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

Foxtail Wind Energy Center
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Dickey County, North Dakota

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1.0 INTRODUCTION

Foxtail Wind, a wholly owned, indirect subsidiary of NextEra Energy Resources, LLC (NEER), is submitting this Application for a Certificate of Site Compatibility (Certificate) to construct the Foxtail Wind Energy Center (Project) in Dickey County, in southeastern North Dakota. Following receipt of the Certificate, Foxtail and Northern States Power Company (NSP), doing business as Xcel Energy (Xcel), will seek North Dakota Public Service Commission (Commission) approval to transfer the Certificate to NSP/Xcel. Subject to that approval, the Project will be constructed and operated by NSP/Xcel. NEER and NSP/Xcel are collaborating on development of the Project to reflect the engineering and design inputs necessary to transfer ownership of the Project to NSP/Xcel at the end of 2017 according to the executed Purchase & Sale Agreement (PSA). NSP/Xcel currently proposes to construct the Project in two phases between 2018 and 2019. Both the NEER and NSP/Xcel teams will be involved in the engineering design of the Project to be constructed, although NSP/Xcel will ultimately construct the Project. **Figure 1-1** displays the proposed Project area. The Project area encompasses approximately 20,029 acres and is the area within which Foxtail Wind negotiated easements with landowners.

The Project will have a nameplate capacity of approximately 150 megawatts (MW), consisting of up to 75 wind turbines using both Hybrid Vestas V-116 and Vestas V-110 turbine generators. Additional facilities include access roads, underground electrical collection systems and cabling, a collection substation, an operations and maintenance (O&M) building, a meteorological evaluation (Met) tower, a construction laydown area, a batch plant, and a switchyard (**Figure 1-2**). Interconnection would occur with the Montana-Dakota Utilities (MDU) transmission system, connecting to the MDU 230 kV Ellendale-Tatanka transmission line at the new substation and will benefit from the Big Stone – Brookings 345 kV Multi-Value Project line when it goes into service in 2017. The Project was studied under Midcontinent Independent System Operator, Inc.'s (MISO) August 2014 Definitive Planning Phase (DPP) Study Cycle. All MISO System Impact Studies and Facility Studies have been completed and are identified in an executed Generator Interconnection Agreement dated August 30, 2016.

NEER develops renewable projects throughout the United States and Canada. NEER is the largest generator of wind-powered electricity in North America, with over 12,400 MW of capacity in 19 states and Canada as of year-end 2015. In North Dakota specifically, NEER, through its affiliates, owns and/or operates approximately 1,250 MW of wind generation. NEER designs, constructs, and operates its facilities in an environmentally sound and responsible manner. Attached as **Appendix A**, please find the sections from NEER's 2016 Corporate Responsibility Report that describe NEER's environmental accountability, management, and stewardship policies that are intended to:

- Design, construct, operate, and maintain our facilities in an environmentally sound and responsible manner;
- Prevent pollution, minimize waste, and conserve natural resources;
- Avoid, minimize, and/or mitigate impacts to habitat and wildlife; and
- Engage stakeholders to build trust and partner toward common goals for environmental stewardship and protection.

1.1 Compliance with the Energy Conversion and Transmission Facility Siting Act

The North Dakota Energy Conversion and Transmission Facility Siting Act requires an application for a Certificate to meet the criteria set forth in North Dakota Century Code (NDCC) Chapter 49-22 and North Dakota Administrative Code (NDAC) Article 69-06. 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).

Foxtail Wind will comply with the exclusion and avoidance areas and selection and policy criteria set forth in NDAC Section 69-06-08-01 in the design of the Project and has provided information on such areas in this application. In addition, sufficient Project design, wind resource, and technical information have been provided for a thorough evaluation of the proposed Project. **Table 1-1** outlines the information required to fulfill the requirements for a Certificate with the Commission and where these requirements are addressed in this document.

Table 1-1 Certificate Completion Checklist

State Authority	Description	Section
NDAC 69-06-04-01	**Certificate of Site Compatibility Application**	
Section 2	**Contents**	
a.	A description of:	
	(1) The type of energy conversion facility proposed	1.0, 4.0
	(2) The gross design capacity	1.0
	(3) The net design capacity	1.3.2
	(4) The estimated thermal efficiency of the energy conversion process and the assumptions upon which the estimate is based	Not applicable
	(5) The number of acres that the proposed facility will occupy	1.3.1, Table 1-4
	(6) The anticipated time schedule for: (a) Obtaining the certificate of site compatibility (b) Completing land acquisition (c) Starting construction (d) Completing construction (e) Testing operations (f) Commencing commercial production (g) Beginning any expansions or additions	1.4
b.	Copies of any evaluative studies or assessments of the environmental impact of the proposed facility submitted to any federal, regional, state, or local agency.	Appendix B
c.	An analysis of the need for the proposed facility based on present and projected demand for the product or products to be produced by the proposed facility, including the most recent system studies supporting the analysis of the need.	2.1
d.	A description of any feasible alternative methods of serving the need.	2.2
e.	A study area that includes the proposed facility site, of sufficient size to enable the commission to evaluate the factors addressed in NDCC Section 49-22-09.	1.3.1, 3.0, 10.0 - 10.12, Figures 1-1, 1-2, and 1-3
f.	A discussion of the utility's policies and commitments to limit the environmental impact of its facilities, including copies of board resolutions and management directives.	Appendix A
g.	A map identifying the criteria that provides the basis for the specific location of the proposed facility within the study area.	Figures 1-4 and 3-1
h.	A discussion of the criteria evaluated within the study area, including exclusion areas, avoidance areas, selection criteria, policy criteria, design and construction limitations, and economic considerations.	3.1, 3.2, 3.3, 3.4, 3.5, 3.6, Tables 3-1 through 3-4, Figure 3-1
i.	A discussion of the mitigative measures that the applicant will take to minimize adverse impacts which result from the location, construction, and operation of the proposed facility.	7.2.3, 7.3.3, 7.4.3, 7.5.3, 7.6.3, 7.7.3, 7.8.3, 7.9.3, 7.10.3, 7.11.3, 7.12.3, 7.13.3, 7.14.3, 7.15.3, 7.16.3, 7.17

j.	The qualifications of each person involved in the facility site location study.	11.0
k.	A map of the study area showing the location of the proposed facility and the criteria evaluated.	1.2, 3.0, Figures 1-4 and 3-1
l.	An eight and one-half-inch by eleven-inch black and white map suitable for newspaper publication depicting the site area.	Provided on CD
m.	A discussion of present and future natural resource development in the area.	7.3.1
n.	Map and GIS requirements. The applicant shall provide information that is complete, current, presented clearly and concisely, and supported by appropriate references to technical and other written material available to the commission.	Figures 1-1 through 7-7
NDCC 49-22-08	**Application for a certificate - Notice of filing - Amendment - Designation of a site or corridor.**	
Section 1	**An application for a certificate shall be in such form as the commission may prescribe, containing the following information:**	
a.	A description of the size and type of facility.	1.3.1, 4.0, Table 1-4
b.	A summary of any studies which have been made of the environmental impact of the facility.	7.0
c.	A statement explaining the need for the facility.	2.1
d.	An identification of the location of the preferred site for any energy conversion facility.	1.3.1, Figures 1-2 and 1-3
e.	An identification of the location of the preferred corridor for any transmission facility.	Not applicable
f.	A description of the merits and detriments of any location identified and a comprehensive analysis with supporting data showing the reasons why the preferred location is best suited for the facility.	7.0
g.	A description of mitigative measures that will be taken to minimize all foreseen adverse impacts resulting from the location, construction, and operation of the proposed facility.	7.2.3, 7.3.3, 7.4.3, 7.5.3, 7.6.3, 7.7.3, 7.8.3, 7.9.3, 7.10.3, 7.11.3, 7.12.3, 7.13.3, 7.14.3, 7.15.3, 7.16.3, 7.17
h.	An evaluation of the proposed site or corridor with regard to the applicable considerations set out in section 49-22-09 and the criteria established pursuant to section 49-22-05.1.	10.0
i.	Such other information as the applicant may consider relevant or the commission may require.	Appendix C
NDCC 49-22-09	**Factors to be considered in evaluating applications and designation of sites, corridors, and routes.**	**10.0**
1.	Available research and investigations relating to the effects of the location, construction, and operation of the proposed facility on public health and welfare, natural resources, and the environment.	10.1
2.	The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects.	10.2
3.	The potential for beneficial uses of waste energy from a proposed energy conversion facility.	10.3
4.	Adverse direct and indirect environmental effects which cannot be avoided should the proposed site or route be designated.	10.4
5.	Alternatives to the proposed site, corridor, or route which are developed during the hearing process and which minimize adverse effects.	10.5
6.	Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designated.	10.6
7.	The direct and indirect economic impacts of the proposed facility.	10.7
8.	Existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site, corridor, or route.	10.8

9.	The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.	10.9
10.	The effect of the proposed site or route on areas which are unique because of biological wealth or because they are habitats for rare and endangered species.	10.10
11.	Problems raised by federal agencies, other state agencies, and local entities.	10.12

1.2 Flexibility in Siting

Wind facility siting is a process that considers input from several different entities. When considering where to locate this wind farm in North Dakota, Foxtail Wind identified the Project area (see **Figures 1-1** through **1-3**) for further investigation based on the modeled wind resource and potential offtaker, as outlined in Section 1.3 below. The identified Project area is considered optimal from a wind resource perspective. Foxtail Wind then analyzed the available land and initiated discussions with landowners and applied setbacks required by Dickey County, the Commission, and Foxtail Wind's internal setbacks. Foxtail Wind then conducted environmental desktop and field studies in the Project area, the results of which are incorporated in the appropriate sections of this application.

Foxtail Wind has entered into agreements with landowners that have agreed to have wind turbines and associated facilities placed on their property. Simultaneously, Foxtail Wind has identified preliminary turbine locations based on initial site inspection, topographic maps, known environmentally sensitive areas, review of North Dakota's power plant siting exclusion and avoidance areas, and communications with local, state, and federal agencies. Foxtail Wind is not seeking a permit for each wind turbine indicated on **Figures 1-1** through **1-3**; rather, the preliminary layout indicates areas of the site with good wind resources and where known environmental or regulatory siting issues have been avoided, minimized, or mitigated. Foxtail Wind seeks a Certificate for the Project area, as opposed to specific turbine locations. Within the permitted Project area, Foxtail Wind proposes that conditions be included specifying that final turbine placement be subject to required setbacks from environmentally sensitive areas, and be sufficient to meet required noise levels.

Foxtail Wind has completed additional required studies, including final cultural resource surveys and wetland delineations, and has evaluated the Project area based on efficient construction of the Project. In addition, Foxtail Wind has sought input from landowners regarding the location of wind turbines and associated facilities. At this time, only minor turbine and/or access road and collection line shifts are anticipated. If any changes to the current site plan are made after submission of this application, a final site plan for the Project will be submitted to the Commission prior to construction and a pre-construction conference call will be held with Commission staff to ensure that the site plan conforms to the Certificate requirements.

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

1.3 Project Summary

Foxtail Wind evaluated wind resources in North Dakota for siting a 150 MW wind generation facility.[1] An explicit part of this review was consultation and coordination with a variety of community leaders and government officials to avoid or minimize any known concerns during siting. Based on this review, Foxtail Wind selected a Project area approximately 96 miles southeast of the city of Bismarck and 50 miles south of the city Jamestown for additional study and preparation of an application for a Certificate to the Commission. The proposed Project area was identified as optimal from wind resource, transmission interconnection, environmental, and economic perspectives. The proposed Project area was selected considering the exclusion and avoidance criteria outlined in NDAC 69-06-08-01.

1.3.1 Proposed Project Area

The proposed Project area is the location within which Foxtail Wind has negotiated easements with landowners, many of which also participated in the Rough Rider project.[1] The Project area was selected to include all areas necessary for Foxtail Wind to optimize the wind resource while avoiding and minimizing impacts to environmental resources. Foxtail Wind currently has leases in Dickey County (**Table 1-2**).

Table 1-2 Project Area Location

Township	Range	Sections
131 North	65 West	19, 20, 21, 28, 29, 30, 31, 32, 33
131 North	66 West	24, 25, 26, 27, 34, 35, 36
130 North	65 West	4, 5, 6, 7, 8, 9, 16, 17, 18, 19, 20, 29, 30, 31, 32
130 North	66 West	1, 3, 11, 12, 13, 14, 23, 24

The Project area encompasses approximately 20,029 acres (31 square miles) in western Dickey County. The amount of land within the Project area participating in the Project is 17,983 acres. Although the turbines will be placed throughout the participating land within Project area, the permanent Project structures will occupy up to 97.74 acres during operation (see **Tables 1-3** and **1-4** below), or less than one percent of the total Project area or approximately 0.06 acres of permanent impacts per turbine. **Table 1-3** summarizes the assumptions used to calculate impacts by Project facility. Permanent impacts are considered to be the Project footprint during operation. Temporary impacts are those impacts that result during construction to accommodate equipment and temporary activities outside of the areas that will remain as the permanent Project footprint during operation. **Table 1-4** summarizes the estimated impact for each Project component during construction, reclamation (or the Project temporary impacts), and operation (or the permanent Project impacts). The Project area and Project layout are shown on **Figures 1-1** through **1-3**. The impact assumptions are shown on **Figure 1-4**.

[1] NEER has been working on the development of a wind farm in Dickey County for several years and previously permitted a 175 MW wind farm through Rough Rider Wind I, LLC (Rough Rider). The Commission issued a Certificate of Site Compatibility for an Energy Conversion Facility (Certificate Number 12) to Rough Rider on August 12, 2009 in Case No. PU-09-84. The Rough Rider project never went forward for commercial reasons. NEER is seeking a new Certificate for the Foxtail Wind Project, rather than seeking an amendment to the previously issued Certificate, due to the passage of time and changes made to the Project.

Table 1-3 Project Impact Assumptions

Project Component	Temporary Construction Disturbance	Construction Disturbance to be Reclaimed	Permanent Disturbance during Operations
Wind Turbines [a]	4.5 acres per turbine	4.44 acres per turbine	0.06 acres per turbine
Access Roads [b]	50 feet wide per linear foot of road	34 feet wide per linear foot of road	16 feet wide per linear foot of road
Collection Lines [c]	50 feet wide per linear foot	50 feet wider per linear foot minus 12 feet by 8 feet per junction box	12 feet by 8 feet for each junction box
Met Tower [d]	1.25 acres per tower	1.25 acres per tower minus 5 square feet per tower	5 square feet per tower
O&M Building	5 acres	0 acres	5 acres
Collection Substation and Switchyard	30 acres	0 acres	30 acres
Batch Plant	5 acres	5 acres	0 acres
Construction Laydown Area [e]	20 acres	20 acres	0 acres

[a] Construction impacts assumed a 250-foot construction radius around the turbine, which equates to approximately 4.5 acres per turbine. Impacts during operation account for an 18-foot diameter turbine base with a 20-foot buffer for the gravel pad, or 0.06 acres per turbine.

