota Maple River Substation approximately 50 miles to the southeast.

The existing O&M facility for the Ashtabula Wind Energy Center will be used for this Project. No new O&M Facility will be required for the proposed Project. **Figure 6** depicts the general path of energy from the Project to energy users and **Figure 7** shows the proposed wind energy facility layout.

4.4 Project Construction

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 steps:

- Any necessary upgrading of roads required for transportation of equipment and components
- Construction of any necessary crane hard-standings, roads entrances, turnarounds, and access ways required for transportation and erection
- Foundation excavation
- Concrete foundations
- All electrical and communications installation
- Tower assembly and machine erection
- Erection of facility structures, like operations and maintenance offices and a warehouse
- Erection of the on-site substation
- System testing

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

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

The EPC contractor also serves as key contact and interface for subcontractor coordination. The EPC contractor will oversee the installation of communication and power collection lines as well as the substation. The EPC contractor will also oversee the installation of roads, concrete foundations, towers, machines, and blades, as well as the coordination of materials receiving, inventory, and distribution.

The 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.

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 Supervisory Control and Data Acquisitions (SCADA) system.

4.5 Project Operation and Maintenance

In addition to regularly scheduled on-site visits, Ashtabula III and the appropriate supplier will control, monitor, operate, and maintain the Project by means of a SCADA computer software program. 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 NextEra 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
- Provide information reporting on a regular basis

NextEra Energy 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. 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.

B. 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.

C. 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.

D. Two-Year Service Inspection. The two-year service inspection consists of the annual inspection, plus checking and tightening of terminal connectors.

E. Five-Year Service Inspection. The five-year 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.

4.5.1 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 of the wind turbines and of 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
- Provision of 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
- Cooperation with avian and other wildlife studies as may be required, to include reporting and monitoring

- Management of lubricants, solvents, and other hazardous materials as required by local and/or state regulations
- Maintenance of appropriate levels of spare parts in order to maintain equipment. Order and maintain spare parts inventory
- Provision of all necessary equipment including industrial cranes for removal and reinstallation of turbines
- Hiring, training, and supervision of a work force necessary to meet the general maintenance requirements
- Implementation of appropriate security methods

4.6 Decommissioning and Restoration

Ashtabula III 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 III 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.

5. ENVIRONMENTAL ANALYSIS

This section provides a description of the environmental conditions that exist within the Project Area. Consistent with the Act, exclusion and avoidance criteria, as well as selection and policy criteria, were considered in the selection and design of the Project. 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.

5.1 Description of Environmental Setting

The Project Area is located in northern Barnes County in eastern 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 2009, Barnes County had an estimated population of 10,753, a decline of 8.7 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 eight miles south of the Project Area (U.S. Census Bureau, 2000).

5.2 Socioeconomics

5.2.1 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.

The site is located in portions of Ashtabula, Baldwin, Ellsbury, Getchell, and Grand Prairie 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 5-1**. 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 5-1. Population and Economic Characteristics

Location	Population	Per Capita Income	Percentage of Population Below Poverty Level
Barnes County (entire)	10,955	$16,566	10.8
Ashtabula Township	89	$22,736	2.4
Baldwin Township	34	$12,393	14.8
Ellsbury Township	28	$41,304	0.0
Getchell Township	68	$16,176	0.0
Grand Prairie Township	49	$14,759	10.8

The 2000 census reported that the median family income for Barnes County was $42,149 and that approximately 11 percent of individuals were living below the poverty level. There were 2,348 single-family owner-occupied homes that had a median value of $57,600.

The labor force in 2000 was comprised of 5,942 individuals, or 62 percent of the population. There were 279 individuals, or 2.9 percent that were unemployed. The top three industries within Barnes County in terms of employment were: educational, health and social services (27%); transportation and warehousing, and utilities (12%); and agriculture, forestry, fishing and hunting (11%).

Agriculture is a large part of the economy for Barnes County. According to the U.S. Department of Agriculture (USDA), there were 921 farms in Barnes County in 2007 that averaged 985 acres per farm (USDA 2007). The total market value for agricultural products produced was $183,261,000, 94 percent of which was from crops ($172,501,000).

5.2.2 Impacts

Overall, the Project is expected to have positive impacts to the landowners and Barnes County. Construction and operation of the Project will result in a long-term beneficial impact to the county's tax base. This will contribute to improving the local economy and strengthen and diversify the economic base of the region. Additionally, Project landowners whose land is utilized will receive payments throughout the life of the Project. This will further contribute to strengthening the local economy and its tax base. 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 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, continuing to establish this 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.

A study conducted at the Langdon Wind Energy Center located in Cavalier County, North Dakota estimated that the North Dakota economy received more than $225 million from construction and more than $4 million per year during the operation of that project (Leistritz and Coon 2008). On a per-megawatt basis, the project's economic impacts were: $8,900 in local expenditures during construction; $2,600 per year in landowner payments; and $2,900 per year in property taxes. Project-specific impacts would vary based on the local availability of materials, services, and labor.

It is anticipated that there will be minor short-term impacts to socioeconomics. The Project will permanently impact approximately 206 acres (1.7 percent of the total Project Area) with the construction of Project facilities. In general, landowners will be able to continue to use their property for agriculture around turbine locations. Properties with Project facilities situated on them will be entitled to compensation. This compensation will be established by individual easement agreements with the landowners. The landowner lease payments are expected to offset potential financial losses from the removal of land for agricultural production and substantially increase landowner income as a result of Project operation. Ashtabula III anticipates spending approximately $112,600 per year in landowner payments for options between 2010 and 2014.

The county is predominately Caucasian and the Project Area is not located in a concentrated low-income area. Therefore, there will be no adverse impacts to low-income families or minorities as a result of the Project.

Local contractors will be used to the extent practicable. Wages and salaries paid to local contractors will directly benefit the regional economy. Wages and salaries paid to non-local contractors will likely benefit the regional economy as well. This benefit will come in the form of expenditures for supplies, lodging, fuel, and other services. Additionally, the Barnes County economy will benefit from the infusion of state and local taxes paid by Ashtabula III. It is expected that the Project will generate approximately $22,300 in sales tax and $1,320,000 in property tax annually.

Certain components of the Project will require specialized labor that will be brought in from other counties or other states such as turbine erection and commissioning. Specialized training of local labor for construction is not warranted given the short duration of Project construction. It is likely that training of local labor will be necessary for O&M during the life of the Project, however. It is anticipated that up to five full-time dedicated personnel on-site to perform O&M services. Local skilled labor for the basic infrastructure and site development needs of the Project is likely available within the county or the state and will be utilized to the extent practicable. Labor relations issues will be alleviated through balancing the use of local and imported specialized contractors.

There are no anticipated impacts on permanent housing. Imported laborers will require temporary lodging. It is likely that imported laborers will use lodging facilities in Valley City. Some limited permanent housing accommodations for specialized labor necessary during the life of the Project will also be required, but as these workers will likely be found locally, they will likely not require new housing.

5.2.3 Mitigative Measures

The increase in the county's tax base and the infusion of wages, payments to landowners, and expenditures as a result of construction and operation of the Project will have positive impacts on the region. To a lesser extent, this infusion is expected to occur for the life of the Project from operation and maintenance.

5.3 Land Use

5.3.1 Description of Resources

The current land use within the Project Area is primarily in agricultural production. The Project is not within any city limits and there are no known military installations in the area. The Project is adjacent to an existing wind energy facility. There will be no displacement of residences or industrial facilities as a result of construction and operation of the Project.

The United States Fish and Wildlife Service (USFWS) has been purchasing wetland easements in the Prairie Pothole Region for the last 20 years. Wetland easements are signed agreements with private landowners to permanently protect valuable wetlands. The landowner receives a one-time payment; protected wetland basins cannot be drained, burned, filled, or leveled. When these wetlands naturally dry up, they can be farmed, grazed or hayed. The land remains in private ownership, remains on the tax rolls, and the landowner controls access. There are 2,030 acres of USFWS wetland easements within the Project Area (**Figure 4** and **Figure 8**).

The Natural Resources Conservation Service (NRCS) administers the Conservation Reserve Program (CRP) to protect soil and water resources. The lands are removed from agricultural production and preserved for wildlife habitat for approximately 10 years time. There are no land parcels currently enrolled in CRP within the Project Area (Mogler pers. comm. 2010).

Review of available databases, aerial photographs, and site visits have determined that the Project Area is primarily in agricultural production. Current property use is almost exclusively limited to cultivated fields planted with corn, soybeans, wheat, barley, sunflowers, and pastures used for cattle grazing. Primary crops grown in the region are corn and soybeans. According to the USGS National Land Cover Dataset (NLCD), approximately 64 percent of the Project Area is comprised of cultivated crops (**Table 5-2**). Pasture/hay and grassland make up 12 percent and nine percent, respectively, of the Project Area. Approximately seven percent of the Project Area is classified as emergent herbaceous wetlands according to the NLCD; all other land cover types each comprise less than four percent of the Project Area (**Table 5-2**).

Table 5-2. Land Cover within the Project Area

Land Cover	Acreage	Percent of Project Area
Cultivated Crops	7,778	63.8
Pasture/Hay	1,464	12.0
Grassland/Herbaceous	1,148	9.4
Emergent Herbaceous Wetlands	851	7.0
Developed, Open Space	481	3.9
Open Water	347	2.8
Deciduous Forest	49	0.4
Woody Wetlands	34	0.3
Evergreen Forest	20	0.2
Mixed Forest	15	0.1
Developed, Low Intensity	8	0.1

Source: USGS 2001.

5.3.2 Impacts

Land use within the Project Area will largely remain unchanged as a result of development of the Project. Landowners often continue to plant crops and graze livestock to the edge of Project facilities at other wind farms throughout the U.S. Ashtabula III will work closely with landowners during the development phase of the Project to minimize land use disruptions from the siting of Project facilities. Additional areas may need to be temporarily disturbed during construction for laydown areas and staging areas. However, these areas will be returned to their original contours and reseeded as necessary.

The Project is still in its preliminary phases and the Project layout has yet to be finalized. A total of 206 acres, or 1.7 percent of the total Project Area, will be permanently affected from construction of the Project.

In general, the public has historically expressed concerns over the potential devaluation of property values from the development of wind energy projects across the U.S. Based on the best data currently available, there is no evidence to suggest that wind projects have a negative impact on property values.

The Lawrence Berkeley National Laboratory recently released a power point presentation entitled, "The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis." The study found that the view and/or distance from homes of a wind facility do not have a statistically significant affect on sale prices. For this study, 24 wind facilities in nine states were analyzed with 7,429 sale transactions in the area. The transactions were analyzed by distance of turbines, timing of the home sale in relation to the public notice of the wind facility, and view. Other data concerning the locations of the transactions such as area amenities were also recorded during the three year study.

The study found that while impacts on home sales could exist, those impacts are statistically insignificant. Impacts were also immeasurable for homes within one mile of the wind facility (Hoen et al. 2009).

The Renewable Energy Policy Project (REPP) conducted a comprehensive study of U.S. projects in 2003 (Sterzinger et al. 2003). Based on three different analyses of real estate transaction within five miles of the 10 wind energy projects included in the study (property value trends throughout the entire study period, trends before and after construction of the wind energy project, and comparison of property value trends with comparable control communities), the REPP study concluded that there is no statistical evidence to suggest that wind farms have a negative effect on property values.

Based on the results of these studies, it does not appear that development of the Project will have a direct negative impact on property values.

5.3.3 Mitigative Measures

Ashtabula III will work closely with the NRCS, USFWS, and landowners in an effort to minimize impacts to sensitive areas to the extent practicable. During operation of the Project, land use within the Project Area will not change and will maintain its agricultural character. The Project will not require the industrial use of non-renewable resources or emissions into the environment. To reduce potential impacts on residences, turbines will be installed a minimum of 1,400 feet from occupied dwellings.

5.4 Public Services

5.4.1 Description of Resources

Local Services

The Project is located in a highly rural, lightly populated area in eastern North Dakota. Residences and farms within the Project Area, and small town nearby, are served by an established transportation and utility network.

Valley City is the county seat of Barnes County. Valley City is the largest city near the Project Area 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

The existing roadway infrastructure within the Project Area consists of county and township (section line) roads, typically comprised of gravel or packed dirt. No federal highways are located within or adjacent to the Project Area. State Highway 26/County Highway 4 runs east-west mostly along the southern boundary of the northern portion of the Project Area and 118th Avenue SE/County Highway 21 runs north-south along the western border of the southern portion of the Project Area. State Highway 32 runs north-south east of the Project Area.

Traffic

Existing traffic volumes on the state highways in the vicinity of the Project are presented in **Table 5-3** and **Figure 9**. Due to the complexity of determining the specific capacity of any highway, general estimates are used for planning purposes. For the purposes of this Application, these estimates include Average Annual Daily Traffic (AADT) and Commercial Truck Traffic counts provided by the North Dakota Department of Transportation (NDDOT). For purposes of comparison, the functional capacity of a two-lane paved rural highway is approximately 5,000 vehicles per day. The state highways in the vicinity of the Project Area carry levels of traffic than are fairly typical for rural North Dakota, representing only a fraction of their capacities (NDDOT 2008).

Table 5-3. Existing Daily Traffic Levels

Roadway Segment	Existing Average Annual Daily Traffic (AADT)/Commercial Truck Traffic
ND-26 at ND -/109th Ave SE	620/95
ND-26 east of Lake Ashtabula	205/40
ND-1/109th Ave SE north of I-94	720/150
ND-32/128th Ave SE at ND 26/Conty Hwy 4	230/40

Source: 2007 Traffic Volumes (NDDOT 2007).

No vehicle count estimates are available for the additional county and township roads that run through the Project Area. However, based on the condition, width, and function of these roads, they are likely to have far lower daily traffic than the nearby state and county highways.

Water Supply

The Project Area is located entirely within an unincorporated, highly rural portion of Barnes County. Water supply is assumed to be provided primarily from private ground water wells. Drillers' logs from the North Dakota State Water Commission (NDSWC) indicate there are two wells in the Project Area: one domestic/stock well in the northern portion of the Project Area and one domestic well in the southern portion (NDSWC 2009). There are three other wells that are near the boundaries of the Project Area but just outside (two in the south, one in the north). Two are identified as domestic/stock; the purpose of the third is not given.

Telecommunications

Telecommunications infrastructure and services that could potentially be impacted by Project construction or operation include underground telephone and fiber optic cables, amplitude modulation (AM) and frequency modulation (FM) radio broadcasts, off-air television, non-federal government microwaves, and Land Mobile Radio (LMR). The locations of underground communication cables in the Project Area will be identified by the respective utility companies prior to Project construction.

Potential impacts of the Ashtabula Wind Energy Center (which included the southern portion of the Ashtabula III Project Area) on existing telecommunications infrastructure within Barnes County were assessed in 2007 (Comsearch). 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.

An update of the non-federal beam path study in March 2010 shows that there are no new concerns within the Project Area. The microwave interference study and worst case Fresnel Zone calculations from Comsearch, as well as the results of the March 2010 study, are attached as **Appendix C**.

5.4.2 Impacts

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

Local Services

No material impacts to local services are expected as the Project is relatively self-sufficient with respect to consumables and services. The number of full time employees at the Project is expected to be of small enough number and found locally, thereby benefitting the tax base without having a detrimental impact to the ability of existing services (e.g., schools) to maintain the current level of service. During construction, local hotels, restaurants, and other retail services may experience a temporary increase in business.

Electrical Service

The Project will require electrical service from the local provider during the construction period and may also require electrical service during brief operational periods when the wind project is not generating electricity. No adverse long term or significant impacts to the local rural electrical service is expected.

Roads

Construction of the Project will include 9.1 miles of new gravel access roads up to 32 feet wide, with low vertical relief to allow cross-travel by farm equipment. Shoulders may also be added to existing county roads to allow for construction equipment maneuvering. This improved and expanded transportation network will be used by construction vehicles during Project construction, and O&M crews inspecting and servicing the wind turbines during Project operation. The access roads will be sited between towers, with one road typically required for each string of turbines. Construction of all roads will be conducted in conformance with applicable state laws and a road agreement between the Barnes County Commission and Ashtabula III.

Traffic

Traffic impacts from the Project will be greatest during Project construction. Impacts may be most noticeable on the local county and township roads within the Project Area, which have particularly low existing traffic use. During construction, 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 III estimates that there will be approximately 50 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.

Trucks will likely access the Project Area from State Highways ND 26 and ND 32 and County Highway 21/118th Avenue SE, varying depending on the truck source and delivery destination. Operating permits (i.e., oversize or overweight) will be acquired from the state, county and/or township as necessary.

Water Supply

Construction and operation of the Project will not significantly impact the water supply. Project facilities are not likely to be sited near wells due to the fact that wells are typically sited in close proximity to the homesteads or farmsteads they serve, and turbines will not be sited within 1,400 feet of residences under easement with the Project. The Project will not require the abandonment of any wells, the appropriation of surface water, or permanent dewatering. Temporary dewatering of groundwater may be required during construction of turbine foundations and water may also be used at batch plants. Some water also being used for blade washing and dust control. Refer to Section 5.12 for detailed discussion of groundwater resources.

Telecommunications

Prior to Project construction, underground telephone and fiber optic cables will be located by the respective utility companies. Negative impacts to these buried telecommunications cables will therefore be avoided.

Construction and operation of the Project will not impact telephone and/or fiber optic service to the Project Area. Land mobile telecommunication system impacts are not anticipated.

5.4.3 Mitigative Measures

Construction and operation of the Project will be conducted in accordance with all associated local, state, and federal permits and regulations and industry standards. Based on the minor impacts expected on the existing public services and infrastructure from the Project, extensive mitigation measures will not be required.

Local Services

As noted, no impact to local services is anticipated; therefore, no mitigation is required. Ashtabula III will coordinate with local fire, police and hospital facilities as necessary prior to construction and operation of the Project.

Electrical Service

In order to prevent adverse effects to the existing electrical transmission system, Ashtabula III will abide by NERC and MISO regulations. 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 440 feet from existing transmission lines. No additional mitigation is necessary.

Roads

Ashtabula III will coordinate with landowners in order to site access roads in a manner that preserves existing land uses to the greatest extent practicable. Ashtabula III will also acquire all required state permits to ensure that road construction or widening is in conformance with applicable regulations and minimizes adverse impacts. Ashtabula III will use the existing Ashtabula Wind Energy Center road agreement with the Barnes County Commission to address the utilization of county roads during construction of the Project. In addition, a road haul permit will be acquired from the County. Refer to **Figures 2-3** for the preliminary layout of access roads.

Traffic

As noted, the traffic capacity of the existing road network is anticipated to be adequate to support Project-related traffic with minimal impacts. As such, no mitigation is proposed.

Water Supply

In the unlikely event that wells must be abandoned due to Project construction, they will be sealed as required by North Dakota law. Any temporary dewatering of groundwater during Project construction will be conducted under the requirements of the National Pollutant Discharge Elimination System (NPDES) permit and Storm Water Pollution Prevention Plan (SWPPP). Refer to Section 5.12.3 for additional mitigation measures related to groundwater resources.

Telecommunications

As noted, 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 III will enter into agreements with service providers so as to avoid interference with their facilities.

Impacts to AM, FM, and off-air television broadcasts are expected to be minimal, and specific mitigative measures are therefore not proposed.

5.5 Human Health and Safety

5.5.1 Description of Resources

Air Traffic

There are three privately owned airports located within ten miles of the Project Area. All three have unpaved airstrips and require permission before landing. Johnson Private Airstrip Airport (FAA ID#N86) is located four miles north of the Project Area. Bryn Airport (FAA ID#ND09) is located approximately eight miles west of the Project Area. Gage Flying Farmer Airport (FAA ID#3ND5) is located approximately eight miles southeast of the Project Area. The nearest airport certified for commercial carrier operations is Jamestown Municipal Airport, located approximately 35 miles southwest of the Project Area (Air Nav 2010).

Electromagnetic Fields

Every electrical device generates both electric and magnetic fields in its vicinity. These fields, referred to in combination as electromagnetic fields (EMF), arise from voltage, or electrical charges,

and current, or the flow of electricity, associated with electrical systems. The intensity of any particular electric field is related to the voltage, while that of the associated magnetic field is related to the current. EMF can be present both outdoors and indoors, associated with large scale structures such as transmission lines, power collection lines, and substation transformers, as well as local household wiring and electrical appliances. There are no known discernible health impacts from power lines. Turbines and underground collector lines will be located where EMF will likely be at background levels. The primary source of existing EMF within the Project Area is likely the existing transmission lines that run through it.

Hazardous Materials / Hazardous Waste

The Project Area is located in a relatively rural area of North Dakota that has not experienced significant industrial activity. There is an existing wind energy center adjacent to the Project Area. Potential hazards may exist in rural areas from old gasoline facilities, landfill sites, and private activities. An assessment of the Project Area will be conducted in the spring of 2010 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 is located in an area that has a low population density.

5.5.2 Impacts

Air Traffic

Due to the height of wind turbines, their installation creates a potential for obstruction to navigable airspace. However, an existing wind energy facility is adjacent to the proposed Project. Furthermore, the distance from existing airports to the Project Area minimizes potential aviation impacts.

Electromagnetic Fields

The general scientific consensus is that electric fields pose no risk to humans; however, the relationship between magnetic fields and biological responses or health effects remains a subject of research and debate (National Institute of Environmental Health Sciences EMF-RAPID Program Staff, 1999). EMFs will be associated with Project components, including turbines, collection lines, and the Project substation; however, because turbines will be sited no closer than 1,400 feet to occupied residences, EMFs will decrease to background levels at these locations. Based on the setback distances between Project components and potential receptors (i.e., residences) and in consideration of the most current research on EMF, the EMF generated by the Project are anticipated to have no impact to public health and safety.

Hazardous Materials / Hazardous Waste

The Project will require the use of petroleum products, primarily including fluids associated turbines and substation/transformer equipment. Each turbine will use three types of fluids derived from petroleum during operation: gear box oil, hydraulic fluid, and gear grease. Transformers will contain mineral oil. Heavy machinery used during Project construction will also use minor amounts of hydraulic fluid. Leaks and spills will be minimized with the use of best management practices and the development of a stormwater pollution prevention plan (SWPPP).

Security

Impacts to the security and safety of local communities from construction and operation of the Project will be negligible. Wind turbine towers will be locked when operations and maintenance personnel are not utilizing the tower.

5.5.3 Mitigative Measures

Air Traffic

Ashtabula III submit a Notice of Proposed Construction or Alteration to the Federal Aviation Administration (FAA) on April 22, 2010, in accordance with Federal Aviation Regulations (FAR), Part 77. The FAA review will include the evaluation of any potential interference with air traffic, as well as the proposed lighting and marking plan for the Project's wind turbines and permanent met towers. FAA's response will be submitted once received.

Electromagnetic Fields

Ashtabula III will follow "prudent avoidance" methods to EMF exposure, and will continue to monitor EMF research. Further, Ashtabula III will setback wind turbines 1,400 feet from all homes, bury collection lines to a depth of approximately 4 feet and will fence off and place warning signs around the Project substation.

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.

Methods to mitigate leaks and spills will be included in the SWPP and SPCC Plan. Material Safety Data Sheets will be kept on site during operation for all contaminants. The local fire department will be briefed on those products and their storage location as necessary.

Security

Ashtabula III will follow security measures in order to reduce the chance of damage to physical property and personal injury, including:

- Siting of wind turbines away from occupied residences and the centers of road right of way, using setbacks of 1,400 feet and 440 feet respectively. These setback distances are considered safe based on developer experience and examples set by other wind projects in North

Dakota. These distances will also serve to mitigate EMF levels as well as sound (as discussed in Section 5.5.3).