[b] Easement width necessary for construction based on turbine types. Temporary and permanent impacts represent a conservative estimate of disturbance. Roads required to support crane access to turbines during operation would remain up to 38 feet wide; other access roads may be built at 16 feet or reduced later to 16 feet. Access road impacts also assume all proposed roads are new access roads and do not consider improvements to existing roads separately.

[c] Where collection lines run parallel to access roads, the respective impact buffers generally do not overlap.

[d] Area of impact is 1.25 acres for one guyed tower during installation. Once installed, the tower has a 1 square-foot base plate and four 1 square-foot anchor points, or 5 square feet.

[e] Assumes 20-acre laydown area.

Table 1-4 Total Project Impacts

Project Component	Temporary Construction Disturbance	Construction Disturbance to be Reclaimed	Permanent Disturbance during Operations
Wind Turbines [a] (75 turbines, excluding 6 alternates)	337.5 acres	333 acres	4.5 acres
Access Roads [b]	145.4 acres	87.2 acres	58.2 acres
Collection Lines [c]	184.02 acres	183.98 acres	0.04 acres
Met Tower [d]	1.25 acres	Approximately 1.25 acres	5 square feet
O&M Building	5 acres	0 acres	5 acres
Collection Substation and Switchyard	30 acres	0 acres	30 acres
Batch Plant	5 acres	5 acres	0 acres
Construction Laydown Area	20 acres	20 acres	0 acres
Total	728.17 acres	630.43 acres [e]	97.74 acres [f]

[a] Assumes 75 turbines times 4.5 acres of ground disturbance during construction; 0.06 acre/turbine of that remaining as permanent. Six alternate turbine locations have been identified to allow siting flexibility, but were not included in the calculation; calculations for associated roads and collection lines included all roads and collection lines shown in the layout because these facilities may be needed to access the proposed turbine locations.

[b] Assumes a 50-foot wide easement for roads during construction; 16 feet of that remaining during operation. Assumes a total of approximately 30 linear miles of service roads. The overlapping areas for turbines were excluded from the road impact calculations to avoid double counting the same footprint.

[c] The overlapping areas between the collection line corridor buffer and the access road corridor buffer were removed from impact calculation. The impacts also include approximately 29 miles of collection lines. Junction boxes will be located on the ground throughout the Project area and will each require approximately 12 feet by 8 feet. Currently 17 junction boxes are anticipated to be required.

[d] One permanent Met tower x 1.25 acres = 1.25 acres disturbance during construction; assuming guyed, 5 square feet.

[e] Assumed temporary impacts for the proposed Project.

[f] Assumed permanent impacts for the proposed Project.

1.3.2 Projected Output

The proposed Project will have a nameplate (gross) capacity of approximately 150 MW with a net capacity factor of 53 percent. As with all wind projects, output is dependent upon wind resource, final design, site-specific features, and equipment.

1.4 Proposed Project Schedule

The commercial operation date is dependent upon permitting, equipment deliveries, and other development activities. Foxtail Wind is targeting site construction to begin in 2018 provided all pre-construction permits and approvals have been obtained. Key schedule milestones include the items described below.

1. **Certificate of Site Compatibility**: Foxtail Wind anticipates and has requested with this filing that the Certificate be issued by year-end 2017.

2. **Land Acquisition**: All land easement agreements for the wind generation facility will be completed prior to construction.

3. **Permits**: Foxtail Wind is responsible for undertaking all required environmental studies required for the issuance of the Certificate from the Commission. Following the transfer of the Certificate to NSP/Xcel, NSP/Xcel will obtain all permits and licenses that are required to initiate construction following issuance of the Certificate. Completing permits is on the “critical path” for the Project and will allow NSP/Xcel to move forward with other commitments on the Project.

4. **Equipment Procurement, Manufacture, and Delivery**: NSP/Xcel is in the process of ordering all long-lead equipment for the proposed Project, including transformers, and has a purchase order in place with Vestas for the wind turbines.

5. **Construction**: Construction is scheduled to begin as early as May 2018, subject to road restrictions, weather, and permitting. The engineering, procurement, and construction (EPC) contractor will be responsible for completing all proposed Project construction, including roads, wind turbine assembly, electrical, and communications work. Construction will be completed in two phases approximately 15 months after construction activity is initiated with only 10 months of actual construction activity.

6. **Testing Operations**: NSP/Xcel anticipates testing to begin in July 2019 after all construction is complete.

7. **Commercial Operation**: NSP/Xcel anticipates commercial operation of the Project to begin by September 2019.

8. **Expansions or Additions**: Foxtail Wind and NSP/Xcel have no specific plans for expansions of the proposed Project at this time.

1.5 Project Ownership

Following transfer of the Certificate and NSP/Xcel obtaining a Certificate of Public Convenience and Necessity from the Commission, NSP/Xcel will own the entire proposed Project and, as a result, will manage the construction of all equipment and associated facilities related to the proposed Project. NSP/Xcel will select a third-party EPC contractor to perform the majority of the engineering and construction of the wind farm. NSP/Xcel will procure the turbine/tower equipment directly from a manufacturer.

2.0 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 (U.S. Energy Information Administration 2016). Nearly 40 percent of North Dakota households use electricity as their primary energy source for home heating. Many public utilities have publicly announced a future demand for wind energy, either via press releases or through formal resources planning processes. NSP/Xcel proposes to continue transitioning from coal to renewables and natural gas (including 35 percent renewable energy from wind and solar by 2030) in its Upper Midwest 2016-2030 Resource Plan (Xcel Energy 2016). Thus, demand for wind energy in the region is expected to remain strong in coming years.

NSP/Xcel submitted an Application for an Advance Determination of Prudence dated March 29, 2017 for a 1,550 MW portfolio of wind generation to be added to the integrated NSP/Xcel System (Wind Portfolio) in Case No. PU-17-120. The Wind Portfolio consists of seven projects, including the Foxtail Wind Project. The Wind Portfolio represents a prudent opportunity for NSP/Xcel to drive down overall system costs by capturing low cost wind projects due, in part, to the ability to fully capture the Federal Production Tax Credit (PTC). Over the life of the Wind Portfolio, NSP/Xcel anticipates savings on a present value of revenue requirements basis (exclusive of externality costs) of approximately $1.6 billion for the entire NSP/Xcel System or approximately $85 million for North Dakota customers.

Additionally, according to the Comprehensive State Energy Policy report for 2010-2025 prepared by the EmPower ND Commission, one of the state's energy goals is to increase installed wind energy capacity to 5,000 MW by 2020 (EmPower ND 2010). North Dakota's energy-related goals include the following:

- General economic development and help the nation achieve greater energy independence
- Derive 25 percent of all energy produced in America from renewable sources by 2025
- Provide a fair and responsible regulatory environment that promotes energy development

Additionally, in their latest report, the EmPower ND Commission recommended removing the sunset provision on the sales tax exemption provided for the construction of wind powered electrical generating facilities (EmPower ND 2016). Other previous reports promote research and development into cost-effective wind projects, recommend tax certainty for wind projects to encourage future investment in renewable wind resources, and recognize the strategic role wind will play in continuing to enhance North Dakota's diverse energy portfolio (EmPower ND 2012, 2014).

A regional need exists for renewable energy produced in North Dakota. Nearly every state in the MISO west, central, and east regions currently has renewable portfolio standards or a voluntary renewable energy standard or target (MISO 2016). According to the MISO Transmission Expansion Plan for 2016, the MISO region needs to add between 11,400 and 79,900 MW to maintain planning reliability targets through 2030. From 2016 onward, 11,900 to 37,300 MW of retirements of mostly fossil-fueled power plants are assumed to occur. Additionally, depending on the projection scenario, MISO assumes anywhere from 3,600 to 25,800 MW of incremental wind penetration during this period.

NEER will transfer ownership of the Project to NSP/Xcel at the end of 2017 according to the executed PSA. Pursuant to this agreement, NSP/Xcel will own and operate the proposed Project. The proposed Project will help to increase the renewable portion of NSP/Xcel's power generating portfolio and help meet NSP/Xcel members' energy needs while keeping member electricity rates low.

2.2 Alternatives

Feasible technology alternatives to wind include electricity generation using coal, natural gas, or biomass. None of these alternatives were considered because, as stated above in Section 2.1, these technologies do not meet the state's goal of adding new wind energy or meet NSP/Xcel's resource plan goal for increasing renewable power generation.

Wind power is not the only type of renewable energy which could contribute to meeting the state's energy goals or NSP/Xcel's resource plan goals for increasing renewable power generation. However, the purpose of this Project is to contribute to the amount of renewable wind energy in North Dakota. There are a number of other renewable energy sources such as geothermal (western North Dakota), biofuels, or solar which are complementary to wind energy, and the proposed Project would not preclude other developers from pursuing these energy sources.

Although the proposed Project will include 75 planned turbines, an additional 6 alternate turbine locations have been included in the proposed Project layout to provide siting flexibility based on on-going environmental studies and landowner preferences.

2.3 10-Year Plan

As required by NDCC 49-22-04, NSP/Xcel will file a 10-Year Plan with the Commission.

3.0 SITE SELECTION CRITERIA

Foxtail Wind has evaluated the proposed 20,029-acre Project area to determine the best locations for up to 75 wind turbines. Siting turbines is a process through which input from several different entities is considered. The Project area was identified as an optimal site from wind resource, transmission, landowner participation, economic, and environmental perspectives. An additional 6 alternate turbine locations have been included in the Project layout in order to provide siting flexibility based on environmental studies and landowner preferences; however, only up to 75 wind turbines will be constructed.

Foxtail Wind has secured voluntary wind option agreements with landowners and identified preliminary turbine locations based on site inspection, topographic maps, known environmentally sensitive areas, review of North Dakota's power plant siting exclusion and avoidance areas, review of Dickey County and state wind siting requirements, and communications with local, state, and federal agencies. NEER has used this siting process in developing recent wind turbine projects, including 14 projects in North Dakota. Through this process, NEER addresses environmental issues that commonly arise during project development and works within the parameters of state rules. North Dakota has several site selection criteria that are considered by the Commission to determine suitability of the site. Foxtail Wind has reviewed the criteria in NDAC Chapter 69-06-08 and has considered these criteria in Project design. These criteria are discussed in this section.

3.1 Exclusion Areas

In accordance with NDAC Section 69-06-08-01(1) and (2), the geographical areas listed in **Table 3-1** shall be excluded in the consideration of a site for an energy conversion facility. The area of exclusion shall include a buffer zone of a reasonable width to protect the integrity of the area. Exclusion areas are mapped for the Project area on **Figure 3-1**.

Table 3-1 Exclusion Areas

Exclusion Area	Present within Proposed Project Area?	Description	Section Addressed
Designated or registered national: 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.	None	Not applicable	3.5, 7.3, 7.8, Figure 3-1
Designated or registered state parks; forests; forest management lands; historic sites; monuments; historical markers; archaeological sites; grasslands; wild, scenic, or recreational rivers; game refuges; game management areas; management areas; and nature preserves.	Present	An archaeological survey is underway; archaeological sites have been identified through a Class I Literature Search, and a Class III Cultural Resources Inventory. Known archaeological sites are not shown on **Figure 3-1** due to confidentiality. One Waterfowl Protection Area is within the Project area.	7.7, 7.8, 7.9, 7.15, 7.17

Exclusion Area	Present within Proposed Project Area?	Description	Section Addressed
County parks and recreational areas; municipal parks; parks owned or administered by other governmental subdivisions; hardwood draws; and enrolled woodlands.	None	Not applicable	7.8, 7.14, 7.17
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, this exclusion does not apply.	Present	The proposed Project area contains 5,104 acres (25.5 percent) of soils of statewide importance and 642 acres (3.2 percent) of prime farmland soils. Prime farmland has been avoided to the extent practical. Permanent impacts to soils of statewide importance and prime farmland soils from turbine placement and access roads are expected to be up to 25.5 acres and 2.8 acres, respectively, which is less than one percent of the proposed Project area.	7.9, 7.10, Figure 7-5
Irrigated land.	None	Not applicable	7.9
Areas critical to the life stages of threatened or endangered animal or plant species.	None	The proposed Project area is within the eastern edge of the whooping crane migration corridor, but there is no designated critical habitat within the proposed Project area for any species.	7.16, 7.17
Areas where animal or plant species that are unique or rare to this state would be irreversibly damaged.	None	Not applicable	7.13, 7.14, 7.15, 7.16, 7.17
Areas within 1,200 feet of the geographic center of an intercontinental ballistic missile launch or launch control facility.	None	Not applicable	7.3.1
Wind-energy specific exclusion areas	Not applicable	The proposed Project complies with the following exclusion areas: • 1.1 x height of turbine + 75 feet from public road right-of-way • 1.1 x height of turbine + 75 feet from railroad right-of-way • 1.1 x height of turbine from 115kV or higher transmission lines • 1.1 x height of turbine from property line of non-participating landowners • 3 x height of turbine from residences of non-participating landowners	4.1.1

3.2 Avoidance Areas

In accordance with NDAC Section 69-06-08-01(3) and (4), the geographical areas listed in **Table 3-2** shall not be approved as a site for an energy conversion facility unless the applicant shows that, under the circumstances, there is no reasonable alternative. In determining whether an avoidance area should be designated for a facility, the Commission may consider, among other things: the proposed management of adverse impacts; the orderly siting of facilities; system reliability and integrity; the efficient use of resources; and alternative sites. Avoidance areas are also mapped for the Project area on **Figure 3-1**.