- Use of temporary and permanent precautions during construction and operation, such as safety fences, warning signs, and locks on equipment and wind power facilities.

For most turbines, all associated electrical equipment, with the exception of the pad-mounted transformers, will be contained within the solid steel enclosed tubular towers on which the turbines are mounted. Access to the tower will be restricted to a single solid steel door to be locked when not in use. The Project substation will have applicable warning signs and will be fenced and locked.

5.6 Shadow Flicker

5.6.1 Overview

A wind turbine's rotating blades can cast a moving shadow on locations within a certain distance of a turbine. These moving shadows are called shadow flicker, and can be a temporary annoyance to people at nearby residences or public gathering places. The potential impact area depends on the time of year and day (which determines the sun's azimuth and altitude angles) and the wind turbine's physical characteristics (height, rotor diameter, blade width, and orientation of the rotor blades). Shadow flicker generally occurs during low angle sunlight conditions, typical during sunrise and sunset times of the day. However, when the sun angle is very low (less than 3 degrees), the light has to pass through more atmosphere and becomes too diffuse to form a coherent shadow. Shadow flicker will not occur when the sun is obscured by clouds/fog, at night, or when the source turbine is not operating.

Shadow flicker intensity is defined as the difference in brightness at a given location in the presence and absence of a shadow. Shadow flicker intensity diminishes with greater receptor-to-turbine separation distance. Shadow flicker intensity for receptor-to-turbine distances beyond 1,500 meters (4,921 feet) is very low and generally considered imperceptible. In general, the largest number of shadow flicker hours, along with greatest shadow flicker intensity, occurs nearest the wind turbines.

5.6.2 Potential Impacts

A shadow flicker study is currently underway and results will be made available once the study is complete. Since the Project will use a minimum turbine siting setback of 1,400 feet from any occupied residence, sensitive receptors are generally not located in the worst case potential shadow flicker impact zones, which ensures that shadow flicker impacts are minimized.

Shadow flicker frequency is related to the wind turbine's rotor blade speed and the number of blades on the rotor. From a health standpoint, such low frequencies generated by wind turbines are harmless. For comparison, strobe lights used in discotheques have frequencies which range from about 3 Hz to 10 Hz (1 Hz = 1 flash per second). As a result, public concerns that flickering light from wind turbines can have negative health effects, such as triggering seizures in people with epilepsy are unfounded. Epilepsy Action (working name for the British Epilepsy Foundation), states that there is no evidence that wind turbines can cause seizures (Epilepsy Action 2008). However, they recommend that wind turbine flicker frequency be limited to 3 Hz. Since the blade pass frequency for any of the wind turbines that may be selected, will be less than 1.0 Hz (less than 1

alternation per second), no negative health effects to individuals with photosensitive epilepsy are anticipated.

Shadow flicker impacts are not regulated in applicable state or federal law and there is no permitting trigger with regard to hours per year of anticipated impacts to a receptor from a wind energy project. Due to the significant growth of the wind energy industry in recent years, some states have published model bylaws for local governments to adopt or modify at their own discretion which sometimes includes guidance and recommendations for shadow flicker levels and mitigation.

A general precedent has been established in the industry both abroad and in the United States that fewer than 30 hours per year of shadow flicker impacts is acceptable to receptors in terms of nuisance and well below health hazard thresholds. In German court case for example, a judge found 30 hours of actual shadow flicker per year at a certain neighbor's property to be tolerable (WindPower 2003).

5.6.3 Mitigative Measures

Ashtabula III will mitigate shadow flicker impacts from the Project through the setback distances employed for wind turbines. The 1,400-foot setback from occupied residences acts as a mitigation measure to minimize potential adverse shadow flicker impacts.

5.7 Sound

5.7.1 Description of Resources

Barnes County can generally be characterized as agricultural and rural, and existing ambient sound levels are expected to be relatively low, although sound levels can be sporadically elevated in localized areas during periods of human activity. Background sound levels will vary both spatially and temporally depending on proximity to area sound sources and natural sounds. Principal contributors to the existing acoustic environment likely include motor vehicle traffic, mobile farming equipment, farming activities such as plowing and irrigation, all-terrain vehicles, local roadways, periodic aircraft flyovers, and natural sounds such as birds, insects, and leaf or vegetation rustle during elevated wind conditions in areas with established tree stands or established crops. Wind turbine generators are currently operational on land adjacent to the Project Area. In addition to anthropogenic noise sources, the windy conditions of this site define a somewhat elevated ambient sound level, which increases with wind speed. Windy conditions can generate noise caused by the rustling of grass and tree leaves. Diurnal effects result in sound levels that are typically quieter during the night than during the daytime, except during periods when evening and nighttime insect sound dominate.

5.7.2 Impacts

Barnes County has not adopted a zoning ordinance or any specific noise-related provisions. At the state level, the NDAC (Article 69-06-08, Section 3) requires that the potential for adverse impacts at noise sensitive areas (NSAs) be assessed during the site selection process; however, there are no numerical decibel limits or formal definition of location of compliance given either by the PSC or any other agency at the state level. Based on a review of regulations and precedent set by other

avoided. The cultural resources inventory report will be submitted to the ND PSC once it is complete.

5.8.3 Mitigative Measures

All of the sites that are deemed eligible or potentially eligible will be avoided and fenced during construction.

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 Spirit Lake Nation Phone: 701.996.4477	Ambrose Littleghost, THPO Mandan, Hidatsa, and Arikara Nation (Three Affiliated Tribes) 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.

5.9 Recreational Resources

5.9.1 Description of Resources

Recreational opportunities in Barnes County include boating, fishing, hiking, hunting, and nature observation. Review of state and federal information indicates that no registered national wildlife refuges, state game refuges, game management areas, nature preserves, county parks, or formal recreational areas are present within the Project Area. Lake Ashtabula/Sheyenne River is located approximately 2,430 feet west of the nearest proposed access road and 4,094 feet west of the nearest proposed wind turbine.

There is one state Wildlife Management Area (WMA) , the Ashtabula Rearing Pond WMA, adjacent to the Project Area WMAs are open to a variety of public uses, including but not limited to hunting, fishing and trapping (NDGIS 2009).

The Project Area is adjacent to multiple USFWS Waterfowl Production Areas (WPAs), including one WPA (Goose Lake WPA) present as an inholding of non-leased land within the Project Area boundary (NDGIS 2010). WPAs are part of the National Wildlife Refuge System and preserve

wetlands and grasslands critical to waterfowl and other wildlife. WPAs are open to a variety of public uses, including hunting, trapping, fishing, and wildlife observation and photography.

5.9.2 Impacts

In general, impacts to nearby recreational areas will be visual in nature, primarily affecting individuals using public or private property within or adjacent to the Project Area for hunting, fishing, trapping, or nature observation. To minimize physical intrusion on recreational activities, Project turbines, buildings, and the substation will be sited at least 0.25 mile from nearby WPAs. Additional impacts to recreational uses due to the Project include increased traffic along county roads in the area, although these impacts will be temporary in nature and primarily associated with the construction period.

5.9.3 Mitigative Measures

Wind turbines will be sited at least 0.25 mile from nearby WPAs in order to mitigate direct, physical impacts preemptively to recreational resources within and adjacent to the Project Area. Residual impacts will be limited indirect and visual changes to the viewshed. Because the Project will not result in the removal or deterioration in functional value of nearby recreational facilities, Ashtabula III does not propose compensational conversion or dedication of adjacent land to recreational use or wildlife management.

5.10 Effects on Land-Based Economies

5.10.1 Description of Resources

Agriculture/Farming

The Project Area is predominately cultivated cropland, which comprises 7,778 acres or 64 percent of the Project Area. The remainder of the Project Area is comprised primarily of pasture/hay, grassland, and emergent herbaceous wetlands, according to the USGS NLCD (**Table 5-2**).

According to the 2007 Census of Agriculture, the top crop item for Barnes County is soybeans (294,103 acres) followed by wheat for grain (148,048 acres). Other crops grown in Barnes County include corn, forage (hay, grass silage and greenchop) and barley. Cattle and calves were the primary livestock in Barnes County in 2007 (USDA 2007). In 2007, Barnes County had 921 farms comprising 907,184 acres. Crop sales accounted for 94 percent of products sold in 2007, while livestock sales represented only six percent of products sold (USDA 2007).

The NRCS mapped soil units within the Project Area include prime farmland, prime farmland if drained, and farmlands of statewide or local importance. Prime farmland and farmlands of statewide importance are lands that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Farmlands of statewide importance generally do not produce a yield as high as prime farmland, but can if conditions are favorable and the land is treated and managed according to acceptable farming methods. Prime farmlands in Barnes County are presented in **Table 5-5** below.

There are 14 prime farmland soils within the Project Area, comprising a total of 5,708 acres or 47 percent of the Project Area. There are five soils that are considered prime farmland when drained; these comprise 1,036 acres or approximately 8 percent of the Project Area.

Table 5-5. Prime Farmland Soils in Barnes County

Soil Unit	Prime Farmland	Prime Farmland If Drained	Area (acres)	Percentage of Project Area (12,194 acres)
Barnes-Buse loams, 3 to 6 percent slopes	X		2,387	20
Barnes-Svea loams, 3 to 6 percent slopes	X		1,038	9
Hamerly-Tonka complex, 0 to 3 percent slopes		X	530	4
Overly-Bearden silty clay loams, 0 to 2 percent slopes	X		433	4
Bearden silty clay loam, 0 to 2 percent slopes	X		411	3
Glyndon silt loam, 0 to 2 percent slopes	X		315	3
Gardena-Zell silt loams, 2 to 6 percent slopes	X		292	2
Hamerly-Wyard loams, 0 to 3 percent slopes		X	280	2
Gardena silt loam, 0 to 2 percent slopes	X		239	2
Svea-Barnes loams, 0 to 3 percent slopes	X		171	1
Divide loam, 0 to 2 percent slopes	X		163	1
Balaton loam, 3 to 6 percent slopes	X		138	1
Colvin silty clay loam, 0 to 1 percent slopes		X	111	1
Tonka silt loam, 0 to 1 percent slopes		X	103	1
Gardena-Glyndon silt loams, 0 to 2 percent slopes	X		73	1
Lanona-Swenoda fine sandy loams, 3 to 6 percent slopes	X		42	Less than 1
Marysland loam, 0 to 1 percent slopes		X	11	Less than 1
Nutley silty clay, 2 to 6 percent slopes	X		5	Less than 1
Fordville loam, 0 to 2 percent slopes	X		2	Less than 1

Woodlands

Economically important forestry resources are not found in the Project Area. The 2007 Census of Agriculture has no record of any market value for cut Christmas trees and short rotation woody crops in Barnes County (USDA 2007). Generally trees are limited in the Project Area and are associated with drainages and shelter belts around homesteads which have limited economic value.

5.10.2 Impacts

Agriculture/Farming

The Project will not have a significant impact on grazing land. Only permanent facilities such as physical turbine locations and access roads will reduce the amount of grazing land available. Approximately 40 acres of land classified as pasture/hay in the NLCD will be permanently affected. All land surrounding these facilities will remain available for grazing. Therefore, no appreciable impacts are anticipated to animal health and safety as a result of construction and operation of the Project.

The Project is in its initial design phase and therefore actual impacts to agricultural production cannot yet be determined. Because the entire Project Area is not used for agricultural production, not all of the permanent impacts will be in areas used for agricultural production. As with permanent

impacts, temporary impacts cannot be determined until the Project layout has been finalized. All temporary disturbances will be restored to pre-construction conditions.

Lease payments will provide farmers with supplemental income that will be significantly greater than any potential losses from operation of the Project. Lease payments will typically contribute more income per acre than the market value per acre for agricultural production. It is anticipated that 95.7 acres of prime farmland and 1.7 acres of prime farmland only when drained will be permanently disturbed from operation of the Project. Approximately 137 acres of land classified as cultivated cropland according to NLCD will be permanently affected. This impact is considered negligible when compared to the agricultural production of the rest of the county. During construction and operations, Ashtabula III will reimburse landowners for damaged crops as specified in the easement agreements with the landowners.