Table 3-2 Avoidance Areas

Avoidance Area	Present within Proposed Project Area?	Description and Proposed Buffer	Section Addressed
Historical resources which are not designated as exclusion areas	Present	Historic farmsteads are present within the proposed Project area. Foxtail Wind will avoid directly impacting all historic farmsteads within the proposed Project area.	7.7, 7.17
Areas within the city limits of a city or the boundaries of a military installation	None	Not applicable	7.3, Figures 1-1 through 1-3
Areas within known floodplains as defined by the geographical boundaries of the hundred-year flood	None	Not applicable	7.12, 7.17
Areas that are geologically unstable	Potentially Present	Sand and gravel resources and historic mines are present within the proposed Project area, but historic mining was limited to surface mining and no known underground mining has taken place. The Project area is located in an area of very low seismic risk, and there are no known active tectonic features or faults. The North Dakota Geological Survey landslide mapping program indicates a minimal amount of landslide deposits occur within the proposed Project area.	7.11, 7.17
Woodlands and wetlands	Present	Permanent impacts to jurisdictional wetlands will be avoided and minimized as practicable. Few woodland impacts are anticipated, and all trees that are removed will be replaced at a 2-to-1 ratio as required by the Commission.	7.13, 7.14, 7.17, Figures 7-1 and 7-6
Areas of recreational significance which are not designated as exclusion areas	None	Not applicable	7.3, 7.8

Avoidance Area	Present within Proposed Project Area?	Description and Proposed Buffer	Section Addressed
Geographic area where, due to operation of the facility, the sound levels within 100 feet of an inhabited residence or a community building will exceed 50 dBA.	None	Noise modeling results indicated that received sound levels would be 50 dBA or less within 100 feet of two out of 50 inhabited residences identified in and near the Project area. Foxtail Wind is working to obtain a waiver from the owner of the residences where 50 dBA would be exceeded. If a waiver cannot be obtained Foxtail Wind will ensure that the 50 dBA requirement is met.	7.6

3.3 Selection Criteria

In accordance with NDAC Section 69-06-08-01(5), a site shall be approved in an area only when it is demonstrated to the Commission by the applicant that any significant adverse effects resulting from the location, construction, and operation of the facility in that area, as they relate to the criteria listed in **Table 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	Up to 97.74 acres of land will be permanently affected by the turbines, associated access roads, and other infrastructure during operation. Additional temporary impacts during construction for turbine installation, road construction, cable trenching, laydown, and construction staging would be up to 630.43 acres. These impacts represent a minor portion of the land area available for agricultural production. Landowner agreements include compensation for crop damage, if any, during surveys and construction. As a result, the proposed Project will not result in significant impacts to agricultural production.	7.3, 7.9
Family farms and ranches	The proposed Project will comply with state setbacks. Although some land area will be converted to wind turbine foundations and pads, access roads, a batch plant, a switchyard, an O&M building, and a substation, wind lease payments to farmers will provide a supplemental source of income. As stated above, landowner agreements also include compensation for crop damage, if any, during surveys and construction. Wind development is a compatible use with existing family farms and ranches and will not displace any farms or ranches.	4.1.1, 7.2, 7.3, 7.10, Table 4-1, Figure 3-1

Selection Criteria	Potential Adverse Effects	Section Addressed
Land which the owner demonstrates has soil, topography, drainage, and an available water supply that cause the land to be economically suitable for irrigation	Participating landowners have not expressed concerns related to economically suitable irrigation on their land. Currently no irrigation is occurring within the proposed Project area.	7.9, 7.10
Surface drainage patterns and ground water flow patterns	A wetlands and waters survey was completed in Fall 2016 and Spring 2017. Project infrastructure will be built to avoid impacts to surface waters to the extent practicable, and will be designed in such a manner that runoff from the upper portions of the watershed can flow unrestricted to the lower portion of the watershed. Temporarily disturbed areas will be returned to their original contours.	7.11, 7.12, 7.13, Figure 7-7
The agricultural quality of the cropland	Minimal impacts to the agricultural quality of the cropland are anticipated. Landowner agreements include compensation for crop damage, if any, during surveys and construction. If compaction of soils occurs during construction, Foxtail Wind will work with landowners to alleviate the compaction.	7.9, 7.10
The impact upon the availability and adequacy of:		
Law enforcement	No adverse impacts to law enforcement are anticipated.	7.4
School systems and education programs	No adverse impacts to school systems and education programs are anticipated.	7.4
Governmental services and facilities	No adverse impacts to governmental services and facilities are anticipated.	7.4
General and mental health care facilities	No adverse impacts to general and mental health care facilities are anticipated.	7.4
Recreational programs and facilities	No recreational programs or facilities will be directly affected by the Project. Recreational impacts would be auditory and visual in nature and limited to individuals using land in and near the Project area for hunting, fishing, or nature observation.	7.4, 7.8, 7.17
Transportation facilities and networks	An increase in vehicle trips per day is anticipated for the duration of proposed Project construction, but is expected to be temporary and not significant. During facility operation, no significant impacts are anticipated.	7.4, Figure 7-3
Retail service facilities	No adverse impacts are anticipated. Local services such as motels, restaurants, and convenience stores are likely to experience an increase in business during proposed Project construction.	7.4
Utility services	The proposed Project will utilize station service from Dakota Valley Electric Cooperative, which will suggest appropriate configurations for the electrical system, and Foxtail Wind will abide by the recommendations to prevent impacts to the transmission system.	1.0, 2.0, 6.0, 7.4
The impact upon:		
Local institutions	No adverse impacts are anticipated.	7.4

Selection Criteria	Potential Adverse Effects	Section Addressed
Noise-sensitive land uses	The noise sensitive land uses within the proposed Project area are the residences near turbine locations. The sound impacts from the proposed Project turbines will be within the Commission limit at inhabited residences, with the exception of two inhabited residences; Foxtail Wind is working to obtain a waiver from the owner of the residences where 50 dBA would be exceeded. If a waiver cannot be obtained, Foxtail Wind will ensure the 50 dBA requirement is met.	7.6, 7.17
Rural residences and businesses	The proposed Project will comply with state and local setbacks. Foxtail wind will utilize a radar-activated aircraft detection lighting system to reduce visual impacts to landowners.	4.1.1, 7.2, 7.3, Figure 3-1
Aquifers	Based on the small amount of increased impervious surface area, which will be created by proposed Project components, relative to the separation of these components and the size of the entire Project area, the proposed Project would likely have minimal impacts to regional groundwater recharge.	7.11
Human health and safety	No impacts to human health and safety are anticipated based on the implementation of the mitigative measures discussed in Section 7.5.3 and maintenance schedules.	4.1.1, 6.3, 6.5, 7.5
Animal health and safety	No impacts to livestock are anticipated from construction or operation of the facility. Based on avian surveys performed to date, mean raptor use was generally low compared to other wind facilities. For other avian species, fatalities from the proposed Project, if any, are not anticipated to have population-level effects. Foxtail Wind will implement measures to avoid and minimize effects to wildlife by siting facilities away from active raptor nests and wetlands to the extent practicable. A Wildlife Conservation Strategy is being prepared for the proposed Project. In addition, NSP/Xcel will implement a post-construction Wildlife Response and Reporting System and one year of post-construction bird and bat mortality monitoring for the proposed Project in order to monitor avian and bat interactions with turbines.	7.15, 7.16
Plant life	The proposed Project will result in up to 97.74 acres of permanent impact. Land where the turbines will be sited is primarily undeveloped pasture/hay, cropland, and grassland.	7.14, Figure 7-1
Temporary and permanent housing	Existing temporary housing, such as hotels, will be utilized during construction. No adverse impacts are anticipated.	7.2
Temporary and permanent skilled and unskilled labor	No adverse effects are anticipated. Local contractors employed for construction will result in increased wages.	7.2

Selection Criteria	Potential Adverse Effects	Section Addressed
The cumulative effects of the location of the facility in relation to existing and planned facilities and other industrial development	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 in the form of new income for landowners, employment during construction, and new property tax revenue. A 2015 study of property values in North Dakota concluded that property values were not diminished by wind farms or turbines (Hoefs 2015). Wind energy development removes less total land from agricultural use than other forms of energy generation development.	7.2, 10.11

3.4 Policy Criteria

In accordance with NDAC Section 69-06-08-01(6), the Commission may give preference to an applicant that will maximize benefits that result from the adoption of the policies and practices listed in **Table 3-4**, and may require the adoption of such policies and practices as appropriate.

Table 3-4 Policy Criteria

Policy Criteria	Potential Adverse Effects	Section Addressed
Recycling of the conversion byproducts and effluents	Not applicable.	N/A
Energy conservation through location, process, and design	Foxtail Wind is developing the site to maximize energy output and will develop a site layout that optimizes wind resources while minimizing the impact on land resources and any potentially sensitive areas. Developing the Project in proximity to an existing transmission line will also reduce land impacts.	4.2
Training and utilization of available labor in this state for the general and specialized skills required	Foxtail Wind will use local labor to the extent practicable.	7.2
Use of a primary energy source or raw material located within the state	The energy generated at the site will utilize the wind resources of the State of North Dakota.	5.2
Not relocating residents	No residents will be relocated as a result of the proposed Project.	7.2.2
The dedication of an area adjacent to the facility to land uses such as recreation, agriculture, or wildlife management	The proposed Project will not interfere with adjacent land uses. As such, it is not anticipated that areas adjacent will be dedicated to recreation, agriculture, or wildlife management, although much of the proposed Project area is already used for agriculture.	7.3, 7.8, 7.9, 7.15, Figure 3-1
Economies of construction and operation	Foxtail Wind will utilize local contractors to the extent practicable.	7.2

Policy Criteria	Potential Adverse Effects	Section Addressed
Secondary uses of appropriate associated facilities for recreation and the enhancement of wildlife	None.	N/A
Use of citizen coordinating committees	Foxtail Wind has met with County officials quarterly, held a landowner dinner on March 7, 2017, and will continue to work with landowners of properties for the proposed Project.	8.0
A commitment of a portion of the energy produced for use in this state	Energy transmitted will be injected into the MDU 230 kV Ellendale-Tatanka overhead transmission line. Foxtail Wind expects that the energy generated will serve NSP/Xcel customers that include North Dakota residents.	6.3
Labor relations	Some trades may be part of unions. No labor relations will be affected.	6.5, 7.2
The coordination of facilities	Existing facilities and facility corridors were considered in the location of the wind farm and associated facilities.	3.0, 3.6
Monitoring of impacts	NSP/Xcel and the EPC contractor will employ best management practices during construction to monitor soil impacts and segregate topsoil. A storm water pollution prevention plan will be prepared for the proposed Project. Foxtail Wind will conduct 1 year of post-construction bat and bird fatality monitoring and rely on the Wildlife Response and Reporting System for the duration of proposed Project operations.	7.10, 7.11, 7.12, 7.15, 7.16

3.5 Design and Construction Limitations

Key design and construction limitations when building a wind farm are wind resources, landowner easements, regulatory setbacks (local and state), environmental avoidance areas, and available transmission. The wind resource is essential to selecting and designing a wind farm. Foxtail Wind has conducted an analysis of the proposed Project area to ensure that the site has ample wind energy to generate revenue for the wind farm. Easements allowing construction of turbine towers and transmission facilities are also critical to the proposed Project. Foxtail Wind has secured voluntary land agreements with landowners necessary to develop the proposed Project. The proposed Project complies with all Commission setbacks and exclusion areas (see Section 4.1.1). Additionally, the Project will connect to the MDU 230 kV Ellendale-Tatanka transmission line, which crosses through the Project area (**Figure 1-1**).

3.6 Economic Considerations

Economics were considered when selecting a location for the proposed Project. As discussed above, it is important to select a site with a wind resource capable of generating energy. The proposed Project area takes advantage of the wind resource in the area. Information on the wind resource at the site is discussed in Sections 5.2 and 5.3.

One of the most important economic considerations related to the proposed Project is the need to qualify for the Federal Production Tax Credit (PTC). For wind facilities commencing construction in 2017, the PTC is an income tax credit of 1.84 cents/kilowatt-hour allowed for the production of electricity from utility-scale wind turbines (USDOE 2017). This incentive was created under the Energy Policy Act of 1992, and has been renewed and expanded many times, most recently in the 2016 spending package

passed by Congress on December 18, 2015 (AWEA 2015). The wind energy PTC was extended through 2016, and then continues at a decreased value through 2019. Wind projects qualify for the PTC if construction is started before the end of 2019.

4.0 GENERAL DESCRIPTION OF THE PROPOSED FACILITY

4.1 Wind Power Technology

As the wind passes over the blades of a wind turbine, it creates lift and causes the rotor to turn. The rotor is connected by a hub and main shaft to a system of gears, which are connected to a generator. Exact turbine models are subject to change to ensure selection of a turbine that is both cost effective and optimizes land and wind resources. Foxtail Wind is proposing to install up to 75 wind turbines. The current layout includes 68 Hybrid Vestas V-116 and 7 Vestas V-110 turbines. Foxtail Wind is seeking flexibility from the Commission to select the most appropriate technology for the proposed Project at the time of construction to ensure optimization of wind and land resources and cost efficiency.

The Hybrid Vestas V-116 utility-grade wind turbine has a nominal nameplate rating of 2.0 MW. Each turbine will have a 262-foot hub height and a 381-foot (116-meter) rotor diameter (**Figure 4-1**). The Vestas V-110 turbine has a nominal nameplate rating of 2.0 MW, an 262-foot hub height, and a 361-foot (110-meter) rotor diameter. Both turbine models begin operation in wind speeds of 6.7 miles per hour (mph), and are designed to operate in wind speeds of up to 45 mph.

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

The electricity generated by each turbine is brought to a pad-mounted transformer where the voltage will be raised (stepped up) to power collection line voltage of 34.5kV. The electricity will be collected by a system of underground power collection lines within the Project area (**Figure 4-2**). Both power collection lines and communication cables will be buried on private property or public rights-of-way along public roads. The collection lines and communication cables distributes power to the proposed collection substation.

Each wind turbine will be accessible via all-weather, aggregate-surfaced roads between 16 and 38 feet in width that will connect with public roads. **Figure 4-2** is a diagram of the path of energy from a wind farm to energy users and **Figure 4-3** shows a typical wind farm facility layout. The power generated by the Project will be stepped up to 230kV at a collection substation that will be constructed on Section 11, Township 130 North, Range 66 West (**Figure 1-3**). The collection substation and switchyard will be co-located along 71st Ave SE, south of 91st St SE to connect the proposed Project to the MDU 230 kV Ellendale-Tatanka overhead transmission line. An O&M building will be constructed on 91st St SE, just east of 72nd Ave SE.

4.2 Wind Energy Center Layout

Foxtail Wind is developing a wind farm layout that optimizes the wind resource while minimizing the impact on land resources and any potentially sensitive areas. Wind-powered electric generation is entirely dependent on the availability of the wind resource at a specific location. The energy available from the wind increases at the third power of the wind speed. In other words, a doubling of the wind speed will increase the available energy by a factor of eight times. Analysis of wind direction data within the Project area suggests that the optimal turbine string alignments are generally from southwest to northeast. Design of the turbine array and collection system will minimize energy loss due to wind turbine wakes (e.g., adverse impacts of one turbine on an adjacent turbine) and turbulence, and electrical line losses.

The setbacks used in designing the proposed Project complies with or exceeds those required by the Commission, NEER's internal standards, and vendor standards. At the time this application was prepared, Dickey County did not have established setbacks relevant to any of the components of the wind energy facility. The proposed Project also complies with or exceeds the following wind energy-specific exclusion areas provided in NDAC Section 69-06-08-01(2):

- 1.1 x height of turbine from interstate and state road rights-of-way
- 1.1 x height of turbine plus 75 feet from public roadways
- 1.1 x height of turbine from railroad right-of-way
- 1.1 x height from 115kV or higher transmission lines
- 1.1 x height from property line of non-participating landowners
- 3 x height from residences of non-participating landowners

Table 4-1 lists the setbacks utilized in designing the proposed Project layout, which sometimes exceeds the setbacks listed above. The distances are based on the Hybrid Vestas V-116 turbine, which has a larger rotor diameter than the Vestas V-110 turbine model, and has a total turbine height (from the bottom of the turbine tower to the top of the blade when vertical) of 453 feet. At a minimum, Foxtail Wind will comply with all applicable Commission setbacks.

Table 4-1 Setback Distances for Wind Turbines

Setback Type	Distance
Commission Exclusion Areas	
Interstate and state road rights-of-way	1.1 x height of turbine plus 75 feet
Public road rights-of-way	1.1 x height of turbine plus 75 feet
Railroad rights-of-way	1.1 x height of turbine plus 75 feet
115kV or higher transmission lines	1.1 x height of turbine
Property line of non-participating landowners	1.1 x height of turbine
Non-participating residences	3 x height of turbine
NEER Internal Standards	
Participating residences	1,400 feet
Unoccupied receptors (barns, sheds, etc.)	1.1 x height of turbine
Property line of participating landowners	223 feet
Beam paths	223 feet
Underground cable or pipeline	223 feet
Distribution lines rights-of-way	1.1 x height of turbine
Section lines	1.1 x height of turbine plus 38 feet

4.3 Associated Facilities

In addition to turbines, the proposed Project includes electrical collection lines, access roads, and a Met tower. The electricity generated by each turbine is stepped up to a power collection line voltage of 34.5kV via a pad-mounted transformer at the base of each turbine. The electricity generated at each turbine will be collected by a system of underground power collection lines and brought to the collection substation. A total of one permanent Met tower will be installed for the proposed Project.

Equipment will be added within the proposed 5-acre footprint of the proposed Project collection substation to accommodate Project needs. The 5-acre O&M facility, 5-acre batch plant, 30-acre

switchyard, and temporary laydown area will also be used for the proposed Project. The Project does not have a transmission line that will require separate permitting, but an overhead wire tap will connect the collection substation to the point of interconnect to the on the same parcel.

4.4 Land Rights

Foxtail Wind has secured easements in Dickey County for the proposed Project. Land rights will encompass the proposed wind farm and all associated facilities, including but not limited to, wind and buffer easements, wind turbines, access roads, underground collection lines, and Met towers. The land for the proposed Project collection substation, O&M building, and switchyard will be purchased.

5.0 PROPOSED SITE

5.1 Identification of Project Area

Foxtail Wind, which has been under development for several years and was previously permitted as the Rough Rider project, selected the Project area based on its wind resource, land-use patterns, and low presence of environmentally sensitive features. The proposed Project area boundary encompasses an area of 20,029 acres (31 square miles). However, the land occupied by turbines and other wind farm infrastructure during operation will be less than 1 percent of this area. It is anticipated that the area of permanent land use during operation will be up to 97.74 acres for the turbines, aggregate-surfaced access or service roads up to 38 feet wide, electrical junction boxes, one permanent Met tower, a collection substation, switchyard, and O&M building. Total temporary land disturbance during construction for the proposed Project is expected to be up to approximately 630.43 acres, including temporary disturbance due to turbine installation, road construction, collection line trenching, fiber optic line, a batch plant, and the laydown area. See **Table 1-4** in Section 1.3.1 and Section 7.0 for a detailed description of the proposed Project area impacts. **Figure 1-3** shows the proposed turbine locations, which are subject to shifts to avoid sensitive resources, pending completion of environmental and cultural resources surveys.

5.2 Wind Resource Areas

The U.S. Department of Energy's Wind Program and the National Renewable Energy Laboratory published a wind resource map for the state of North Dakota. This resource map shows wind speed estimates at 50 meters above the ground and depicts the resource that could be used for utility-scale wind development (USDOE 2014). As a renewable resource, wind is classified according to wind power classes, which are based on typical wind speeds. These classes range from Class 1 (the lowest) to Class 7 (the highest). In general, at 50 meters, wind power Class 4 or higher can be useful for generating wind power with large turbines. The map indicates that North Dakota has wind resources consistent with utility-scale production. Good-to-excellent wind resource areas are located throughout North Dakota; winds within the vicinity of the proposed Project area range from Class 3 to Class 6 winds, with proposed turbine locations in areas with Class 5 and 6 winds.

5.3 Wind Characteristics in Study Area

Foxtail Wind has utilized wind data from Met towers in the Project area to characterize the wind resource. Foxtail Wind has secured information from other long-term references to aid in correlating the wind data on site, including 30-year re-analysis data processed by the National Aeronautics and Space Administration (NASA) and processed by NEER. Industry standard software, such as Windographer, Openwind, WRF, and ArcGIS as well as internal NEER tools 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. Based on analysis by NEER’s internal wind resource group, WindLogics, there is good correlation between the long-term wind measurements and the short-term Project-specific wind.

6.0 ENGINEERING AND OPERATIONAL DESIGN ANALYSIS

This section provides a summary description of the proposed Project, which includes a description of the proposed Project layout, turbines, electrical system, and associated facilities. Additional design components addressed in this section are proposed Project construction, schedule, operation, and decommissioning of the site. There are other turbines that are feasible choices for the Project area that are available from various manufacturers and Foxtail Wind wishes to reserve the right to select alternative turbines representative of the Vestas V-116 and V-110 class of wind turbines. Turbine type may affect the number and configuration of the turbine array. Details for the Vestas V-116 and V-110 turbines are presented below. However, if an alternative but comparable turbine model is selected, the engineering and operational design considerations and procedures would be expected to be consistent with the description below for the V-116 and V-110 turbines.

6.1 Proposed Project Layout and Associated Facilities

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

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

Electrical system design and interconnection details will be determined as a result of studies and discussions with NSP/Xcel. The proposed Project includes a computer-controlled communications system, the Supervisory Control and Data Acquisitions System (SCADA), which permits automatic independent operation and remote supervision, thus allowing the simultaneous control of many wind turbines. Additionally, a radar-activated aircraft detection lighting system (ADLS) or equivalent lighting-mitigation system will be installed on turbines to reduce potential night effects of flickering lights. NSP/Xcel will be responsible for O&M for the life of the proposed Project or will contract with an appropriate supplier of O&M services at the time of operation, to ensure high quality operations.

6.2 Description of Wind Turbines

The proposed Project is currently designed to include a total of 75 turbines; 68 Hybrid Vestas V-116 and 7 Vestas V-110 turbines. Foxtail Wind is seeking flexibility from the Commission to select the most appropriate technology for the proposed Project at the time of construction to ensure optimization of wind and land resources and cost efficiency.

6.2.1 Turbine

Both turbine models will have a hub height of 262 feet; the V-116 turbines will measure 453 feet from the base of the tower to the tip of the upright blade (**Figure 4-2**), and the V-110 turbines will measure 443 feet.

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

The turbines have SCADA communication technology to allow control and monitoring of the wind farm. The SCADA communications system permits automatic, independent operation and remote supervision, thus allowing the simultaneous control of many wind turbines. Operations, maintenance, and service for

the proposed Project will be structured so as to provide for timely and efficient operations. The computerized data network will provide detailed operating and performance information for each wind turbine. NSP/Xcel will maintain a computer program and database for tracking each wind turbine's operational history.

Other specifications of the turbines include:

- Rotor blade pitch regulation
- Gearbox with three-stage planetary/helical system
- Double fed three-phase asynchronous 6-pole generator with a wound rotor
- A braking system for each blade (three self-contained systems) and a fail-safe disc brake
- Electromechanically driven yaw systems
- Radar-activated ADLS or equivalent lighting-mitigation system

6.2.2 Rotor

The rotor consists of three blades mounted to a rotor hub. The hub is attached to the nacelle, which houses the gearbox, generator, brake, cooling system, and other electrical and mechanical systems. The V-116 turbines have a 116-meter (approximately 381 feet) rotor diameter, with a swept area of 114,009 square feet. The V-110 turbines have a 110-meter (approximately 361 feet) rotor diameter, with a swept area of 102,354 square feet. Both models require a minimum wind speed for operation of 6.7 mph and will cut out at a wind speed of 45 mph.

6.2.3 Turbine Tower

The turbine towers will be conical or cylindrical tubular steel with a hub height of up to 262 feet. The portion of the foundation that is above ground will be approximately 16 to 18 feet wide at the base of the tower. The turbine towers, on which the nacelle is mounted, consist of three to four sections manufactured from certified steel plates. All welds will be made by automatically controlled power welding machines and ultrasonically inspected during manufacturing per American National Standards Institute specifications. All surfaces will be sandblasted and multi-layer coated for protection against corrosion. Corrosion Protection Classification for external areas of tower components is C5-1. Access to the turbine will be provided through a lockable steel door at the base of the tower. Radar-activated ADLS or an equivalent lighting-mitigation system will be installed on each tower.

6.2.4 Lightning Protection

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

6.3 Description of Electrical System

In the nacelle of each turbine, a step-up transformer will step up the voltage to the power collection line voltage of 34.5 kV. The power from these transformers will be run through an underground collection system consisting of various sized buried cables. Collection lines will be buried 42 to 48 inches deep and will not affect farming equipment. All the collection system cables will terminate at the proposed Project substation, where additional substation equipment will be installed to accommodate the proposed Project. The substation will include power transformers to step up the voltage from 34.5 kV to 230 kV and provide the necessary protection and control for interconnection to the transmission grid. The Project substation is proposed to be located along 71st Avenue SE in the southwest quarter of Section 11 in Township 130 North, Range 66 West.

All utility protection and metering equipment will meet Foxtail Wind and National Electrical Safety Code standards for parallel operations. The construction manager will ensure that proper interconnection protection is established.

6.4 Proposed Project Construction

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

- Ordering of all necessary components including turbine towers, nacelles, blades, foundations, and transformers (NSP/Xcel)
- Final turbine siting (Foxtail Wind)
- Complete survey to site locations of structures and roadways (Foxtail Wind)
- Complete soil borings, testing, and analysis for proper foundation design and materials (Foxtail Wind)
- Complete construction of access roads, to be used for construction and maintenance (NSP/Xcel)
- Construct underground feeder lines (NSP/Xcel)
- Design (Foxtail Wind) and construction (NSP/Xcel) of the proposed Project substation facilities (to be installed within the proposed Foxtail Wind Energy Center substation's 5-acre parcel)
- Installation of turbine tower foundations (NSP/Xcel)
- Installation of underground and aboveground junction boxes (NSP/Xcel)
- Turbine tower placement and wind turbine setting (NSP/Xcel)
- Acceptance testing of facility (NSP/Xcel)
- Commencement of commercial operation (NSP/Xcel)

Turbine access roads will be built adjacent to the turbine towers, allowing access to the turbines during and after construction. Access roads will be typically 16 feet wide,[2] will have an aggregate surface as cover, and will be adequate to support the size and weight of maintenance vehicles. The specific turbine placement will determine the amount of private roadway that will be constructed for the proposed Project.

During the construction phase, several types of light, medium, and heavy-duty construction vehicles will travel to and from the site, as well as private vehicles used by construction personnel. Foxtail Wind estimates that there would be approximately 800 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 turbine tower assembly are taking place. At the completion of each construction phase, this equipment will be removed from the site or reduced in number.

6.4.1 Construction Management

An EPC contractor will be primarily responsible for the construction management of the proposed Project. The EPC contractor will use the services of local contractors, where possible, to assist in

[2] Roads required to support crane access to turbines during operation would remain up to 38 feet wide; all other roads may be built at 16 feet wide or reduced later to 16 feet.

construction. The EPC contractor, in coordination with local contractors, will undertake the following activities:

- Securing building, electrical, grading, road, and utility permits
- Performing detailed civil, structural, and electrical engineering
- Scheduling and execution of construction activities
- Forecasting 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 substation modifications. The EPC contractor will also oversee the installation of roads, concrete foundations, turbine towers, and blades, as well as the coordination of materials receiving, inventory, and distribution. The Project will be constructed under the direct supervision of an on-site construction manager with the assistance of local contractors. Project construction will consist of the following tasks:

- Site development, including roads
- Foundation excavation
- Concrete foundation installations
- All electrical and communications installation
- Turbine tower assembly and machine erection
- System testing

The construction team will be on site to handle materials purchasing, construction, quality control, testing, and start-up. The EPC contractor will manage subcontractors to complete all aspects of construction. Throughout the construction phase, ongoing coordination will occur between the proposed Project development and the construction teams. The on-site Project construction manager will help to coordinate all aspects of the proposed Project, including ongoing communication with local officials, citizens groups, and landowners. Even before the proposed Project becomes fully operational, the O&M staff will be integrated into the construction phase of the proposed 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 operations.

6.4.2 Foundation Design

The freestanding 262-foot cylindrical or tubular wind turbine towers will be connected by anchor bolts to an underground concrete foundation. Geotechnical surveys, turbine tower load specifications, and cost considerations will dictate final design parameters of the foundations. Foundations for similar sized turbines are generally octagonal or circular, 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 professional engineer licensed to practice in the State of North Dakota.

6.4.3 Civil Works

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

- Improvement of existing public access roads to the Project area
- Construction of roads adjacent to the wind turbine strings (turbine access roads) to allow construction and continued servicing of the wind turbines
- Clearing and grading for wind turbine tower foundation installations
- Installation of underground cabling for connecting the individual wind turbines

- Installation of an on-site feeder system for connecting wind turbine strings for delivery to the electricity collection/metering location
- Installation of site fencing and security where necessary
- Restoration and revegetation of disturbed land when construction activities have been completed

Any improvements to existing public access roads would consist of re-grading and filling 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. Turbine access roads 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 16 to 38 feet wide and will be covered with road base designed to allow passage under inclement weather conditions. The roads will consist of graded dirt and will be covered with an aggregate surface. Once construction has been completed, the roads will be re-graded, filled, and dressed as needed.

6.4.4 Commissioning

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

6.4.5 Proposed Project Operation and Maintenance

NSP/Xcel will operate the wind energy facility for the life of the proposed Project. Approximately six to nine people will be employed on site to operate and maintain the facility. The O&M staff will have full responsibility for the facility to ensure O&M are conducted consistent with the applicable permits, prudent industry practice, and equipment manufacturer recommendations for the turbines.

In addition to the on-site O&M staff, remote staff will control, monitor, operate, and maintain the proposed Project by means of a SCADA computer software program. The operation of the entire wind farm, including discrete settings for individual turbines, will be managed by the on-site operations staff and remotely via the SCADA system.

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

Maintenance Schedule
NSP/Xcel's on-site operations staff will be responsible for the maintenance of the proposed Project on a daily basis. This monitoring will be accompanied by visual inspections by the on-site operating staff. Several daily checks will be made in the first few months of commercial operation to verify that the proposed Project is operating within expected parameters.

Once installed, the proposed Project service and maintenance will be carefully planned and will be consistent with prudent industry practices. An initial maintenance inspection of each turbine will be performed after turbine commissioning. Following this initial inspection, each turbine will receive annual visits that will include inspections of the various systems and components such as the gearbox, generator, brake, pitch, lubricant, bolts, and transformer.

6.4.6 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 proposed Project structures, access roads, drainage systems and other facilities necessary for the Project operation
- Maintenance of all O&M field maintenance manuals, service bulletins, revisions, and documentation for the proposed Project
- Maintenance of all parts, price lists, and computer software
- Maintenance and operation of Project substation facilities
- 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 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
- Remote monitoring on a daily basis

6.5 Decommissioning and Restoration

NSP/Xcel will develop a Decommissioning Plan in accordance with NDCC 49-02-27 and NDAC 69-09-09. Additionally, NSP/Xcel, or a qualified O&M supplier on behalf of NSP/Xcel, has a contractual obligation to the landowners to remove the wind facilities, including foundations to a depth of four feet below ground, when the wind easement expires and to restore the area to the same physical condition that existed immediately before the construction of the turbines. NSP/Xcel also reserves the right to explore alternatives regarding decommissioning at the end of the proposed Project's Certificate term. For example, 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.