As discussed in Section 5.3.2, there are no negative impacts anticipated to the valuation of homes in the area. The Project layout will be designed to ensure that no turbines will be placed within 1,400 feet of occupied dwellings. The loss of land from construction and operation of the Project will impact family farms; these impacts will not be known until the Project layout has been finalized, however. Any impacts caused by construction and operation of the Project will be substantially less than the lease agreements established between Ashtabula III and the landowners.

Woodlands

No significant impacts to woodlands are anticipated.

5.10.3 Mitigative Measures

Agriculture/Farming

Available data will be analyzed and landowners will be consulted to minimize impacts to prime farmland and other productive farmland areas. All construction areas will be separated from grazing animals. Once impacts have been minimized to the extent practicable and the Project layout has been finalized, the extent of impacts as a result of construction and operation of the Project will be known and additional mitigative measures, such as lease payments to landowners, will be implemented.

Woodlands

Because there are no anticipated significant impacts to woodlands, no mitigation is proposed.

5.11 Soils

5.11.1 Description of Resources

The U.S. Department of Agriculture has mapped 44 soil map units within the Project Area (USDA 2009). These soils are primarily loams, silt loams, and silty clay loams derived from the underlying glacial till and glaciolacustrine sediments. They generally range from well drained to somewhat poorly drained, although a few units are characterized by more extreme drainage classifications (i.e., very poorly drained or excessively drained). Together, the two predominant soil units ("Barnes-Buse loams, 3 to 6 percent slopes" and "Barnes-Buse loams, 6 to 9 percent slopes") comprise over one third of the Project Area (35.31 percent); however, the remaining soil types are fairly uniform in

prevalence, with 22 individual units comprising at least one percent of the Project Area (**Figure 12**). **Table 5-6** provides a summary of the soil map units within the Project Area, including their acreages and percentages of the Project Area.

Table 5-6. Soil Map Units Within the Project Area

Map Unit Symbol	Map Unit Name	Area (acres)	Percentage of Project Area (12,194 acres)	Farmland Classification
14B	Barnes-Buse loams, 3 to 6 percent slopes	2,387	19.6	All areas are prime farmland
14C	Barnes-Buse loams, 6 to 9 percent slopes	1,920	15.7	Not prime farmland
17B	Barnes-Svea loams, 3 to 6 percent slopes	1,038	8.5	All areas are prime farmland
23F	Buse-Barnes loams, 15 to 35 percent slopes	618	5.1	Not prime farmland
14D	Barnes-Buse loams, 9 to 15 percent slopes	595	4.9	Not prime farmland
50	Hamerly-Tonka complex, 0 to 3 percent slopes	530	4.4	Prime farmland if drained
62	Overly-Bearden silty clay loams, 0 to 2 percent slopes	433	3.6	All areas are prime farmland
18	Bearden silty clay loam, 0 to 2 percent slopes	411	3.4	All areas are prime farmland
48	Glyndon silt loam, 0 to 2 percent slopes	315	2.6	All areas are prime farmland
6	Southam silty clay loam, 0 to 1 percent slopes	309	2.5	Not prime farmland
40B	Gardena-Zell silt loams, 2 to 6 percent slopes	292	2.4	All areas are prime farmland
66	Hamerly-Wyard loams, 0 to 3 percent slopes	280	2.3	Prime farmland if drained
16C	Barnes-Sioux loams, 6 to 9 percent slopes	256	2.1	Not prime farmland
43	Gardena silt loam, 0 to 2 percent slopes	239	2.0	All areas are prime farmland
63	Renshaw loam, 0 to 2 percent slopes	208	1.7	Not prime farmland
68E	Sioux-Renshaw loams, 9 to 25 percent slopes	206	1.7	Not prime farmland
65	Svea-Barnes loams, 0 to 3 percent slopes	171	1.4	All areas are prime farmland
16B	Barnes-Sioux loams, 0 to 6 percent slopes	167	1.3	Not prime farmland
27	Divide loam, 0 to 2 percent slopes	163	1.3	All areas are prime farmland
19	Colvin silty clay loam, saline, 0 to 1 percent slopes	158	1.3	Not prime farmland
54	Lamoure silt loam, channeled, 0 to 6 percent slopes	140	1.1	Not prime farmland
84	Easby loam, 0 to 1 percent slopes	138	1.1	Not prime farmland
66B	Balaton loam, 3 to 6 percent slopes	138	1.1	All areas are prime farmland
40C	Zell silt loam, 6 to 9 percent slopes	137	1.1	Not prime farmland
3	Parnell silty clay loam, 0 to 1 percent slopes	114	0.9	Not prime farmland
26	Colvin silty clay loam, 0 to 1 percent slopes	111	0.9	Prime farmland if drained
71	Vallers-Parnell complex, 0 to 1 percent slopes	111	0.9	Not prime farmland
2	Tonka silt loam, 0 to 1 percent slopes	103	0.9	Prime farmland if drained
67C	Renshaw-Sioux loams, 2 to 9 percent slopes	93	0.8	Not prime farmland
15C	Lanona fine sandy loam, 6 to 9 percent slopes	82	0.7	Not prime farmland
46	Gardena-Glyndon silt loams, 0 to 2 percent slopes	73	0.6	All areas are prime farmland
77	Vallers loam, saline, 0 to 1 percent slopes	60	0.5	Not prime farmland
15B	Lanona-Swenoda fine sandy loams, 3 to 6 percent slopes	42	0.3	All areas are prime farmland
40E	Zell silt loam, 9 to 25 percent slopes	35	0.3	Not prime farmland
16E	Barnes-Sioux loams, 9 to 25 percent slopes	32	0.3	Not prime farmland
W	Water	30	0.3	Not prime farmland
92B	Barnes-Cavour loams, 3 to 6 percent slopes	16	0.1	Not prime farmland
49	Glyndon silt loam, saline, 0 to 2 percent slopes	16	0.1	Not prime farmland
80	Marysland loam, 0 to 1 percent slopes	11	0.1	Prime farmland if drained
87	Svea-Cavour loams, 0 to 3 percent slopes	6	0.1	Not prime farmland
64	Pits, gravel and sand	6	0.1	Not prime farmland
9B	Nutley silty clay, 2 to 6 percent slopes	5	Less than 0.1	All areas are prime farmland
89	Fordville loam, 0 to 2 percent slopes	2	Less than 0.1	All areas are prime farmland
98B	Barnes-Svea loams, 0 to 6 percent slopes, extremely stony	Less	Less than	Not prime farmland

Map Unit Symbol	Map Unit Name	Area (acres)	Percentage of Project Area (12,194 acres)	Farmland Classification
		than 1	0.1	

Source: USDA 2009.

Slightly more than one half of the Project Area (55 percent) is characterized by soils that are either prime farmland (47 percent) or prime farmland if drained (8 percent). Approximately four percent of the Project Area is covered by soils classified as "all hydric"; the remaining area consists primarily of partially hydric soils (i.e., soils containing hydric inclusions) (77 percent) and non-hydric soils (18 percent). All of the soils in the Project Area (with the exception of areas mapped as "Water", which are unrated) have low to moderate susceptibility to erosion by water (i.e. K-factors from 0.05 to 0.4). The majority of the soils (59 percent) also have low to moderate susceptibility to wind erosion (i.e., USDA Wind Erosion Groups 6 or greater) (USDA 2009).

5.11.2 Impacts

The impact to soils within the Project Area will be limited to areas removed from agricultural production by occupancy of Project components, including turbines, roads, and collection lines. Access roads will be 32-foot wide aggregate-surfaced roadways. Estimated impacts include up to 206 acres of permanent disturbance due to turbine placement and access road construction.

5.11.3 Mitigative Measures

Wind and water erosion are potential hazards for the soils found in the Project Area, particularly following anthropogenic disturbance. To minimize erosion during and after construction, best management practices (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. If cuts are made during construction, top soil will be segregated and reapplied after final contours have been graded.

5.12 Geologic and Groundwater Resources

5.12.1 Description of Resources

Barnes County, located in southeastern North Dakota, lies within the Western Young Drift Section of the Central Lowland physiographic province. The Western Young Drift Section consists of multiple physiographic districts, the largest of which, the Glaciated (or Drift) Plains District, contains all of Barnes County (Kume and Hansen 1965). The Glaciated Plains District is a glaciated landscape characterized by rolling topography (Bluemle and Biek 2007).

The physiography and surficial geology of Barnes County are the product of glacial processes that occurred during the late Wisconsin glaciation. The topography of most of the county is characterized by gently undulating plains of ground moraine interspersed by narrow, elongate ridges of end moraine. The southern portion of the Project Area demonstrates this typical undulating topography. The northern portion of the Project Area, however, is located in an area of extensive

end moraine and consequently exhibits more moderate to high relief topography (Kelly and Block 1967).

Glacial sediments throughout the county vary considerably in composition and thickness. On average, surficial sediments in areas east of the Sheyenne River, such as the Project Area, have a relatively uniform thickness of about 130 feet; however, in areas underlain by end moraines, such as the northern portion of the Project Area and parts of the southern portion of the Project Area, sediment thickness averages about 200 feet (Kelly and Block 1967). No areas of shallow or exposed bedrock have been identified in the Project Area (USDA 2009; Kelly and Block 1967). Although sediments throughout both portions of the Project Area are part of the Quaternary Coleharbor Formation, a number of distinct sediment types have been identified (NDGS 1980; Kelly and Block 1967). The northern portion of the Project Area is underlain primarily by end moraine consisting of sandy to silty glacial till with abundant boulders; however, along its western edge, the sediments are comprised of glacial outwash sands and gravels. The southern portion of the Project Area is also underlain by multiple surficial sediment types, including glaciolacustrine silts and clays in the south, flat lying sandy to silty glacial till across the middle, and moderate to high relief sandy to silty glacial till in the northeast (Kelly and Block 1967).

The bedrock geology of the entire Project Area consists of two formations, the Niobrara Formation and the Pierre Formation. The northern portion of the Project Area is underlain almost entirely by the Niobrara Formation, except along its western edge, where it is underlain by the younger Pierre Formation. Alternatively, the southern portion of the Project Area is underlain almost entirely by the Pierre Formation, except at its eastern edge, where the Niobrara Formation is mapped. Both the Niobrara and Pierre Formation are Upper Cretaceous sedimentary units consisting primarily of shale (Kelly and Block 1967; Kelly 1966)

No large scale mineral extraction occurs in Barnes County (USGS 2005). The North Dakota Geological Survey (NDGS) has not mapped any existing mineable coal deposits in the Project Area and no oil and gas production occurs in Barnes County (NDGS 2010; NDIC DMR 2010). The primary mineral resource in the Project Area is likely sand and gravel. USGS 1:24,000 scale topographic maps depict a total of five sand and gravel pits in the Project Area, including four in the southern portion and one in the northern portion. The current statuses of these operations are unknown; however, USGS data dated 2003 does not identify any of them as an active operation monitored by the USGS Minerals Information Team (USGS 2005). Furthermore, none of these facilities is located within 800 feet of planned Project infrastructure.

The ND State Lands Department has identified subsurface leaseholds within the both portions of the Project Area, in parts or all of Township 143 North, Range 57 West, Sections 16 and 17 and Township 142 North, Range 58 West, Sections 25 and 26. The ND State Lands Department has requested that they be notified if any mineral, such as gravel, scoria, or other aggregate, is identified on State-owned land.

Geologic hazards in the Project Area are expected to be minimal. According to the North Dakota Geological Survey, North Dakota is located in an area of very low earthquake probability. There are no known active tectonic features in the Project Area and the deep basement formations underlying

North Dakota are expected to be geologically stable (Bluemle 1991). This information is supported by USGS seismic hazard maps, which show that the Project Area is located in an area with very low seismic risk (USGS 2008). Related geologic hazards, such as soil liquefaction, are therefore also unlikely.

Groundwater resources in Barnes County are available primarily from surficial aquifers and, to a much lesser extent, bedrock aquifers. The Dakota Sandstone is the primary bedrock aquifer in the county. The underlying bedrock formations typically yield only highly saline groundwater, and overlying bedrock aquifers are limited to the Pierre Shale, which has low permeability and is a significant source only locally in the central part of the county. The Dakota Sandstone is an artesian aquifer, with most wells flowing to the surface after completion of drilling. Water from this formation is highly mineralized and generally unsuitable for domestic or municipal use. Wells penetrating this formation are typically 600 to 1,500 feet deep and water yielded from this aquifer is primarily used for stock watering. The predominant source of groundwater in Barnes County is glacial aquifers; however, the productivity and quality of these aquifers varies considerably. The Project Area is located in an area where only small quantities of water are locally available from glacial aquifers for stock and domestic uses. Aquifers are generally at depths of 5 to 300 feet below ground surface (bgs), and water quality varies from poor to fair (Kelly 1966).

Review of driller logs available from the North Dakota State Water Commission database indicates that only two wells have been drilled within the Project Area: one domestic well and one domestic/stock well. Another 11 wells are located within one mile of the Project Area, most of which are domestic/stock wells. Static water levels are not provided for the two wells in the Project Area; however, both are 25 feet deep. Of the 11 additional wells within one mile of the Project Area, static water levels are only recorded for two of the wells, both of which are adjacent to the northern portion of the Project Area. The static water levels of these wells are 141 and 4.5 feet bgs, with the deeper well located east of the Project Area and the shallower well located west of the Project Area (NDSWC 2009). Although these water levels vary significantly, they correlate with the approximate range of 5 to 300 feet bgs suggested by the NDGS (Kelly 1966).

5.12.2 Impacts

Impacts of the Project to available mineral resources are likely to be highly limited. No coal or oil and gas resources are known to be actively extracted in the Project Area. Additionally, no active sand and gravel extraction activities have been identified within the vicinity of proposed Project infrastructure. Should NextEra encounter mineable mineral resources on the identified state subsurface leaseholds during Project construction, they will promptly notify the ND State Lands Department. Geologic hazards, such as subsidence or seismic activity, are unlikely to impact the Project.

Impacts to groundwater resources in the Project Area are anticipated to be minimal. Only two groundwater wells have been identified in the Project Area, neither of which is within 1,000 feet of a proposed turbine location. Major withdrawals of groundwater will not be necessary due to the limited water supply needs of the Project. No new wells will be drilled. Based on the small amount of increased impervious surface area that would be created by Project components relative to the separation of these components and the size of the entire Project Area, the Project will likely have

minimal impacts to regional groundwater recharge. Based on the estimated range of groundwater levels in the area, Project construction activities such as excavation and construction of foundations may locally encounter shallow groundwater. If, as a result, impacts to groundwater quality or flow patterns were to occur, they would likely be minor, highly localized, and unlikely to adversely affect local water supply wells. If dewatering of excavations were necessary, water would be discharged to the surrounding surface, allowing it to infiltrate back into the ground to minimize potential impacts. In addition, each turbine would be located a minimal distance of 1,400 feet away from existing residential structures, thereby minimizing the risk of impacts to private wells in the area, which are assumed to be located in proximity to the structures they serve.

It is highly unlikely that development of the turbine foundations would require subsurface blasting. If, however, subsurface blasting were required, it could potentially fracture bedrock and affect groundwater flow in the immediate vicinity of the disturbance. In the event that subsurface blasting is required, a blasting plan would be developed and implemented to keep the impacts localized and fracture the least amount of bedrock necessary for construction. Potential disturbances due to blasting would be localized and temporary, with groundwater likely to resume its natural course of flow down gradient of the foundation.

5.12.3 Mitigative Measures

Wind turbines will be sited so as to avoid sand and gravel resources identified in the Project Area. Ashtabula Wind III will conduct site-specific geotechnical surveys to evaluate the subsurface conditions at the location of each turbine to ensure the suitability of subsurface condition for the proposed infrastructure. Project components will then be microsited, as necessary, based on the results of the surveys.

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. In the highly unlikely event that subsurface blasting is required, a blasting plan would be developed and implemented to keep the impacts localized and fracture the least amount of bedrock necessary for construction. It may be necessary to pump out any accumulated groundwater in the excavation during construction. All dewatering of the excavation would be discharged to the surrounding surface, thereby allowing it to infiltrate back into the ground to minimize potential impacts.

5.13 Surface Water and Floodplain Resources

5.13.1 Description of Resources

Surface water and floodplain resources were identified for the Project Area using Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), USGS topographic maps, National Land Cover Dataset (NLCD), USFWS National Wetlands Inventory (NWI) data, and the National Hydrography Dataset. The Project Area is located in the Drift Plains and End Moraine Complex regions of the Northern Glaciated Plains ecoregion (USGS 2006). The majority of the Project Area is located in the End Moraine Complex region has high wetland densities (USGS 2006).

The region is characterized by gently rolling topography with numerous shallow saucer-shaped depressions, but few hills or deep cup-shaped depressions. This landform occurs where moderate

amounts of glacial till were deposited at the base of a moving glacier and by collapse from within the glacier when it finally melted. The surficial material consists primarily of glacial till with thin layers of windblown loess on ridges and alluvium near streams. Lake Ashtabula/Sheyenne River runs north-south west of the Project Area (**Figure 1**). According to NLCD data, open water accounts for 347 acres, or 2.8 percent of the entire Project Area (**Table 5-2**).

The Project Area is located in FEMA panels 38003C0125F, 38003C0150F, and 38003C0300F. The entire Project Area is mapped as zone X, which is outside the 100-year and 500-year floodplains (FEMA 2010).

5.13.2 Impacts

Wind turbines will be built on uplands to avoid surface water resources in the lower elevations to the extent practicable. Project facilities, such as underground electrical collector lines, access roads, and turbine pads, will be microsited to avoid impacts to surface water resources. Because the Project Area is outside the 100-year and 500-year floodplains, the Project will not impact floodplain resources.

5.13.3 Mitigative Measures

Runoff from the upper portions of watersheds adjacent to access roads will be allowed to flow unrestricted to the lower portion of the watershed. A Notice of Intent (NOI) to obtain coverage under the NPDES general permit for storm water discharges associated with construction activity will be submitted to the North Dakota Department of Health (NDDOH) prior to construction of the Project.

5.14 Wetlands

5.14.1 Description of Resources

The Project is located within the Prairie Pothole region. Prairie potholes are glacially formed water-holding depressions. These depressions provide ideal habitat for waterfowl and other migratory and resident wildlife. Wetlands also perform important hydrologic (flood attenuation and groundwater recharge) and water quality (sediment attenuation and nutrient removal) functions.

Desktop wetland analysis methods were used to identify wetlands and waterbodies within the Project Area. The desktop analysis included an assessment of data from the NWI and information from WPA, NRCS, Wetland Reserve Program (WRP) easements, and North Dakota geographic information system (GIS).

The desktop wetland analysis identified 917 acres (approximately 8 percent of the Project Area) classified as NWI wetlands. The desktop wetland analysis also identified 2,030 acres of property (approximately 17 percent of the Project Area) in USFWS wetland easements, although actual wetland acreage within these easements is substantially less. In many locations, the NWI wetlands and USFWS wetland easements overlap. NLCD data identified 9,437 acres or 77 percent of the Project Area as having partially hydric soils and 513 acres or approximately 4 percent of the Project Area as having hydric soils. Soils are one of the parameters considered in addition to hydrology and vegetation when identifying wetlands.

The Project is in the preliminary phase of development; as such, the Project layout has not been finalized. Once the layout is finalized, an on-site wetland delineation will be performed. The delineation will be performed using the methods described in the 1987 United States Army Corps of Engineers (USACE) Wetland Delineation Manual (Environmental Laboratory, 1987), the Great Plains Regional Supplement to the 1987 Manual (USACE March 2008). These methods incorporate a three-parameter approach using vegetation, soils, and hydrology to identify the presence of freshwater wetland. The extent of relatively permanent waters (RPWs), other than wetlands, will be determined by applying the USACE definition of Ordinary High Water Mark (OHWM) and methods for jurisdictional determinations as detailed in the USACE Jurisdiction Determination Form Instructional Guidebook (Corps JD Guidebook) revised on June 5, 2007 including the December 2, 2008 USACE/EPA revised Rapanos guidance.

Wetland Permitting

Wetlands with "jurisdictional status" are Waters of the U.S. as defined by Section 404 of the Clean Water Act (CWA). Jurisdictional areas covered under Section 404 are regulated by the USACE and the USEPA. Several classes of waterbodies are subject to Section 404, including: traditional navigable waters (TNWs), non-navigable tributaries of TNWs that are RPW, and wetlands that directly abut RPWs (USACE 2007).

The USEPA and the USACE are required to assert jurisdiction over certain types of other waters based on fact-specific analysis as to whether the water has a significant nexus with a TNW (USACE 2007). These types of waters include:

- Non-navigable tributaries that are not relatively permanent waters (non-RPWs), but have a surface connection to TNWs;
- Wetlands adjacent to RPWs or non-RPWs, and separated by a natural berm, dike, or similar structure; and
- As defined by the USACE, a wetland is adjacent when it is "bordering, contiguous, or neighboring," to other Waters of the U.S., but not directly "touching" or abutting the Waters of United States (USACE 2007).

The USACE does not presently assert jurisdiction over the following features:

- Drainage swales or erosional features (i.e., gullies, small washes with small volumes and infrequent flow); and
- Ditches (including roadside ditches) excavated wholly in and draining only uplands, and that are not RPWs.

In the absence of adjacent or abutting wetlands, lateral jurisdiction extends to the OHWM. The definition of the OHWM is "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas" (Code of Federal Regulations (CFR) 2002, USACE 2005, 2007).

The OHWM is also used in the identification of the upstream limits of jurisdiction for tributary waters. Federal jurisdiction generally extends up stream banks and upstream within a tributary to the point where the OHWM is no longer discernible. Additionally, non-RPW channels are considered jurisdictional if an OHWM is discernable. Thus, jurisdictional tributaries range from substantial rivers with definite OHWMs to channels that are usually dry, and may have faint or ill-defined OHWMs, provided there is an eventual surface connection with a TNW (USACE 2005).

North Dakota has been granted authority in Section 404 permit decisions through State Water Quality Certifications (CWA, Section 401). Under the 401 Certification, the NDDOH has prohibited work that will have impacts in classified waters (i.e., certain lakes) under the USACE Nationwide Permit 12 (NDDOH 2007). In accordance with NDCC 43-36-23, hydric soils will be classified by a certified North Dakota soil classifier following wetland delineations as defined in NDCC 43-36- 01.

5.14.2 Impacts

Ashtabula III has committed to no wetland impacts. The finalized turbine layout will take advantage of higher elevations and avoid low-lying areas which are more likely to contain wetland areas. Wetland basins within USFWS wetland easements will either be avoided by Project facilities or bored under (for underground collection lines) using horizontal directional drilling so that these wetlands will not be impacted.

5.14.3 Mitigative Measures

Wetlands will be avoided during construction and operation of the Project. Prior Project authorization under a Section 404 USACE Nationwide Permit (NWP) will be obtained if impacts to CWA jurisdictional waters are unavoidable and less than 0.5 acre.

If applicable, NWP specific General and/or Regional Conditions prescribed for projects in North Dakota as set forth by the USACE and other applicable BMPs will be used during construction and operation of the Project 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 re-vegetating disturbed areas with native species.

5.15 Vegetation

5.15.1 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 WPAs. 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 2010).

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, burr oak, and other deciduous woodlands. However, the vast majority of the native vegetation within the Project Area has been replaced with croplands.