7.0 ENVIRONMENTAL ANALYSIS

This section provides a description of the environmental conditions that exist within the Project area. Consistent with the North Dakota Energy Conversion and Transmission Facility Siting Act, exclusion and avoidance criteria, as well as selection and policy criteria, were considered in the selection and design of the site. To support this siting process, maps of the Project area were generated that indicate the presence or absence of many of the criteria highlighted in NDCC 69-06-08. The analysis was based on a layout including Vestas V-116 and V-110 turbine models; however, if an alternative but comparable turbine model is selected, it is assumed that environmental impacts would be within the range of those discussed here.

7.1 Description of Environmental Setting

The Project area is located in western Dickey County in southeastern North Dakota, a primarily rural agricultural area located approximately 96 miles southeast of Bismarck, North Dakota and approximately 15 miles northwest of Ellendale, North Dakota.

7.2 Socioeconomics

7.2.1 Description of Resources

The proposed Project is located in a primarily rural agricultural region in the western portion of Dickey County, North Dakota. The Project area is located near U.S. Highway 281 to the east, State Highway 56 to the west, and State Highway 11 to the south. There are no incorporated communities within the Project area. The Project area is approximately 10 miles west of the small community of Monango (2010 population 36) and 15 miles northwest of Ellendale (2010 population 1,394) (U.S. Census Bureau 2017a). The small town of Forbes is 6.5 miles southeast (2010 population 53), Kulm is 10 miles north (2010 population 354), and Ashley lies 22 miles west (2010 population 749) of the Project area (U.S. Census Bureau 2017a). The unincorporated community Wirch is approximately 1.75 miles west of the Project area (no census data provided). There are approximately 24 occupied residences within the Project area and within two miles from the proposed turbine locations.

Dickey County had a population of 5,289 persons in 2010, with an estimated 4.3 percent decrease in 2016 for an estimated total in 2016 of 5,064 persons (U.S. Census Bureau 2017b). The county contains 1,131 square miles of land, with a density of approximately 4.7 persons per square mile. Approximately 95 percent of the population of Dickey County is composed of white persons who are not of Hispanic or Latino origin. As of 2015, it is estimated that approximately 22 percent of the county population is 65 years or older, while approximately 6 percent of the population is under 5 years of age.

According to the 2011-2015 U.S Census Bureau American Community Survey approximately 15 percent of the Dickey County workforce worked in agriculture, forestry, fishing and hunting, and mining, and over 25 percent worked in educational services, and health care and social assistance (U.S. Census Bureau 2015). Per capita income estimated in 2015 was $27,825 and the median household income was $53,750. In 2015, approximately 8.2 percent of the county population lived below the poverty level, compared to 15.5 percent nationwide.

Agriculture continues to play a significant role in Dickey County's land use and economy. In 2012, there were 543 farms in Dickey County, comprising approximately 87 percent of the land area (USDA 2012). According to the 2012 Census of Agriculture, total market value of agricultural products produced in Dickey County was $266,829,000, 88 percent of which was from crops and 12 percent from livestock sales. The primary livestock is cattle and the principal crops include soybeans and corn. Wheat, spring wheat, and forage for hay are also commonly grown.

7.2.2 Impacts

No residents will be displaced due to the proposed Project. The proposed Project will have positive economic impacts for the local population, including lease and royalty payments for participating landowners, employment, and property and sales tax revenue.

Foxtail Wind estimates that the Project will provide over $22 million in tax revenue to Dickey County over 30 years. In addition, the Project will create approximately 200 construction jobs and six to nine permanent full-time jobs. The Project will also provide over $25 million in payments to participating landowners over 30 years, which will not only benefit those landowners, but also the local economy as that money is reinvested in local goods and services.

Up to 97.74 acres of the total Project area will be permanently affected due to conversion to turbine sites, access roads, a collection substation, O&M building, and a Met tower. Landowner compensation has been established under individual lease agreements, and includes compensation for crop damage during surveys and construction. A 2015 study of property values in North Dakota concluded that property values were not diminished by wind farms or turbines (Hoefs 2015). In general, agricultural areas surrounding each turbine can still be farmed. In addition, in an environment of uncertain and often declining agricultural prices and yields, the supplemental income provided to farmers from wind energy leases is expected to provide stability to farm incomes and thus will help assure the continued viability of farming in the Project area. Project construction will not cause additional impacts to leading industries within the Project area. There is no indication that any minority or low-income population is concentrated in any one area of the Project, or that the wind turbines will be placed in an area occupied primarily by any minority or low-income group.

To the extent that local contractors are used for portions of the construction, total wages and salaries paid to contractors and workers in Dickey 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.

Up to 200 construction workers are expected to be required for 10 months for construction of the Project. It is likely that general skilled labor is available either in the county or the state to serve the basic infrastructure and site development needs of the Project. Specialized labor will be required for certain components of wind farm development. It is likely that this labor will be imported from other areas of the state or from other states, as the relatively short duration of construction does not warrant special training of local or regional labor. Balancing the use of local contractors and imported specialized contractors will likely alleviate any labor relations issues.

No effects on permanent housing are anticipated. During construction, out-of-town laborers will likely use lodging facilities in and around the city of Ellendale. Operation and maintenance of the facility will require six to nine full-time employees, most of which are expected to reside locally. Sufficient permanent housing is available within the county to accommodate these new employees.

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 has been important in diversifying and strengthening the economic base of North Dakota. In addition, establishing the central region of North Dakota as an important producer of renewable energy, such as wind, has spurred the development of wind-related businesses in the area and contributes to the economic growth in the region; there are at least four wind energy-related manufacturing facilities in North Dakota (AWEA 2017).

7.2.3 Mitigative Measures

Socioeconomic impacts associated with the proposed Project would be primarily positive, with an influx of wages and expenditures made at local businesses during the Project construction and an increase in the county's tax base due to construction and operation of the wind turbines and associated infrastructure. In addition, the lease payments paid to landowners will diversify the revenue stream for farmers and ranchers.

7.3 Land Use

7.3.1 Description of Resources

The Project area is located on private land in rural Dickey County, North Dakota with the predominant land use being agriculture, supporting both livestock grazing and crops (**Figure 7-1**). The Project area is not within any city limits or within an area of any known military installments. Land classifications, including acreage within the Project area, are shown in **Table 7-1**.

Table 7-1 Land Cover within the Project Area

Land Cover	Acreage	Percentage of Project Area	Temporary Impact Acres	Permanent Impact Acres
Grassland/Herbaceous	12,129.75	60.56%	361.67	48.26
Pasture/Hay	2,420.49	12.08%	95.22	27.88
Cultivated Crops	1,773.54	8.85%	109.51	12.38
Shrub/Scrub	1,714.81	8.56%	50.68	6.52
Open Water	1,320.18	6.59%	4.18	0.11
Developed, Open Space	341.45	1.70%	4.90	2.29
Emergent Herbaceous Wetlands	270.37	1.35%	4.01	0.30
Deciduous Forest	52.09	0.26%	0.26	0.00
Woody Wetlands	5.10	0.03%	0.00	0.00
Barren Land (Rock/Sand/Clay)	1.55	0.01%	0.00	0.00
Developed, Low Intensity	0.00	0.00%	0.00	0.00
Developed, Medium Intensity	0.00	0.00%	0.00	0.00
Evergreen Forest	0.00	0.00%	0.00	0.00
TOTAL	**20,029.34**	**100.00%**	**630.43**	**97.74**

Source: National Land Cover Data 2011 (Homer et al. 2015)

In addition to the general land uses listed above, the U.S. Fish and Wildlife Service (USFWS) manages lands including their easements within the Project area (**Figure 7-2**). One USFWS Waterfowl Production Area (WPA), the Reinke WPA, is within the Project area; however, no project infrastructure is located within the Reinke WPA. Four other WPAs, the LSB WPA, Erienbusch WPA, Rutschke WPA, and the North Rutschke WPA are within one mile of the Project area. These WPAs are managed by the Kulm Wetland Management District. WPAs, initially acquired by the USFWS through the Duck Stamp Act of 1934, became part of the National Wildlife Refuge System in 1966 through the National Wildlife Refuge System Administration Act to preserve wetlands and grasslands critical to waterfowl and other wildlife (USFWS 2014e). WPAs are open to a variety of public uses including hunting, fishing, trapping, wildlife observing, and environmental education. There are no National Wildlife Refuges (NWRs) within the Project area; the nearest NWR is the Maple River NWR, located approximated 20 miles east of the Project area.

The USFWS also holds wetland, grassland, and Farmer Home Administration (FmHA) easements within the Project area. These easements are legal agreements between landowners and the USFWS to protect wetlands and grasslands that are vital to wildlife habitat. The USFWS owns the perpetual rights to certain wetland basins within wetland easements which cannot be burned, drained, filled, or leveled without authorization under a Special Use Permit from the USFWS. The upland portions of wetland easements may be developed without a permit as long as the wetland basins are avoided. The USFWS owns the perpetual rights to the entire grassland easements, and plowing, grading, and development within an easement are not allowed without authorization under a Special Use Permit. Within FmHA easements, the USFWS may own rights to wetland basins, shelterbelts, and/or other features. Each FmHA easement has its own specific regulations that may prohibit draining or filling of wetlands, require vegetation buffers around wetlands, or may restrict the cultivation of grasslands (USFWS 2013c). Approximately 5,419 acres of wetland easements, 298 acres of grassland easements, 4,078 acres of grassland/wetland combination easements, and 800 acres of other FmHA easements exist within the Project area. Foxtail Wind has avoided placing infrastructure on any USFWS grassland or grassland/wetland combination easement and is working with USFWS Refuge staff to avoid impacts to protected basins with the USFWS wetland easements (**Appendix C**).

The North Dakota Game and Fish Department (NDGFD) holds Private Land Open to Sportsmen (PLOTS) agreements with private landowners within the Project area, and allows walk-in public access to otherwise private land. Normal farming and ranching activities are allowed in these PLOTS agreements. Three areas within the Project area, totaling approximately 324 acres, are enrolled in the PLOTS program.

PLOTS agreements can also work side by side with Conservation Reserve Program (CRP) lands. CRP land is administered by the Farm Service Agency (FSA) through the U.S. Department of Agriculture (USDA). In exchange for yearly compensation, CRP lands are removed from agriculture production and planted with species that will improve environmental quality and health, with a long-term goal of establishing valuable land cover to improve water quality, prevent soil erosion, and reduce the loss of wildlife habitat (FSA 2017). Specific CRP acres are subject to privacy laws between each landowner and the FSA.

7.3.2 Impacts

The development of the proposed Project would not result in a significant change in land use. Approximately 0.5 percent, or 97.74 acres, of the total land within the Project area would be permanently converted into a renewable energy generation facility and its associated infrastructure. No residents or farms would be displaced due to construction activities or Project O&M. No turbines or associated infrastructure would be located within FmHA easements, and no turbines would be located on PLOTS land. Any land taken out of CRP would be negotiated between the individual land owner and the FSA.

7.3.3 Mitigative Measures

Foxtail Wind is working closely with landowners and seeking input from local, state, and federal agencies in locating wind turbines and access roads to minimize land use disruptions and impacts to environmentally sensitive areas to the greatest extent possible. The wind farm land use will not involve any ongoing industrial use of non-renewable resources or emissions to the environment.

7.4 Public Services

7.4.1 Description of Resources

Local Government Services

The Project is located in a sparsely populated, rural area in southeastern North Dakota in western Dickey County. Around the Project area is a network of established roads and utilities that provide access and necessary services to the cities, communities, homesteads, and farms. There are no incorporated or unincorporated cities within the Project area. The incorporated cities nearest to the Project area are Forbes (approximately 6.5 miles southeast), Monango (approximately 10 miles east), and Kulm (approximately 10 miles north). The unincorporated community of Wirch is approximately 1.75 miles west of the Project area. Ellendale, the county seat of Dickey County, is located approximately 15 miles southeast of the Project area. Ellendale provides sanitary sewer, water, utility services, educational facilities, and recreational facilities and parks to its residents and visitors. Ellendale's local services include emergency management, ambulance service, clinics, a landfill, fire department, and a police department. The Project area is located in the Ellendale and Kulm School Districts.

Electrical Service

Rural electrical service in the Project area is provided by Dakota Valley Electric Cooperative.

Roads

Roads located within and adjacent to the Project area are State Highway 11, State Highway 56, county roads (gravel graded and drained roads), township roads, and section lines. Roads within the Project area fall under the North Dakota Department of Transportation (NDDOT) District Boundary of Valley City.

Traffic

The NDDOT supplies annual average daily traffic (AADT) levels for major roadways in North Dakota. The data is used for planning and transportation engineering. The total volume is used to calculate vehicle traffic of major roadways for a year. Existing traffic volumes on the major roadways are documented in **Table 7-2** and **Figure 7-3**. Additional county and township roads run through the Project area, but no vehicle count data are available for them. In general, the NDDOT indicates that roads with vehicle counts under 100 AADT are rarely counted and roads with no count data are likely lower than those with count data.

Table 7-2 Existing Daily Traffic Levels

Roadway Segment	AADT/Commercial Truck Traffic
State Highway 11 east of State Highway 56	235/45
State Highway 11 west of State Highway 56	200/40
State Highway 56 north of State Highway 11	85/30
State Highway 11 west of US Route 281	960/130
State Highway 11 between State Highway 56 and US Route 281	450/105
State Highway 11 east of State Highway 3	400/50
State Highway 56 south of State Highway 13	280/45

Source: 2016 Traffic Volume Map (NDDOT 2016).

Water Supply

The Southeast Water Users District - West supplies potable water to communities within and near the Project area. Foxtail Wind would likely obtain water for construction from the cities of Ellendale or Edgeley and truck the water to the construction site. Foxtail wind will consult with Ellendale or Edgeley to obtain the appropriate permits and/or approvals.

Communications

With the switch to digital television in 2009 throughout the United States, the concern of ghost images and flickering that may be caused by wind turbine interference with analog signals is no longer an issue.

Foxtail Wind conducted a preliminary telecommunications study to identify all non-federal microwave telecommunication systems within the Project area. There is one beam path crossing the Project area.

7.4.2 Impacts

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

Local Government Services

No impact is expected to local services.

Electrical Service

The proposed Project will require station service from Dakota Valley Electric Cooperative when the Project is not generating electricity.

Roads

Construction of the proposed Project will require approximately 30 miles of new aggregate-surfaced access roads. During operation of the Project, the access roads will be used by operation and maintenance crews while inspecting and servicing the wind turbines. The access roads will be between towers, offset as necessary to allow for adequate crane access. One road will be required for each string of turbines. Although a 50-foot wide temporary disturbance area is likely during construction, the permanent access roads will primarily be 16 feet wide and low profile to allow cross-travel by farm equipment.

Traffic

There will be a temporary increase in truck traffic during construction activities. The maximum construction workforce is expected to generate approximately 800 additional vehicle trips per day on each road within the Project area. Using any combination of state and county highways and other township roads throughout the Project area, the traffic impacts are considered negligible. Approximately 30 concrete trucks will be required to pour the foundation for each turbine. This is typically completed within two days per foundation. While there may be some noticeable increase in heavy vehicle traffic in discrete locations for limited amounts of time, for the Project area as a whole, the capacity of route and level-of-service to the traveling public will be negligible as any combination of state and county highways and other township roads throughout the Project area would be used.

Truck access to the Project site is provided by Highway 11, which runs east and west through the southern end of the Project area and Highway 56, which runs north and south through the western end of the Project area. Specific truck routes will be dictated by delivery location. Additional operating permits will be issued by the State or County for over-sized truck movements.