Native Prairie Habitats

Native prairies serve as a vital ecological resource by improving water quality, providing erosion control, and supporting a diverse population of plants and animals. However, due to the native prairies' fertile soils and predominantly flat topography, large portions of the native prairie have been converted to agricultural lands. This wide spread loss of native prairie makes this an ecosystem of conservation concern and one of the most endangered ecosystems in North America (Samson et al 1998).

Native prairies are habitat used by prairie grouse (e.g., sharp-tailed grouse, greater prairie-chicken) for lekking, nesting, brood rearing, and wintering. Grouse lek habitat is classified as open, short grass vegetation with minimal amounts of agriculture. Development in grouse lekking habitat could result in direct habitat loss, habitat loss through avoidance, predator facilitation, and construction-related disturbance. Most prairie grouse are considered gamebirds and are often managed locally by state fish and game agencies for hunting purposes.

In fall 2009, Tetra Tech conducted a native prairie survey that included the northern portion of the Project Area. The southern portion of the Project Area will be surveyed for native prairie in June 2010 (during the appropriate growing season). The native prairie survey report will be made available once it is complete.

As vegetation and land cover map for North Dakota was created as part of the North Dakota Gap Analysis Project for the U. S. Geological Survey's National Gap Analysis Program (GAP). Vegetation and land cover was mapped from a multi-temporal analysis of Landsat Thematic Mapper images. According to 2005 GAP data, there are 543 acres classified as "prairie" in the Project Area.

5.15.2 Impacts

Within the Project Area, potential impacts to plant communities due to construction activities include the footprint for the proposed turbine locations, access roads, and substation. 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 a proposed buried collector system will result in some temporary effects to native and non-native grasslands.

The proposed turbine layout dated May 3, 2010 includes 43 1.6-MW GE wind turbines. Based on this layout, approximately 15 acres of land classified as "prairie" according to 2005 GAP data would be permanently affected, including ten turbine pad locations.

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 collector system will result in some temporary effects to native and non-native grasslands. Where native prairie is disturbed, effects can be mitigated by reseeding the trenched areas with native grasses following completion of construction activities.

5.15.3 Mitigative Measures

Ashtabula III will work to avoid and to minimize impacts to existing trees and shrubs. Trees and shrubs anticipated to be cleared will be inventoried for replacement. Tree replacement will be on a 2 to 1 basis with 2-year-old saplings; shrub replacement will be on a 2 to 1 basis with stem cuttings. Trees and shrubs will be replaced by the same species or similar species, according to the PSC Tree and Shrub Mitigation Specifications.

In order to mitigate the loss of native prairie as a result of the Project, Ashtabula III will reseed disturbed areas with native material following completion of construction activities. Ashtabula III will also develop a management plan to prevent the spread of noxious weeds throughout the Project or adjacent areas during construction and ongoing operations, in accordance with state and county regulations.

5.16 Wildlife

5.16.1 Description of Resources

Information on the existing wildlife in the wind farm site was obtained from a variety of sources, including observations during a site visit, communication with local residents and information from the North Dakota 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 Area consists of birds, mammals, fish, reptiles, amphibians, and insects, both resident and migratory, which utilize the project site habitat for forage, migratory stopover, breeding and/or shelter. Species present in the project vicinity are associated with agricultural fields, pasture grasslands, and wetland areas. Common mammals in the Project vicinity include raccoon, mink, spotted skunk, weasel, white-tailed deer, moose, coyote, red fox, badger, porcupine, and eastern cottontail.

Federally Protected Species

The Endangered Species Act (ESA) 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. According to the USFWS (2010), of the ESA-listed species known to occur within North Dakota, only the whooping crane and gray wolf are listed for Barnes County.

Whooping Crane

The whooping crane is protected by both federal and state laws in the United States. It was considered endangered in the United States in 1970 and the endangered listing was 'grandfathered'

into the ESA in 1973. Under the North Dakota comprehensive wildlife conservation strategy guide, a level three species of conservation priority is a species of moderate priority but is believed to be peripheral or non-breeding in North Dakota (Hagen et al. 2005). State listing carries no regulatory protection in North Dakota, however.

One self-sustaining wild population of whooping cranes currently exists in the world. Members of this population breed primarily within the boundaries of Wood Buffalo National Park in Canada and migrate through the central United States in route to the wintering grounds at Aransas National Wildlife Refuge along the Gulf Coast of Texas. This flock is referred to as the Aransas-Wood Buffalo National Park Population. Due to intensive management, this population has increased from 15 birds in 1941 to 263 as of the start of spring migration in 2010 (WCCA 2010).

Whooping cranes undertake a 5,000-mile annual round-trip migration from the breeding area in Canada to the wintering area in Texas. Individuals depart the breeding ground in Canada and travel south through Alberta, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and reach the wintering ground on the Texas coast. The migration route is well defined and 94 percent of all observations occur within a 200-mile wide corridor during spring and fall migration (CWS and USFWS 2007). The Project Area is located outside and to the east of the migration corridor. In a desktop likelihood assessment conducted for the adjacent Ashtabula Wind Energy Center, Tetra Tech (2008b) concluded that although the Project Area is comprised mostly of wetland-agricultural matrix, the likelihood of use by whooping cranes during migration is low because of its location outside the migration corridor and because the Project Area contained a similar amount of wetlands compared to a 10-mile buffer area.

Gray Wolf

The gray wolf was listed as an endangered species in 1978 (USFWS 1978). In 2003, the USFWS downgraded the two northern subpopulations (western and eastern distinct population segments) to threatened (USFWS 2003). While additional decisions regarding the western populations of gray wolf have been made more recently, the eastern population remains listed as threatened. Once common in forested habitats throughout North Dakota, the last confirmed sighting in the state was 1991, although there have been more recent but unconfirmed reports of sightings in the Turtle Mountains in the north-central portion of the state.

Bald and Golden Eagles

Bald and golden eagles are federally protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). The bald eagle is listed by the state of North Dakota as a Level II priority, which indicates a moderate to high conservation priority. This species is a permanent resident in the Dakotas and typically resides near large bodies of open water such as lakes, marshes, and rivers with adequate prey and tall trees for nesting and roosting. Bald eagles breed and over-winter in the Dakotas primarily along the Missouri River and other large rivers. Bald eagles have been observed during avian surveys adjacent to the Project Area.

Migratory Birds

The federal MBTA of 1918 (16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755) establishes provisions for the protection of migratory birds. The MBTA forbids anyone "at any time, by any means, or in any manner, to pursue, hunt take, capture, kill [or] any part, nest, or eggs of any such bird…." (16 USC § 703(a)). The MBTA is distinct from the federal Endangered Species Act (ESA) because it protects migratory bird species that are not necessarily threatened or endangered. Over 800 species of migratory birds are protected by the MBTA (50 CFR 10.13). The United States Fish and Wildlife Service (FWS) implements and enforces the MBTA.

Many aspects of wind energy project development, including site clearing and wind turbine operation, are subject to the provisions of the MBTA. The MBTA is a strict liability statute and does not provide for permits to cover accidental impacts from a wind energy project. Knowledge or intent is not required to be liable under the MBTA. (16 USC § 707(a)).

North Dakota has 354 documented bird species (Faanes 1982) and is situated within the Central Flyway, one of the main bird migratory routes (USFWS 2008). The Central Flyway runs through the central portion of the United States and thus the Project Area. Most birds that move along the Central Flyway travel from Canada through the central states, eventually reaching the tropics of South America via the Gulf of Mexico (USFWS 2008). Lake Ashtabula is a potential breeding and staging area for waterfowl and other water birds, shorebirds, and wading birds. Avian surveys are currently underway in the Project Area, including spring point count surveys and surveys for raptor nests and prairie grouse leks. Fixed point count surveys (800-meter radius) are being conducted at eight points distributed throughout the Project Area for 13 weeks. A survey report will be made available once it is complete. See **Appendix E** for the survey protocol.

On-site Migratory Bird Surveys

Avian point count surveys were conducted in areas adjacent to the Project Area for the Ashtabula Wind Energy Center in fall 2007 (Tetra Tech 2007) and spring 2008 (Tetra Tech 2008a). Mean use is defined as the average number of birds observed per 20-minute survey point; the encounter rate is the rate at which a species flew at heights consistent with the anticipated rotor swept area (RSA).

Non-raptors - Overall use by non-raptors in the Ashtabula Project Area was very high in both fall and spring surveys. In the fall survey, the non-raptors with the highest mean use were the red-winged blackbird, Canada goose, mallard, and common grackle. In the spring survey, the non-raptors with the highest mean use were the snow goose, red-winged blackbird, Canada goose, and American coot; raptors were also among the most commonly observed species group during the spring surveys. Among species groups, mean use was highest for songbirds in the fall and waterfowl in the spring. These two groups were also the most commonly observed species. In the fall survey, the highest encounter rates for non-raptors were found for the ring-billed gull, unidentified passerine, Canada goose, and double-crested cormorant; in the spring surveys, snow geese had the highest encounter rate of all species observed, largely because of large flocks flying through the RSA during the surveys.

Raptors - High raptor use has been associated with high raptor mortality at wind farms (Erickson 2007). Raptors are a group of special interest because of their propensity to fly at heights similar to those encompassed by a turbine RSA. Overall raptor use in the Ashtabula Project Area was moderate in both fall and spring surveys, although the encounter rate was low. The raptors with the highest use in both the fall and spring were the red-tailed hawk, and the red-tailed hawk and northern harrier were detected most frequently. The spring 2007 surveys also included raptor nest surveys; 34 raptor nests were observed. Red-tailed hawks were the most common nesting species. Nests were most commonly located in cottonwood, followed by green ash and Chinese elm.

Listed and Sensitive Species - No federally listed species were observed during fall or spring surveys; however, the bald eagle, protected under the BGEPA, was detected during spring surveys. Although state-listed species in North Dakota receive no regulatory protection, the North Dakota Game and Fish Department (NDGFD) has identified 100 species of conservation priority, or those in greatest need of conservation in the state (NDGFD 2008). They are categorized into three levels based on such factors as known status, funding available, and presence of breeding habitat within North Dakota (Hagen et al. 2005).The NDGFD defines Species of Conservation Priority as either Level I, II, or III.

- Level I - Species in greatest need of conservation
- Level II - Species in need of conservation, but have had support from other wildlife programs
- Level III - Species in moderate need of conservation, but are believed to be on the edge of their range in North Dakota

Nine species seen during the avian surveys (see below) are Level I Species of Conservation Priority: the horned grebe, American white pelican, Swainson's hawk, upland sandpiper, marbled godwit, Wilson's phalarope, black tern, Franklin's gull, and grasshopper sparrow. Level II Species of Conservation Priority detected in the Ashtabula Project Area included northern pintail, canvasback, redhead, northern harrier, bald eagle, prairie falcon, sharp-tailed grouse, American avocet, red-headed woodpecker, and bobolink. The majority of these species had low mean use and encounter rates. The peregrine falcon is the only Level III Species of Conservation Priority that was documented in the Ashtabula Project Area.

During grouse lek surveys in spring 2008, biologists documented three sharp-tailed grouse leks. Populations of sharp-tailed grouse in the east-central portion of North Dakota, where the Project Area is located, appear to be more secure than other populations within its range. The geographic distribution of sharp-tailed grouse in North Dakota appear to be increasing to fairly stable; however, some populations are vulnerable or extinct in other portions of their range (Tetra Tech 2008a).

Bats

There are no federally listed bat species or State listed bat Species of Conservation Priority within Barnes County, North Dakota (NDGFD 2010). According to the USGS Northern Prairie Wildlife Research Center (2006), there are nine bat species that can be found in North Dakota, of which, three species, the western small-footed myotis, long-eared myotis, and long-legged myotis 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. 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 in the Project Area during the winter or summer seasons.

Of the remaining six species, five are restricted to the eastern half of North Dakota including areas along the Missouri River (USFWS 1995, USGS 2007). Nearly 75 percent of all bat fatalities have been associated with migratory tree bats including the hoary bat, eastern red bat and silver-haired bat, all three of which occur within the range of the Project Area. Migratory bats travel long distances at altitudes occupied by wind turbine blades, making them susceptible to collisions. Threats to these species also include impacts to woodland roosting habitat and wetlands used for foraging.

Because the avian point count surveys are conducted during daylight hours, no bats were observed. However, bats are likely present within the vicinity of 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.

Tetra Tech assessed the likelihood of occurrence for bats for the Ashtabula Wind Energy Center adjacent to the Project Area (2008d). The heavily forested Sheyenne River to the west of the Project Area may serve as an attractant to bats due to the greater amount of forested and open water habitat. Although the Ashtabula Project Area had a high amount of habitat for bats, the Project Area was found to be less attractive to bats than the surrounding 3-mile buffer area.

5.16.2 Impacts

Activities such as road construction can destroy or disrupt wildlife habitat and allow for the introduction of unwanted plant species. Displaced wildlife would likely relocate to nearby unaffected areas within the Project Area. In general, most wildlife species do not use disturbed agricultural land as their primary habitat. As a result, there will be minimal impact to most species. Cranes, geese, and blackbirds all utilize agricultural land, however, especially during migration and in the winter.

Impacts to protected and sensitive species are unlikely. The likelihood of whooping cranes to occur in the Project Area is low because the Project is outside of the migration corridor and the Project Area contains a similar amount of wetlands to the surrounding 10-mile buffer area. The primary threats to this species include loss of roosting and foraging habitat; indirect effects, such as avoidance, are undocumented. The bald eagle is present in the Project Area, but the encounter rate during avian surveys was low for this species. No bald eagle fatalities have been reported at existing wind farms. The Project is unlikely to directly affect the gray wolf; in the unlikely event that a transient individual moves through the Project area, low posted speed limits on Project roads will minimize the potential for collisions. Project construction and operations are not expected to have any direct impacts on wolves.

Due to the large numbers of some species observed during the fall and spring surveys, is it possible that avian fatalities will occur; in the event that fatalities do occur, however, they should not have

population-level impacts, either because commonly detected species are not known to be at high risk of collision (e.g., Canada goose, black tern, Wilson's phalarope) or because they have large and stable local population (e.g., snow goose, red-winged blackbird) .

In addition to mortality associated with wind farms, concerns have been raised that some 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 near Lake Benton in Minnesota, densities of male songbirds were significantly lower in 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 (Erickson et al. 2004). Recent research at two wind farms in North and South Dakota (Shaffer and Johnson 2008) suggests that certain grassland songbird species (2 of 4 species studied) may avoid turbines by as much as 200 meters but these results have not been finalized (i.e., more species are currently being analyzed) nor assessed at additional sites. No studies have addressed whether or not these avoidance effects are temporary (i.e., the birds may habituate to the presence of turbines over time) or permanent.

5.16.3 Mitigative Measures

Ashtabula III has conducted environmental studies of the Project Area to aid in the initial placement of turbines, roads, and associated facilities to avoid or minimize impacts to wildlife and habitat. Mitigative measures discussed in Sections 5.9.3, 5.11.3, 5.13.3, and 5.14.3 will also be beneficial for wildlife in the Project Area. In addition, Ashtabula III will implement the following measures to help avoid potential impacts to wildlife in the Project Area during selection of the turbine locations and subsequent development and operation:

- Bury all collection lines and minimize total Project footprint to the extent practicable;
- Minimize the use of lights on turbines when practicable in accordance with local, state, and federal requirements;
- Map and flag raptor nests found during construction, and restrict construction and/or operation activities due to active raptor nests; and
- 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 injuries and mortalities during routine maintenance operations.

5.17 Rare and Unique Natural Resources

5.17.1 Description of Resources

Native Prairie Habitats

As discussed in Section 5.15.1, native prairies serve as a vital ecological resource by improving water quality, providing erosion control, and supporting a diverse population of plants and animals. However, due to the native prairies' fertile soils and predominantly flat topography, large portions of

the native prairie have been converted to agricultural lands. This wide spread loss of native prairie makes this an ecosystem of conservation concern and one of the most endangered ecosystems in North America (Samson et al. 2004).

Native prairies are important habitat used by prairie grouse (e.g., sharp-tailed grouse, greater prairie-chicken) for lekking, nesting, brood rearing, and wintering. Grouse lek habitat is classified as open, short grass vegetation with minimal amounts of agriculture. Development in grouse lekking habitat could result in direct habitat loss, habitat loss through avoidance, predator facilitation, and construction-related disturbance. Most prairie grouse are considered gamebirds and are often managed locally by state fish and game agencies for hunting purposes.

As discussed in **Section 5.15.1**, a native prairie survey will be completed for the Project in June 2010.

5.17.2 Impacts

The proposed turbine layout dated May 3, 2010 includes 43 1.6-MW GE wind turbines. Based on this layout, approximately 15 acres of land classified as "prairie" according to 2005 GAP data would be permanently affected, including ten turbine pad locations.

5.17.3 Mitigative Measures

Ashtabula III will avoid the native prairie to the extent practicable. Avoidance and minimization practices are discussed in Section 5.15.3.

5.18 Summary of Impacts

Table 5-7 summarizes the resources that will be impacted as a result of the Project and the appropriate mitigation.

Table 5-7. Summary of Impacts and Mitigation

Resource	Impact	Mitigation
Socioeconomics	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.	N/A
Land Use	Approximately 206 acres of land will be affected by 43 turbines, associated access roads, and a substation. Temporary impacts within the construction easements include an additional 742 acres.	Ashtabula III will work with landowners to minimize impacts of the Project.
Public Services	No impacts are anticipated.	Ashtabula III will utilize station service from the local electrical utility and 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 III will follow "prudent avoidance" methods to minimize EMF exposure. A variety of security measures will be implemented to reduce the chance of physical

Resource	Impact	Mitigation
		and property damage.
Shadow Flicker	Based on distance from turbines to occupied residences and the blade pass frequency of the turbines under consideration, impacts are anticipated to be consistent with similar wind energy projects and no negative health effects are anticipated.	The 1,400-ft setback of turbines from all occupied residences minimizes potential adverse shadow flicker impacts.
Sound	Potential acoustic impacts associated with Project construction and operation are anticipated to be consistent with similar wind energy projects and no negative health effects are anticipated.	The setback of at least 1,400 ft from all occupied residences minimizes potential adverse sound impacts on noise sensitive areas.
Visual	Visual impacts will occur. The impacts are based on a subjective human response, and there is an existing wind energy facility adjacent to the proposed Project.	Ashtabula III will work with landowners 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 III will complete a Class III inventory in spring 2010. Turbines and other Project facilities were microsited to avoid impacts to archaeological sites.
Recreational Resources	Visual impacts will likely occur at the WMA and WPAs adjacent to the Project Area.	Since no significant recreational resources will be removed from service due to the Project, no mitigation measures are proposed.
Land Based Economies	Approximately 206 acres of land will be affected by 43 turbines, associated access roads, and a substation. Temporary impacts within the construction easements include an additional 742 acres.	Ashtabula III will work with landowners to minimize impact to their land.
Soils	Same as above.	BMPs for erosion and sediment control will be utilized to minimize wind and water erosion at the site. Only land needed for the facility will be permanently affected. Temporarily disturbed areas will be restored.
Geologic and Groundwater Resources	No impacts to groundwater resources are anticipated.	N/A
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 III will implement BMPs to minimize erosion and sedimentation at the site.
Wetlands	No impacts are anticipated.	All impacts to wetlands will be avoided during construction of the Project; horizontal directional drilling will be used where necessary to avoid impacts to wetlands from collection line trenching.
Vegetation	Approximately 206 acres of land will be affected by 43 turbines, associated access roads, and a substation. Temporary impacts within the construction easements include an additional 742 acres. Based on the layout dated May 3, 2010 and GAP data, 10 turbines will be located in native prairie.	Ashtabula III will avoid existing trees and shrubs as practicable and will use BMPs during construction and operation to minimize impacts. 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. Native prairie will be avoided to the extent practicable and disturbed areas will be reseeded

Resource	Impact	Mitigation
		using native prairie mix.
Wildlife	Potential avian and bat collisions may occur, but are anticipated to be relatively few.	A variety of mitigative measures will be implemented, as discussed in Section 5.16. Ashtabula III's WRRS will be implemented after construction of the Project.
Rare and Unique Natural Resources	Based on the layout dated May 3, 2010, 10 turbines will be located in native prairie.	Native prairie will be avoided to the extent practicable and disturbed areas will be reseeded using native prairie mix.

6. PUBLIC COORDINATION

Public coordination and interaction is a key component to Project success. Principal stakeholders in the Project are landowners that have entered or will be entering into agreements with Ashtabula III to provide wind rights for the Project. Ashtabula III will continue to meet with landowners and County officials as the Project moves forward and Ashtabula III seeks any necessary permits (e.g. access permit, sanitary permit) from the County.

Ashtabula III and its representatives have also engaged state and federal agencies to inform them of the Project and identify and address potentially sensitive issues. In addition to key federal stakeholders (e.g., USFWS, USACE, etc.), Ashtabula III has notified and requested input from the 21 designated state agencies and officers identified by NDAC 69-06-01-05. Refer to Section 8.1 for comments received from these agencies and officers.

7. 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 7-1**. Permits dependent on the final site layout will be applied for after receiving PSC approval, but prior to construction.

Table 7-1. Potential Permits and Approvals Required for Construction and Operation of the Proposed Facility

Agency	Type of Approval	Status	Need
Federal Approvals			
USACE	CWA, Section 404 Permit (NWP)	3	Permit required for fill in jurisdictional waters of the U.S. Further investigation is required to determine USACE jurisdiction of wetlands within the Project Area.
USEPA	Oil Pollution Prevention Regulations (40 CFR 112.5), Spill Prevention, Control, and Countermeasure Plan (SPCC)	3	Plan is required if aggregate storage capacity of 1,320 gallons of oil on site with the potential to discharge to Waters of the U.S. Assessment of on site oil storage during both construction and operations of the facility. Qualified Tier I facilities can now self-certify their SPCC Plan if less than 10,000 gallons are stored onsite in above ground storage.
FAA	Form 7460-1, Notice of Proposed Construction or Alteration	2	Notice and approval are required for structures over 200 ft in height. FAA approval of lighting and marking of turbines is required.
FERC	Federal Power Act, Section 205 rate approval	3	Prior to commissioning of the facility, rates and charges for selling electric energy must be reviewed and authorized by FERC.
State of North Dakota			
PSC	Certificate of Site Compatibility	1	LOI and CSC Application required for construction of generation facility over 60 MW in size.
NDDOH, Division of Water Quality	NPDES Permit: General Construction Storm Water	3	NOI required for disturbance of greater than 5 acres for major projects. Must prepare a SWPPP.
	Section 401 Water Quality Certification	3	Applicants receiving a Section 404 permit from USACE are required to obtain a Section 401 Water Quality Certification from the state.
NDDOT, North Dakota Highway Patrol	Overheight/Overweight Permit	2	Permit required for hauling construction equipment and materials on State Highways.
	Trip Permit/Fuel Permit	3	A trip permit and fuel permit will be required if the trucking company is not currently registered in the state.
NDDOT	Driveway Application and Permit Form SFN 5918 (Rev. 10-2008)	3	Permit required for construction of access roads from State Highways.
	Utility Occupancy Application and Permit Form SFN 7995 (Rev. 11-2008)	3	Permit required for utilities placed within or crossing State Highway ROW.

Agency	Type of Approval	Status	Need
Local Permits			
Barnes County	Height Variance for turbines	1	Because the turbines will be taller than 40 feet, Ashtabula III applied for a variance.
	Building Permit	2	Ashtabula III will apply for building permit in June/July 2010.
	Road Agreement	3	Final layout will determine if needed.
Barnes County/Townships	Road Haul Permit	3	Final layout will determine if needed.