Water Supply

Construction and operation of the proposed Project will not significantly impact local water supply. Construction of the Project will require approximately three million gallons of water for foundations, backfill, and compaction; five million gallons of water for road construction and civil infrastructure; and 10 million gallons of water for dust control. Construction water estimates are subject to change due to final site investigation and weather. The construction water will be brought on-site via trucks, most likely from the Southeast Water Users District, the city of Ellendale, or the city of Edgeley. Water for operation of the

O&M facility may be obtained from the Southeast Water Users District or via an on-site water well. The abandonment of wells is not required for the Project. The Project will not require appropriation of surface water or permanent dewatering. Temporary dewatering of groundwater (i.e., locally lowering groundwater levels in the vicinity of the excavation) may be required during construction of turbine foundations.

Communications

Existing telephone and fiber optic cables within the Project area will be located in the field by the respective utility companies prior to construction to ensure that impacts to telephone and fiber optic cables will be avoided. No response has been received yet from the National Telecommunications and Information Administration (NTIA) (**Appendix B**). No impacts to Federal Communications Commission (FCC) licensed microwave beams are anticipated from the Project turbines because a setback of blade length (190 feet) plus 33 feet (223 feet total) has been incorporated in the turbine layout.

The extent of the interference created by wind turbines on AM and FM radio and television has been gradually diminished over the past decade due to advances in turbine manufacturing and transmitter/receiver antenna design. This has reduced the impact on AM and FM radio systems to the point where only small degradation of signal is noticed a few feet from a turbine location. Coverage of AM and FM radio services are not expected to be impacted by the wind farm because turbines will be constructed a sufficient distance from each dwelling. With the switch to digital television in 2009, the concern of ghost images and flickering caused by wind turbine interference with analog signals is no longer an issue (Angulo et al. 2014).

7.4.3 Mitigative Measures

Construction and operation of the proposed Project will be in accordance with all applicable local, state, and federal permits and laws, as well as industry construction and operation standards. Due to the minor impacts expected on the existing communications infrastructure during Project construction and operation, additional mitigation measures are not required.

Local Government Services

No impact to local government services is anticipated, and no mitigation is required.

Electrical Service

Foxtail Wind will purchase station service from Dakota Valley Electric Cooperative, which will suggest appropriate configurations for the electrical system that Foxtail Wind will abide by to prevent impacts to the transmission system. Foxtail Wind has established a setback of 499 feet (110 percent the turbine height) from existing transmission lines (**Table 4-1**). No additional mitigation is necessary.

Roads

Foxtail Wind is working closely with local landowners to locate access roads in order to minimize land-use disruptions to the extent possible. The preliminary layout of the turbines and access roads is shown in **Figure 1-3**.

Traffic

The capacity of any route and level-of-service to the traveling public will not be affected, and as such, no mitigation is necessary.

Water Supply

The abandonment of wells is not required for the proposed Project. However, in the event wells are abandoned, they will be sealed as required by North Dakota law.

Communications

Collection and telecommunication lines will be buried underground to avoid collisions, to the extent practicable. 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 communications systems, Foxtail Wind will enter into agreements with service providers as necessary to avoid interference with their facilities.

7.5 Human Health and Safety

7.5.1 Description of Resources

Air Traffic

There are no public airports or private airports/airstrips within the Project area. The closest airport/airstrip is the Pruetz Municipal Airport in Kulm, ND located approximately 8.2 nautical miles (9.4 miles) northwest of the Project area. Nautical miles are the standard measure for aviation; 1 nautical mile is equal to 1.15 statute miles. The nearest airport certified for commercial carrier operations is the Aberdeen Regional Airport, located in Aberdeen, SD and approximately 40 nautical miles (46 miles) south of the Project area.

Federal Radar Interference

Wind turbines may interfere with radar systems and airspace navigation. AECOM queried the online Department of Defense (DoD) Preliminary Screening Tool to obtain a preliminary review of potential impacts to Long Range Radar and Weather Radars, Military Training Routes and Special Airspaces (FAA 2017). The DoD Preliminary Screening Tool then produces a map relating the structure to any of the DoD/U.S. Department of Homeland Security (DHS), and National Oceanic and Atmospheric Administration (NOAA) resources listed above.

The Federal Aviation Administration (FAA) reviews potential impacts to DoD radar as part of its aviation hazard review of structures that file a Notice of Proposed Construction or Alteration (FAA Form 7460-1). The FAA will request that the DoD and the DHS review the filing and may issue a Notice of Presumed Hazard if the DoD and DHS determine that impacts to radar are considered significant. The impact of a wind energy project on radar systems primarily depends on the distance to the radar, and the number and configuration of the turbines.

Air Defense and Homeland Security Radars (Long Range Radar)

The results of the Preliminary Screening Tool indicated no anticipated impacts to Air Defense and Homeland Security radars (FAA 2017). The entire search area appears as green on the map produced by the screening tool, which indicates there will be no anticipated impact to Air Defense and Homeland Security radars (**Appendix B**).

Weather Surveillance Radar

The results of the Preliminary Screening Tool indicated that for the northern part of the Project area, impacts are not likely (shown as green on the map in the screening tool); however, some impacts are possible for the southern part of the project (shown as dark green on the map in the screening tool) (**Appendix B**). The results of the Preliminary Screening Tool indicate that because the Weather Surveillance Radar-1988 Doppler radar (WSR-88D, also known as NEXRAD) can detect wind turbines occasionally at great distances, NOAA would like to know the location of all wind farm projects so that corrupted radar data can be flagged (FAA 2017).

Military Training Routes and Special Use Airspace

The Project's four boundary locations, in degrees, minutes, and seconds, encompassing the Project area were utilized for review in the Preliminary Screening Tool (FAA 2017). The results of the Preliminary Screening Tool indicate impacts to military airspace are not likely (**Appendix B**).

Electromagnetic Fields

Power frequency electric and magnetic fields (EMF) are created wherever electricity flows, which includes the wiring in our homes and schools, power lines, and the electrical equipment and devices we use at work and home. Leading U.S. and international scientific organizations, such as the National Cancer Institute and the World Health Organization, have evaluated EMF research. These organizations generally conclude that overall the body of scientific research does not show that exposure to EMF causes or contributes to any type of cancer or any other disease or illness (NIEHS 1999).

Shadow Flicker

A wind turbine's moving 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 phenomenon experienced by people at nearby residences or public gathering places. The 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.

Hazardous Materials/Hazardous Waste

The Project is located in a rural area of North Dakota. Hazardous wastes from large industrial or commercial activities are not likely to be present in the Project area. Potential hazards may exist in rural areas from farm dumps and agricultural chemicals. A Phase I Environmental Site Assessment will be conducted in the Project area prior to construction 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. When more than 1,320 gallons of oil storage is located on-site, then a Spill Prevention, Control, and Countermeasures (SPCC) Plan is required to address the safe and secure containment of oil as well as procedures for operations and spill prevention practices.

Security

The Project area is located in an area that has low population density. Construction and operation of the Project will have minimal impact on the security and safety of the local communities.

7.5.2 Impacts

Air Traffic

The installation of wind turbines creates a potential for air traffic collision. The wind turbines and the Met tower will have lighting and markings that comply with FAA requirements and the FAA's review will include the evaluation of any potential interference with air traffic. Foxtail Wind will submit Notices of Proposed Construction or Alteration to the FAA for all Project turbines and will install an FAA-approved radar-activated ADLS or equivalent lighting-mitigation system.

Air Defense and Homeland Security Radars (Long Range Radar)

The Project is not anticipated to impact Air Defense and Homeland Security radars. The results of the Preliminary Screening Tool indicate that the entire Project area appears as green on the map produced by the screening tool (**Appendix B**).

Weather Surveillance Radar

Some impacts to weather radar operations are possible in the southern part of the Project area; Foxtail Wind will notify NOAA of the Project so that any potential impacts can be tracked.

Military Training Routes and Special Use Airspace

No impacts to military airspace are expected.

Electromagnetic Fields

Low-level power frequency EMF will occur around the wind turbine generators (in the nacelles), around the generator step-up transformers, along the collector lines, and at the Project substation. All Project facilities would be set back from residences as required by state and county regulation. At these distances EMF levels would not be above background levels. The only exposure will be brief exposure to maintenance workers, primarily at the substation. Based on the above, no significant adverse impacts are anticipated.

Shadow Flicker

Shadow flicker impacts are not regulated in applicable county, state, or federal law, and there is no permitting threshold with regard to hours per year of anticipated impacts to a receptor from a wind energy project. An analysis of potential shadow flicker impacts from the Project turbine layout dated May 26, 2017 was conducted using the WindFarm software package (**Appendix B**). The WindFarm analysis was conducted to determine shadow flicker impacts under realistic impact conditions (actual expected shadow flicker, which accounts for historical sunshine probability, wind speed, and wind direction). This analysis calculated the total amount of time (hours and minutes per year) that shadow flicker could occur at receptors out to 4,528 feet. The analysis assumes that the receptors all have a direct in line view of the incoming shadow flicker sunlight and does not account for trees or other obstructions which may block sunlight. In reality, the windows of many houses will not face the sun directly to be affected by the key shadow flicker impact times.

A total of 50 structures were identified within and near the Project area; of these, 24 were determined to be occupied residences and are considered potential shadow flicker receptors for the purpose of this analysis. The predicted shadow flicker impacts are less than 30 hours per year at all but one identified occupied receptors; this receptor is owned by landowners that are not participating in the Project. The maximum predicted shadow flicker impact at any occupied residence receptor is 98.3 hours per year. The analysis was deliberately conservative and actual shadow flicker is expected to occur for less than the modeled durations; however, Foxtail Wind is working with this landowner to sign a waiver for any potential impacts.

Hazardous Materials/Hazardous Waste

A Phase I Environmental Site Assessment will be conducted and results will be used to minimize risk associated with potential recognized environmental conditions that may pose a threat to human health and safety. Significant findings are not anticipated due to the known historic uses of the property.

As with any construction activity, there is the possibility of accidentally spilling fuel, hydraulic fluid, or other hazardous substances during construction of the Project. The potential of such events would be minimized through implementation of a SPCC Plan, which would include the following:

- Construction equipment will be equipped with spill cleanup kits.
- Equipment refueling will take place at secure areas, away from wetlands or drainages.
- Workers will be trained in spill clean-up and the use of the spill cleanup kits.

These measures would ensure that surface and groundwater quality would not be degraded through inadvertent spillage of contaminants.

Security

Proposed Project construction and operation would have minimal impacts to the security and safety of the local communities.

7.5.3 Mitigative Measures

Air Traffic

Foxtail Wind submitted Form 7460-1 to FAA for each turbine to determine whether the Project layout and lighting will impact navigable airspace or communications technology used in aviation operations. The response from FAA will be submitted to the Commission when received. Wind turbines and the Met tower will have an ADLS or an equivalent lighting system according to FAA requirements that minimize any potential for air traffic impacts.

Air Defense and Homeland Security Radars (Long Range Radar)

Since no significant adverse impacts are anticipated, no mitigative measures are proposed at this time.

Weather Surveillance Radar

Since no significant adverse impacts are anticipated, no mitigative measures are proposed at this time.

Military Training Routes and Special Use Airspace

Since no significant adverse impacts are anticipated, no mitigative measures are proposed at this time.

Electromagnetic Fields

Since no significant adverse impacts are anticipated, no mitigative measures are proposed at this time.

Shadow Flicker

The primary mitigation measure used to minimize shadow flicker from wind turbines is setback distance. Foxtail Wind is committed to at least a setback distance of three times the turbine height from all existing occupied residential structures, as required by the Commission. Foxtail Wind is working with this landowner to sign a waiver for any potential impacts. Because no other significant impacts are anticipated, no additional mitigation is proposed at this time.

Hazardous Materials/Hazardous Waste

Because no significant findings are anticipated, no mitigation is proposed at this time. All petroleum fluids will be contained within the wind turbines and electrical equipment. Any petroleum wastes generated will be handled and disposed of in accordance with local, state, and federal regulations.

Security

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

- The towers will be placed at least 573 feet from public road right-of-way and three times the turbine height from occupied residences. These distances meet or exceed the required local setbacks.
- Security measures will be taken during the construction and operation of the Project, including temporary and permanent (safety) fencing, warning signs, and locks on equipment and wind power facilities.
- Turbines will sit on solid steel-enclosed tubular towers in which all electrical equipment will be located, except for the pad-mounted transformer. Access to the tower is only through a solid steel door that will be locked when not in use.
- Where necessary or requested by landowners, Foxtail Wind will construct gates or fences such as those around the collection substation.
- Foxtail Wind will provide educational materials to landowners within the site boundaries and upon request to interested persons about the Project.

7.6 Noise

7.6.1 Description of Resources

The Project area is primarily rural and agricultural. There are no populated towns within the Project area. The nearest planned Project turbine is approximately 7.8 miles from the city of Forbes, the closest incorporated city. The existing acoustic environment is defined primarily by distant traffic noise from the nearby arterial highways, and would also include intermittent aircraft overflights, and noise from agricultural operations (**Appendix B**). 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.

7.6.2 Impacts

The Commission's rules (NDAC 69-06-08-01(4)) specify that sound levels from a wind facility may not exceed 50 dBA within 100 feet of an inhabited residence or a community building, unless waived in writing by the owner. Wind turbine generators produce noise through a number of different mechanisms roughly grouped into mechanical and aerodynamic sources. Modern wind turbines include design features that minimize mechanical sound sources. The interaction of air and the turbine blades produces aerodynamic noise through a variety of processes as air passes over and past the blades. Unlike other sound sources, wind turbines generally radiate more noise as wind speed increases. However, at elevated wind speeds the wind tends to generate significant background noise by moving trees and grasses, which can create a masking effect and may aid in reducing the audibility of wind turbine sound.

In June 2017, an acoustic engineering analysis was developed to assess potential sound levels resulting from wind turbine operations, as well as the consideration of sound from the electrical substation and sound generated during Project construction and maintenance activities. Wind turbine operation was analyzed for the Project employing the Vestas V-110 and V-116 turbine models and the substation located in the southwest quarter of Section 11 in Township 130 North, Range 66 West. The Vestas V-110 and V-116 turbine noise specifications were used for their respective proposed turbine locations according to the turbine layout dated May 26, 2017. Acoustic modeling was completed at both wind turbine cut-in and maximum rotational conditions, inclusive of the entire range of future Project operational conditions. Project compliance was assessed at a total of 50 receptors in and near the Project Area, 24 of which were determined to be occupied structures.

The noise modeling results indicate that the received sound levels at 22 occupied receptors are below the North Dakota noise requirement (Chapter 69-06-08-01(4)), which prescribes a limit of 50 dBA within 100 feet of an inhabited residence. Two occupied receptors exceeded the noise requirement. The highest modeled sound level for an occupied residence was 56 dBA at a non-participating landowner.

Project construction may cause short-term, but unavoidable noise impacts. The sound levels resulting from construction activities vary significantly depending on several factors such as the type and age of equipment, the specific equipment manufacturer and model, the operations being performed, and the overall condition of the equipment and exhaust system mufflers. Sounds generated by construction activities are typically exempt from state and local noise oversight provided that they occur within weekday, daytime periods as may be specified under local zoning or legal codes. Reasonable efforts will be made to minimize the impact of noise resulting from construction activities.

Construction activity will generate traffic having potential noise effects, such as trucks traveling to and from the site on public roads. At the early stage of the construction phase, equipment and materials will be delivered to the site, such as hydraulic excavators and associated spreading and compacting equipment needed to form access roads and foundation platforms for each turbine. Once the access roads are constructed, equipment for lifting the towers and turbine components will arrive. Traffic noise is categorized into two categories: (1) the noise that will occur during the initial temporary traffic movements related to turbine delivery, haulage of components, and remaining construction; and (2) maintenance and ongoing traffic from staff and contractors, which is expected to be minor.

7.6.3 Mitigative Measures

The primary mitigation measure used for wind turbine noise is setback distance. Foxtail Wind is committed to a minimum three times the turbine height setback distance from all existing occupied residential structures, as required by the Commission. It should be noted that the acoustic model conservatively predicts outdoor sound levels and assumes no shielding or attenuation by trees or other vegetation. Foxtail Wind is working to obtain a waiver from the owner of the residences where 50 dBA would be exceeded. If a waiver cannot be obtained Foxtail Wind will ensure that the 50 dBA requirement is met.

7.7 Cultural Resources

7.7.1 Description of Resources

Class I Literature Review

Tetra Tech, Inc. (Tetra Tech) performed a Class I Literature Review for archaeological and architectural resources for the Project area and a 1-mile buffer around the Project area. The file review was completed at the State Historical Society of North Dakota (SHSND) in May 2015. This file review included identifying previously recorded archaeological sites identified during previous surveys, and historic architecture within the Project area and within 1 mile of the Project area. AECOM performed an additional file review in November of 2016.

The literature review identified 31 previously recorded archaeological sites and seven site leads within the proposed wind resource area (**Table 7-3**). Site leads refer to resources that lack sufficient information to fully record and complete all necessary data fields on the North Dakota Cultural Resources Survey (NDCRS) site forms. Examples of site leads include: (1) locations recorded from various historic documents, (2) locations reported by a landowner or other non-professional, (3) isolates, a location with five or fewer surface visible artifacts which, in the professional judgment of the archaeologist, is likely to be a limited surface expression of a former occupation area where most of the artifacts are still buried, and/or (4) locations recorded by a cultural resource specialist outside of their project area(s), and thus not fully recorded.

Of the 38 previously recorded archaeological resources, 28 are Native American sites or site leads, seven are Euro-American sites or site leads, one is a Native American/Euro-American site, and two are archaeological sites of unknown cultural affiliation. Nearly all of the Native American sites are stone

circles, cairns, or a combination of these feature types. The Euro-American sites include two single graves, a site lead and a small cemetery and sites associated with former farmsteads. The Native American/Euro-American site consists of a single cairn with Euro-American depressions. The sites of unknown cultural affiliation include a possible disturbed Native American cairn/possible Euro-American gravel pit and a site with no known information (**Table 7-3**).

Table 7-3 Previously Recorded Sites within the Project Area and 1 Mile of the Project Area

Site Number	Site Type	NRHP Status	Cultural Affiliation
Sites within Project Area			
32DI0113	Stone circle and cairn	Unevaluated	Native American
32DI0114	Cemetery	Unevaluated	Euro-American
32DI0115	Grave	Unevaluated	Euro-American
32DI0116	Cairn and depressions	Unevaluated	Native American/Euro-American
32DI0117	Cairns	Unevaluated	Native American
32DI0118	Cairn and depressions	Unevaluated	Unknown
32DI0119	Cairns	Unevaluated	Native American
32DI0120	Cairn	Unevaluated	Native American
32DI0121	Cairn and stone circle	Unevaluated	Native American
32DI0122	Cairn	Unevaluated	Native American
32DI0123	Foundations	Unevaluated	Euro-American
32DI0124	Dump and depression	Unevaluated	Euro-American
32DI0125	Farmstead	Not Eligible	Euro-American
32DI0126	Cairn	Unevaluated	Native American
32DI0127	Cairn	Unevaluated	Native American
32DI0128	Cairn	Unevaluated	Native American
32DI0129	Foundations and cultural material scatter	Unevaluated	Euro-American
32DI0130	Cairns and stone circle	Unevaluated	Native American
32DI0131	Stone circle	Unevaluated	Native American
32DI0132	Cairn and stone circles	Unevaluated	Native American
32DI0133	Stone circles	Unevaluated	Native American
32DI0134	Stone circles	Unevaluated	Native American
32DI0135	Stone circle	Unevaluated	Native American
32DI0136	Stone circle	Unevaluated	Native American
32DI0137	Stone circle	Unevaluated	Native American
32DI0138	Stone circles	Unevaluated	Native American
32DI0168	Stone circles	Unevaluated	Native American
32DI0169	Stone circle	Unevaluated	Native American
32DI0171	Stone circles	Unevaluated	Native American
32DI0172	Stone circles	Unevaluated	Native American
32DI0173	Stone circle	Unevaluated	Native American
32DIX0028	Grave site lead	Unevaluated	Euro-American

Site Number	Site Type	NRHP Status	Cultural Affiliation
23DIX0080	Unknown	Unknown	Unknown
32DIX0108	Stone circles	Unevaluated	Native American
32DIX0109	Stone circle	Unevaluated	Native American
32DIX0110	Stone circle	Unevaluated	Native American
32DIX0116	Stone circles	Unevaluated	Native American
32DIX0119	Stone circles	Unevaluated	Native American
Sites within 1 mile of the Project Area			
32DI0043	Stone circles	Unevaluated	Native American
32DI0141	Cairn	Unevaluated	Native American
32DI0142	Stone circle	Unevaluated	Native American
32DI0143	Cairns, stone circles and depression	Unevaluated	Native American
32DI0144	Whitestone Hill Battlefield	Listed	Native American/ Euro-American
32DI0162	Stone circle	Unevaluated	Native American
32DI0163	Cairns and stone circle	Unevaluated	Native American
32DI0181	German Township School	Unevaluated	Euro-American
32DI0185	Unknown	Unknown	Unknown
32DI0186	Unknown	Unknown	Unknown
32DIX0085	Isolated lithic	Unevaluated	Native American
23DIX0091	Whitestone Hill Battlefield Study Area	Unevaluated	Native American/ Euro-American
32DIX0103	Farmstead	Unevaluated	Euro-American
32DIX0111	Stone circle	Unevaluated	Native American
32DIX0112	Stone circle	Unevaluated	Native American
32DIX0116*	Stone circles	Unevaluated	Native American
32DIX0118	Stone circle	Unevaluated	Native American
32DIX0119*	Stone circles	Unevaluated	Native American
32DIX0172	Stone circle	Unevaluated	Native American
32DIX0173	Stone circle	Unevaluated	Native American
32DIX0174	Cairns and stone alignments	Unevaluated	Native American
32DIX0185	Offering stone	Unevaluated	Native American
32DIX0186	Cairn	Unevaluated	Native American
32DIX0187	Stone circle	Unevaluated	Native American
32DIX0188	Stone alignment	Unevaluated	Native American
32DIX0189	Stone alignment and depression	Unevaluated	Native American
32DIX0190	Stone alignment	Unevaluated	Native American
32DIX0191	Stone alignment	Unevaluated	Native American
32DIX0192	Stone alignment	Unevaluated	Native American
32DIX0193	Stone alignment and depression	Unevaluated	Native American
32DIX0194	Stone circle	Unevaluated	Native American
32DIX0195	Stone circle	Unevaluated	Native American

Site Number	Site Type	NRHP Status	Cultural Affiliation
32DIX0197	Stone circle	Unevaluated	Native American
32DIX0198	Cairn and stone circle	Unevaluated	Native American
32DIX0199	Stone circle	Unevaluated	Native American
32DIX0201	Stone circle	Unevaluated	Native American
32DIX0202	Stone circle	Unevaluated	Native American
32DIX0204	Stone alignment	Unevaluated	Native American
32DIX0212	Cairn and depression	Unevaluated	Native American
32DIX0213	Cairn and depression	Unevaluated	Native American
32DIX0214	Cairn	Unevaluated	Native American
32DIX0215	Stone circle and depression	Unevaluated	Native American
32DIX0216	Stone circle	Unevaluated	Native American
32DIX0217	Cairn	Unevaluated	Native American

* Portions of these sites are located in the Project area.

Within one mile of the Project area, there are 10 recorded archaeological sites and 34 site leads (**Table 7-3**). These include 38 Native American sites or site leads, two Euro-American sites, two Native American/Euro-American sites, and two archaeological sites of unknown cultural affiliation. Nearly all of the Native American sites are stone circles, cairns, stone alignments, or a combination of these feature types. Other Native American site types include an offering stone and a chipped stone isolated find. The Euro-American sites include a former schoolhouse and a former farmstead. The Native American/Euro-American sites are both associated with the Whitestone Hill Battlefield located 2.5 miles north of the closest turbine location, as requested by the SHSND (see Section 8). No information was available for the two sites with unknown cultural affiliation.

Class III Cultural Resources Inventory for Archaeological Resources

Foxtail Wind and AECOM have coordinated with the SHSND on the appropriate scope and level of survey for the adjacent proposed Project. A Class III Intensive Cultural Resources Inventory of the Survey Corridor has been completed to identify archaeological resources and a Class III Cultural Resources Inventory Report is underway. Once complete, the Class III Cultural Resources Inventory Report will be submitted to the SHSND for review and concurrence, and will also be provided to the Commission.

Class III Cultural Resources Inventory for Architectural Resources

Based on SHSND regulations, a Class III Cultural Resources Inventory for Architectural Resources is required for architectural resources within two miles of the proposed Project area. An architectural historian completed a survey of architectural resources within two miles of proposed Project turbines in spring of 2017. Additional surveys will be completed, if necessary, for changes to the turbine locations. A report will be submitted to the SHSND when complete for review and concurrence, and will also be submitted to the Commission.

Native American Coordination

On November 29, 2016, an initial outreach letter was sent to the following 16 Tribes in North Dakota, South Dakota, and Montana:

- Standing Rock Sioux Tribe

- Turtle Mountain Band of Chippewa Indians
- Cheyenne River Sioux Tribe
- Crow Creek Sioux Tribe
- Flandreau Santee Sioux Tribe
- Lower Brule Sioux Tribe
- Oglala Sioux Tribe
- Rosebud Sioux Tribe of Indians
- Santee Sioux Nation
- Sisseton-Wahpeton Oyate
- Yankton Sioux Tribe
- Crow Nation
- Northern Cheyenne Tribe
- Fort Peck Assiniboine and Sioux Tribes
- Mandan, Hidatsa & Arikara Nation
- Spirit Lake Tribe of Fort Totten

On December 2, 2016, emails, including copies of the tribal outreach letters, were sent to five Tribes (Sisseton, Spirit Lake, Standing Rock, Cheyenne River, and Crow Nation). In those emails, NEER offered to provide additional information, highlighted the proposed Project's proximity to the Whitestone Hill Battlefield site, and offered to set up meetings with the Tribes. During December 2016 and January 2017, Spirit Lake, Sisseton, and Yankton Sioux responded to NEER, expressing interest in being involved in the Project. On February 22, 2017, representatives of Sisseton, Standing Rock, Rosebud, and Northern Cheyenne met with NEER in Tulsa, OK, to discuss the Project, timing, and their request for completion of a study on sites of religious and cultural importance to the Tribes. NEER offered to set up a meeting of area Tribes, which was subsequently scheduled for, and took place on March 23, 2017 in Aberdeen, SD. Representatives of eight Tribes (Cheyenne River, Crow Creek, Northern Cheyenne, Rosebud, Sisseton, Spirit Lake, Standing Rock, Yankton Sioux), NEER, NSP/Xcel, and AECOM attended the day-long meeting that resulted in establishment of a contract with Makoche Wowapi (Wilson Mentz Consultants), to perform a study on the sites of religious and cultural importance to the Tribes on the Foxtail Project site.

The first tribal study phase focused primarily on turbine locations and was completed in April 2017. After completion of the first phase, Makoche Wowapi provided their results to NEER along with avoidance recommendations. NEER used the combination of recommendations from the cultural study provided by AECOM and the study of sites of religious and cultural importance to the Tribes from Makoche Wowapi to revise the Project infrastructure prior to the second phase of study. A second tribal meeting held in Aberdeen, SD, attended by representatives of Rosebud, Sisseton, Standing Rock, and Yankton Sioux, as well as NEER, NSP/Xcel, and AECOM, included discussion of the results of the first phase of study, the NEER approach to incorporating cultural and tribal resources in Project development, and planning for the second phase. Revision of the Project site layout after the first phase resulted in avoidance of the ribal sites of religious and cultural importance as recommended by Makoche Wowapi. In May and June 2017, phase two of the tribal study focusing on a revised Project site layout, was completed. Makoche Wowapi provided results and avoidance recommendations to NEER that were considered during revisions of the Project site layout in late June and early July. As a follow up, NEER offered to set up a site visit of the project with THPOs from the participating Tribes, which is scheduled for Wednesday, July 12, 2017. NEER, Makoche Wowapi, AECOM, and the SHSND are coordinating a joint report that includes the results of the tribal study and the Class III Cultural Resources Inventory.

7.7.2 Impacts

Archaeological Resources

Foxtail Wind will avoid newly documented sites and the previously documented cultural resources within the Project footprint. Avoidance buffers will be created for these sites and the buffers will be delineated prior to construction to ensure that archaeological resources are avoided. The pedestrian survey and shovel probing will be completed as weather permits by July 2017 and the cultural resources inventory report will be submitted to the SHSND when complete for review and concurrence, and will also be submitted to the Commission.

Architectural Resources

An architectural historian conducted a survey of architectural resources within 2 miles of proposed Project turbines in spring of 2017. The proposed Project would not directly impact any architectural resources. A report that evaluates potential visual effects on historic properties is underway. This report will be submitted to the SHSND when complete for review and concurrence, and will also be submitted to the Commission.

7.7.3 Mitigative Measures

The sites that will be avoided during construction will be fenced to reduce the potential that they are inadvertently disturbed.

An Unanticipated Discovery Plan will be prepared for the proposed Project that outlines the procedure that will be followed to prepare for and address any unanticipated discoveries of cultural resources, including possible human remains. It will provide direction to on-site personnel and their consultants as to the proper procedure to follow in the event that unanticipated discoveries are made during construction of the proposed Project. No significant impacts to undiscovered archaeological sites are, therefore, anticipated from the proposed Project.

In the event that burials or cultural sites with Native American religious values are identified during construction of the proposed Project, construction would stop within 100 feet of the site and the site will be protected until SHSND and the North Dakota Indian Affairs Commission (NDIAC) are consulted.

If confirmed or potential human skeletal remains are discovered, the Dickey County Sheriff's office will be contacted. The Sheriff will call the North Dakota State Forensic Examiner to determine if the remains are associated with a crime scene. If the remains are determined not to be part of an active crime scene or investigation, the North Dakota Chief Archaeologist will be contacted.