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

8. FACTORS CONSIDERED

The Act lists 11 factors to guide the PSC in the evaluation and designation of the site of the facility.

8.1 Public Health and Welfare, Natural Resources, and the Environment

The preceding sections discuss the research and investigations relating to 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 **Table 5-7**.

8.2 Technologies to Minimize Adverse Environmental Effects

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

8.3 Potential for Beneficial Uses of Waste Energy

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

8.4 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 of Project facilities and the use of the land within the Project Area. The visual character of the site will be changed due to the construction of the Project, although there are existing wind turbines adjacent to 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, access road, and substation layout is expected to impact approximately 206 acres of land. An additional 742 acres of land may be temporarily affected during construction.

8.5 Alternatives to the Proposed Site

No alternatives were considered for the development of the Project. Ashtabula III believes that the proposed Project Area is the most viable alternative. Ashtabula III is committed to being flexible on the preliminary Project layout and will work closely with landowners and to examine all reasonable alternatives to the preliminary layout.

8.6 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, and 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 of the Project will necessitate a one-time expenditure of funds, which is not retrievable.

Labor and natural resources will be used in the fabrication and preparation of construction materials. These materials are usually not retrievable. 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. These resources are not in short supply, and their use will not have an adverse effect on the availability of these resources. In addition, the anticipated economic benefits of the Project will balance the irretrievable commitment of resources resulting from the construction of the Project (see Section 8.7).

8.7 Direct and Indirect Economic Impacts

Economic impacts include impacts associated with the temporary use of up to 742 acres of land within construction easements; permanent impacts due to the construction of turbine sites, associated access roads, and associated facilities will be lower, at approximately 206 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. Wind energy development removes less total land from agricultural use than other forms of development. The rural economy and energy production in the county and state is diversified. 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 Ashtabula III 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 eastern 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.

8.8 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.

8.9 Effect of Site on Cultural Resources

A Class I file search was conducted in March 2010 to identify documented cultural resources in the Project Area (Section 5.8.1). A Class III pedestrian survey will be conducted in spring 2010. Ashtabula III is committed to minimize impacts to cultural resources and will avoid these resources and any additional resources as necessary that are identified during the Class III pedestrian survey, during construction of the Project, and throughout the life of the Project. If avoidance is not possible, Ashtabula III will work with the North Dakota SHPO to mitigate potential impacts.

8.10 Effect of Site on Biological Resources

Ashtabula III will implement measures to avoid and minimize effects to biological resources in the proposed Project Area. 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 (Section 5.8.16).

8.11 Cumulative Effects

Wind energy development is anticipated to have a positive cumulative impact on air quality, and minimal impacts to geology, soils, water, noise, safety and health issues, and cultural resources. Socioeconomic impacts are anticipated to be positive, as the rural economy and energy production is diversified. The principal resources of concern for cumulative impacts are anticipated to be land use and vegetation, wildlife, and visual resources. With the increase in land being used for wind energy generation activities, farming may decrease slightly. The cumulative impacts will be a concern for the rural communities that have historically made their living from agricultural activities. The additional income from wind development on their land, however, may make it more feasible for farmers to keep most of their land in agricultural uses rather than being developed for suburban development. Wind energy development removes less total land from agricultural use than other forms of development.

With regard to the cumulative impacts to wildlife, there is a concern that even if no wetlands and other sensitive habitat are directly affected by wind energy facilities, the wetlands surrounding the facilities will no longer be used by wildlife, and particularly to whooping cranes. Ashtabula III has committed to zero impacts to wetlands, and no new transmission line construction.

8.12 Agency Comments

Agencies were contacted in April 2010 to comment on the Project. **Table 8-1** summarizes the agency responses received as of May 14, 2010. Agency query letters and responses are included in **Appendix D**.

Table 8-1. Agency Responses

Agency	Response
North Dakota Aeronautics Commission	No response received as of May 14, 2010.
State of North Dakota, Office of Attorney General	No response received as of May 14, 2010.
North Dakota Department of Agriculture	No response received as of May 14, 2010.
North Dakota Department of Health	In a response dated April 28, 2010, NDDOH stated that the environmental impacts of the proposed Project would be minor and can be controlled by proper construction methods, including dust control, prevention of siltation or spills in waterways, minimizing noise, and stormwater management. See Appendix
North Dakota Department of Human Services	No response received as of May 14, 2010.
North Dakota Department of Labor	In a letter dated April 28, 2010, the Department of Labor took no position on the Project.
North Dakota Department of Career and Technical Education	No response received as of May 14, 2010.
North Dakota Department of Commerce, Economic Development & Finance Division	No response received as of May 14, 2010.
North Dakota Department of Commerce, Division of Community Services	No response received as of May 14, 2010.
North Dakota Game and Fish Department	No response received as of May 14, 2010.
North Dakota Geological Survey	No response received as of May 14, 2010.
North Dakota Department of Transportation	In a response dated April 27, 2010, NDDOT stated that the Project would not have an adverse effect on the state transportation system. If any work is done on highway right-of-way, appropriate permits will need to be obtained.
State Historical Society of North Dakota	In a letter dated April 19, 2010, the State Historical Society of North Dakota stated there is potential for unrecorded and recorded cultural resource properties in the Project Area, and recommends a Class I file search.
North Dakota Indian Affairs Commission	No response received as of May 14, 2010.
North Dakota State Land Department	In email responses dated April 30, 2010, the State Land Department stated the agency has surface ownership and sub-surface mineral interests near the Project Area.
North Dakota Parks and Recreation Department	No response received as of May 14, 2010.
North Dakota State Water Commission	No response received as of May 14, 2010.
U.S. Fish and Wildlife Service, North Dakota Field Office	No response received as of May 14, 2010.
U.S. Army Corps of Engineers Omaha District, North Dakota Regulatory Office	In a response dated May 3, 2010, USACE stated that if the Project avoids discharging fill into waters of the U.S. and does not affect a navigable waterway, a permit from USACE would not be required.
Barnes County Soil Conservation District	No response received as of May 14, 2010.
U.S. Department of Agriculture, Natural Resources Conservation Service	No response received as of May 14, 2010.
Federal Aviation Administration	No response received as of May 14, 2010.

9. QUALIFICATIONS OF CONTRIBUTORS

NAME PROJECT ROLE	EDUCATION AND PROFESSIONAL EXPERIENCE
JOHN DIDONATO Executive Director, Project Development NextEra Energy Resources	John will lead negotiation of all key commercial agreements associated with the project including the PPA. John directs all wind energy development efforts in the Mid-Continent region (excluding Texas). Since 2000, John has developed over 2,000 MW of generation projects for NextEra Energy Resources (NextEra). He has directed development efforts and negotiated the PPAs for all of the wind projects that NextEra has developed and constructed in the Dakotas, which will total over 410 MW by the end of 2007. Additionally, he also directed development efforts and negotiated nearly all of the critical agreements for the 680 MW Calhoun Energy Center, a gas fired simple cycle facility located in Oxford, Alabama. Over the past nine years with NextEra, John has led or played a major role in the development or acquisition of over $3 billion in electric generation assets utilizing wind and clean natural gas technologies. John holds a BBA in Accounting from Kent State University and a Masters Degree in Taxation from Florida Atlantic University.
SCOTT SCOVILL Project Manager, Project Development NextEra Energy Resources	Project developer representing Ashtabula III in all commercial and regulatory aspects of the project.
ALLEN WYNN Environmental Specialist NextEra Energy Resources	Mr. Wynn has over 15 years of experience preparing NEPA documents and permitting for large linear projects and energy facilities. B.S., Southwest Texas State University, Natural Resource and Environmental Studies
DICK RAUSCH Construction Project Manager NextEra Energy Resources	Provided input on route from a "constructability" perspective.
TOM FACTOR Land Easement Specialist/ Route Mapping NextEra Energy Resources	Representing NextEra Energy Resources on wind resource, landowner discussions and selection of corridor.
BRIAN BJELLA Attorney for Applicants Crowley Fleck PLLP	Applicant's counsel. J.D. and Bachelor's degree, both from University of North Dakota.
TRACEY MARTORANO, P.E. Project Manager Tetra Tech EC, Inc.	Ms. Martorano has twelve years of experience 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. Bachelor's degree in Civil Engineering, Merrimack College.
ANNE-MARIE GRIGER, AICP Environmental Planner Tetra Tech EC, Inc.	Ms. Griger has five years experience preparing and securing environmental permits for large infrastructure and energy-related facilities, conducting socioeconomic and environmental justice analyses, and contributing to National Environmental Policy Act (NEPA) documents. She also has public involvement experience. Bachelor's Degree: Environmental Policy & Planning, Master's Degree: Urban & Regional Planning, both from Virginia Polytechnic Institute and State University.

NAME PROJECT ROLE	EDUCATION AND PROFESSIONAL EXPERIENCE
JASON JONES, PH.D. Senior Ecologist Tetra Tech EC, Inc.	Dr. Jones has provided senior oversight for the avian surveys and provided input for the wildlife sections of this application. Dr. Jones has over 17 years experience as a wildlife ecologist, with a focus on avian and bat ecology and natural resource management. He has published more than 25 peer-reviewed scientific publications and has given dozens of invited seminars and scientific conference presentations on avian and bat ecology.
MICHAEL GLEASON GIS Analyst/Resource Specialist Tetra Tech	Mr. Gleason supported preparation of the application by creating the application figures and performing impact calculations, as well as other GIS tasks, and by authoring the soils, geology, and groundwater sections. Mr. Gleason has over two years of professional experience as a GIS Specialist and has supported the development of various constraint/impact analyses and planning/siting applications for commercial energy projects, primarily including wind, electricity transmission, and liquid natural gas. He has evaluated the impacts of various commercial energy developments on soils, geology, and groundwater in at least seven states, and has contributed to three previous North Dakota PSC applications as either a GIS Specialist or resource specialist (geology and soils).
TED GUERTIN Senior Consultant Tetra Tech	Mr. Guertin has over 20 years experience as an air quality and environmental consultant. His experience includes wind power related environmental assessments and wind resource assessments. He has conducted wind power related assessments using the WindPro software including shadow flicker, zone of visual impact (ZVI), wind farm photo simulations, and initial wind resource evaluation. Master's degree in Atmospheric Science, State University on New York at Albany
ERIK KALAPINSKI Senior Sound and Vibration Engineer Tetra TEch	Mr. Kalapinski is an acoustical engineer with over 14 years of professional consulting experience in transportation and stationary source noise impact assessments. With over 10 years of experience in the study and evaluation of wind turbine acoustics with projects ranging from the siting of a single demonstration wind turbine unit to full scale utility wind energy conversion projects, Mr. Kalapinski has served as an expert witness on numerous noise issues before state and local planning, environmental, and health boards and in courts of law. Bachelor’s degree in Civil Engineering, University of Massachusetts at Amherst
JOHN SCHULZ Wildlife Biologist Western Plains Consulting, Inc.	Mr. Schulz has 35 years of experience in the wildlife/natural resources field. He has vast experience conducting avian, prairie grouse lek and threatened and endangered species surveys for the wind energy industry, oil companies and state and federal agencies. Bachelor’s degree in Biology and Earth Science, Dickinson State University Master’s degree in Zoology/Wildlife Management, North Dakota State University
CHRISTINA BURNS Archaeologist Beaver Creek Archaeology	Ms. Burns led the Class I and Class III Cultural Resources Inventory for the Project.
GREGORY C. DAWDY Senior Environmental Scientist/Project Manager	Mr. Dawdy led the wetland delineation effort for the Ashtabula III Wind Energy Center. 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. Society of Wetland Scientists American Fisheries Society BS, Biological Studies, Southern Illinois University, 1985

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Figures

Appendices

Appendix A
FPL Group 2006 Sustainability Report and FPL Group 2007 Profile

Appendix B
Design Data Report

Appendix C
Comsearch Study

Appendix D
Agency Correspondence

Appendix E
Pre-Construction Investigation Protocols