7.8 Recreational Resources

7.8.1 Description of Resources

There are no designated recreational areas such as state or federal parks, NWRs, or designated scenic trails within the Project area; however, a number of recreational opportunities exist within and around the Project area. As stated above in section 7.3 Land Use, one WPA is located within the Project area and four WPAs are located within one mile of the Project area. These WPAs are open to a variety of public uses including hunting, fishing, trapping, wildlife observing, and cultural and environmental education. One NDGFD designated fishing water, Moores Lake, is located within the Project area. The NDGFD regularly stocks this lake with fish and maintains site access and a public restroom.

One half-section, 320 acres, within the Project area is school trust land and is managed by the North Dakota Department of Trust Lands (NDDTL). Three other areas, two quarter-sections and one full

section, located within one mile of the Project area, are also school trust lands. These lands are dedicated to producing income for the schools and designated trust funds of North Dakota; 99 percent of North Dakota's school trust lands are leased to farmers and ranchers (NDDTL 2017). School trust land is generally open to walk-in public use; however, lessees may restrict access if livestock are present.

The 324 acres within the Project area enrolled in the PLOTS program, as described in section 7.3 Land Use, allow walk-in public access for hunting purposes only and are not open to horseback riding, camping, ATV riding, dog training, and other activities without landowner permission. These regulations are enforced year-round, but do not restrict the landowners from participating in these activities on their own lands.

The Whitestone Hill Battlefield State Historic Site is located over 2.5 miles north of the closest turbine. A Native American (Yanktoni, Dakota, Lakota, and Blackfeet) camp was ambushed on September 3, 1863 by General Alfred Sully's enlisted men (SHSND 2016). An estimated 100 to 300 Native Americans were killed and approximately 150 were captured. After the encounter, General Sully's men destroyed the camp before leaving the area. Today, the site includes a portion of the encounter and a small museum with exhibits explaining the massacre. A picnic area with a shelter, tables, and parking lot is nearby.

7.8.2 Impacts

No recreational resources will be directly impacted as impacts to recreational resources would mainly be visual in nature. Sportsman, landowners, and site seers that make use of private land, WPAs, fishing waters, school trust lands, PLOTS lands, and the historic site could potentially be temporarily impacted by construction activities. Areas close to permanent turbine locations could potentially be impacted by possible noise of wind turbines. Thirteen turbines are located within one half mile of WPAs within and around the Project area; five turbines are located within one mile of Moores Lake; 19 turbines are located within one half mile of PLOTS land; and, three turbines are located on school trust land. The leases from the turbines on school trust land will benefit the state by providing income for state schools.

Recreational opportunities that rely on wildlife resources may be temporarily impacted during construction as wildlife may avoid the busier construction areas. It is anticipated that wildlife will resume their normal behavior once construction is complete.

7.8.3 Mitigative Measures

No turbines, access roads, or associated facilities would be placed on WPA or PLOTS land. The North Dakota State Historic Preservation Officer (NDSHPO) requested a 2.5 mile setback from the Whitestone Hill Battlefield Site, and Foxtail Wind has accommodated this request. The nearest turbine is approximately 2.5 miles from the site.

Additionally, a lighting-mitigation system will be installed on turbines to reduce potential night effects of flickering lights, which will reduce impacts to night-sky viewing.

7.9 Effects on Land-Based Economies

7.9.1 Description of Resources

Agriculture/Farming

The majority of the Project area is classified as herbaceous grasslands (Homer et al. 2015) (**Figure 7-1**). Grasslands encompass 12,129.75 acres (approximately 61 percent) of the Project area; pasture or hayland comprises 2,420.49 acres (approximately 12 percent) of the Project area; and cultivated crops comprises 1,773.54 (approximately 9 percent) of the Project area (**Figure 7-4**).

According to the Census of Agriculture, corn is the most widely grown crop, with over 22,500,000 bushels being harvested in 2012 (USDA, NASS 2012). Soybeans and wheat are the next most harvested crops with roughly 5,800,000 and 1,100,000 bushels being harvested. Oats, barley, sorghum, and sunflowers are additional crops grown in Dickey County. Cattle, hogs, sheep, and chickens are the livestock raised in Dickey County with cattle being the most prevalent with roughly 47,000 head. In 2012, the total market value of agriculture products produced in Dickey County was $266,829,000, 88 percent of which was from crops, while 12 percent was from livestock sales.

As described further in Section 7.10 below, 25.5 percent of soils in the Project area are classified as farmland of statewide importance and 3.2 percent of the Project area is classified as prime farmland (Soil Survey Staff 2017) (**Figure 7-5**). These areas have been identified by the USDA and Natural Resources Conservation Service (NRCS) as lands that may produce highest crop yields.

Woodlands

Wooded areas within the Project area consist of isolated shelter belts and wooded ravines. No economically important forestry resources are found within or around the Project area.

7.9.2 Impacts

Agriculture/Farming

Construction of the proposed Project would permanently take 40.26 acres, and temporarily take 204.73 acres, of crop and hayland out of production. Of the land that would be permanently converted out of production, 2.8 acres are within prime farmland and 25.5 acres are within farmland of statewide importance. Areas of cropland temporarily impacted will be restored to cropland based on landowner preference.

A total of 48.26 acres of grassland, some of which is used for livestock grazing, will be permanently taken out of use; 361.67 of grassland acres will be temporarily taken out of use. No impacts to physical livestock are expected. Areas of grassland temporarily impacted will be restored based on landowner preference.

Woodlands

No economically important forestry resources are found within the Project area. Trees and shrubs in the Project area are sparse and limited to shelterbelts between fields, windbreaks surrounding farmsteads, along drainages, and near wetlands. Therefore, tree removal from Project construction will be minimal.

7.9.3 Mitigative Measures

Agriculture/Farming

Foxtail Wind will work with landowners to minimize impacts to their land. Where feasible, turbine and access road locations were positioned along section lines and field edges to lessen the fragmentation of land. During construction, areas will be separated from grazing animals by temporary or permanent fencing. Once construction activities have been completed, temporary construction areas will be able to go back to their previous use.

Although the Project would result in the conversion of farmland to a wind farm, economic losses to producers of the land are anticipated to be minimal in comparison to the additional income provided by the wind farm and restoration and reseeding of temporarily impacted areas. Construction sites will utilize a stormwater pollution prevention plan (SWPPP) to mitigate disturbed soils and prevent erosion and contamination of surface waters.

Woodlands

No significant impacts are anticipated to woodlands. If trees and shrubs need to be removed during construction, removal will be coordinated with the landowner and a tree and shrub mitigation plan will be created for the Commission.

7.10 Soils

7.10.1 Description of Resources

Within the Project area, the USDA has mapped 38 soil map units (Soil Survey Staff 2017). Soils in the area are primarily well-drained clay loams and silt loams, and to a lesser extent sandy loams and gravely sands, all deriving from loamy glacial till deposits and sandy and gravelly glaciofluvial deposits. Of the 38 mapped soil map units, five comprise of more than 75 percent of the Project area. These soils are the Williams-Bowbells loams (25.5 percent of the Project area), Williams-Zahl-Zahill complex (21.8 percent of the Project area), Zahl-Max-Bowbells loams (18.1 percent of the Project area), Southam silty clay loam (5.2 percent of the Project area), and the Zahl-Max-Arnegard loams (5.1 percent of the Project area).

Eleven soil map units, 28.7 percent of the acreage within the Project area, are classified as prime farmland or farmland of statewide importance. Prime farmland is the land that is best suited for food, feed, fiber, forage, and oilseed crops (Soil Survey Staff 2017). Farmland of statewide importance includes lands that are nearly prime and that produce high yields of crops when treated and managed according to acceptable farming practices. Eight soil map units, 11.7 percent of the acreage within the Project area, are classified as somewhat poorly drained, poorly drained, and very poorly drained; these eight soils have hydric soil components. **Table 7-4** provides a summary of the soil map units within the Project area, including their acreage, percentage of the Project area, farmland rating, and drainage class.

Table 7-4 Soil Map Units within the Project Area

Map Unit Name	Area (acres)	Percent (%) of Project Area	Farmland Rating	Drainage Class
Williams-Bowbells loams	5,102.3	25.5%	Farmland of statewide importance	Well drained
Williams-Zahl-Zahill complex	4,374.1	21.8%	Not prime farmland or farmland of statewide importance	Well drained
Zahl-Max-Bowbells loams	3,624.1	18.1%	Not prime farmland or farmland of statewide importance	Well drained
Southam silty clay loam	1,043.8	5.2%	Not prime farmland or farmland of statewide importance	Very poorly drained
Zahl-Max-Arnegard loams	1,016.0	5.1%	Not prime farmland or farmland of statewide importance	Well drained
Lehr-Wabek loams	825.9	4.1%	Not prime farmland or farmland of statewide importance	Somewhat excessively drained
Hamerly-Tonka-Parnell complex	631.8	3.2%	Not prime farmland or farmland of statewide importance	Somewhat poorly drained
Wabek-Lehr-Appam complex	465.9	2.3%	Not prime farmland or farmland of statewide importance	Excessively drained
Zahl-Williams-Zahill complex	368.8	1.8%	Not prime farmland or farmland of statewide importance	Well drained

Map Unit Name	Area (acres)	Percent (%) of Project Area	Farmland Rating	Drainage Class
Williams-Zahl loams	319	1.6%	Not prime farmland or farmland of statewide importance	Well drained
Parnell silty clay loam	286.1	1.4%	Not prime farmland or farmland of statewide importance	Very poorly drained
Zahl-Max-Parnell complex slopes	210.3	1.0%	Not prime farmland or farmland of statewide importance	Well drained
Makoti-Sakakawea complex	196.1	1.0%	All areas are prime farmland	Moderately well drained
Vallers loam	171.3	0.9%	Prime farmland if drained	Poorly drained
Tonka silt loam	161.1	0.8%	Not prime farmland or farmland of statewide importance	Poorly drained
Sioux-Arvilla-Renshaw complex	161.2	0.8%	Not prime farmland or farmland of statewide importance	Excessively drained
Williams-Zahl-Parnell complex	143.5	0.7%	Not prime farmland or farmland of statewide importance	Well drained
Renshaw-Sioux complex	148.1	0.7%	Not prime farmland or farmland of statewide importance	Somewhat excessively drained
Makoti-Sakakawea complex	116	0.6%	All areas are prime farmland	Moderately well drained
Renshaw-Sioux complex	114.3	0.6%	Not prime farmland or farmland of statewide importance	Somewhat excessively drained
Wabek-Appam complex	106	0.5%	Not prime farmland or farmland of statewide importance	Excessively drained
Ruso-Appam complex	71.8	0.4%	Not prime farmland or farmland of statewide importance	Well drained
Arvilla-Sioux complex	59.4	0.3%	Not prime farmland or farmland of statewide importance	Somewhat excessively drained
Spottswood loam, dry	69.5	0.3%	All areas are prime farmland	Moderately well drained
Barnes-Buse-Langhei loams	35.6	0.2%	Not prime farmland or farmland of statewide importance	Well drained
Sioux-Arvilla-Renshaw complex	38.7	0.2%	Not prime farmland or farmland of statewide importance	Excessively drained
Sinai silty clay loam	37.2	0.2%	All areas are prime farmland	Moderately well drained
Harriet loam	13.6	0.1%	Not prime farmland or farmland of statewide importance	Poorly drained
Pits, gravel and sand	26	0.1%	Not prime farmland or farmland of statewide importance	Excessively drained
Water	20.1	0.1%	Not prime farmland or farmland of statewide importance	
Barnes-Svea loams	15.4	0.1%	All areas are prime farmland	Well drained
Divide loam	29.6	0.1%	All areas are prime farmland	Somewhat poorly drained
Sioux-Arvilla complex	11.3	0.1%	Not prime farmland or farmland of statewide importance	Excessively drained

Map Unit Name	Area (acres)	Percent (%) of Project Area	Farmland Rating	Drainage Class
Forman-Cavour loams	5.7	0.0%	Farmland of statewide importance	Well drained
Barnes-Svea loams	7.5	0.0%	All areas are prime farmland	Moderately well drained
Fordville loam	0.3	0.0%	All areas are prime farmland	Well drained
Lowe-Fluvaquents, channeled complex	0.1	0.0%	Not prime farmland or farmland of statewide importance	Poorly drained
La Prairie-Fluvaquents, channeled complex	1.3	0.0%	Not prime farmland or farmland of statewide importance	Moderately well drained

7.10.2 Impacts

Impacts to soils within the Project area will be limited to areas removed from their current use by the occupancy of Project structures. Soil disturbance activities including grading for the roads, turbine pads, and associated facilities, and excavation activities for turbine foundations and underground utilities has the potential to contribute to soil erosion through the exposure of soils that were previously vegetated and stable. Estimated impacts include approximately 97.74 acres of permanent disturbance and 630.43 acres of temporary disturbance.

7.10.3 Mitigative Measures

Wind and water erosion are potential hazards within the Project area during and after construction. Soil compaction can also occur by the use of heavy equipment such as cranes. To minimize these impacts, best management practices (BMPs) will be implemented. BMPs may include the separation of topsoil and subsoil, use of silt fences, erosion blankets, temporary seeding and straw wattles during construction with the addition of permanent seeding and noxious weed control once construction is complete. In addition, during construction and operation, vehicle speed will be limited on Project roads to minimize dust. Construction sites will utilize a SWPPP to mitigate disturbed soils and prevent erosion and contamination of surface waters.

7.11 Geologic and Groundwater Resources

7.11.1 Description of Resources

The Project area is in the western portion of Dickey County and lies immediately west of the Missouri Escarpment. This escarpment extends north to south, dividing the county into the Missouri Coteau on the west and the Glaciated Plains on the east (Bluemle 1979). Elevations west of the Missouri Escarpment average 300 to 400 feet higher than on the east. The topography of the Missouri Coteau is characterized by poorly drained depressions which receive snowmelt and runoff water from closely spaced rolling hills while the topography of the Glaciated Plains is nearly level with limited areas on rolling land. **Figure 1-3** shows the topography of the Project area.

The Missouri Coteau and the Project area are within the Central Dark Brown Glaciated Plains major land resource area, which is almost entirely covered by glacial till plains (USDA, NRCS 2006). Surficial deposits within the Project area consists of up to 300 feet of glacial sediments. The interspersed collapsing of these sediments developed the hummocky, rolling hills surrounding the numerous sloughs and lakes. A geological map of Dickey County shows transverse ridges along the east side and large ice thrust masses along the south west portion of the Project area (NDGIS, NDITD 2017). A minimal amount of landslide deposits occur within the Project area along steep slopes, mainly occurring along the

Missouri Escarpment (NDGS 2017). Nine sand and gravel mines are located within five miles of the Project area; one active sand and gravel mine occurs within the Project area (Anderson 2012). Dickey County is one of 32 counties in North Dakota that does not have conditional use permit requirements related to the extraction and production of sand and gravel.

No aquifers are located within the Project area; however, two shallow glacial drift aquifers are located within five miles of the Project area (NDSWC 2017). The nearest aquifer is unnamed and is located approximately 0.6 miles west of the Project area. This unnamed aquifer is approximately 10,090 acres with water depths ranging from nine to 50 feet below ground service (bgs). The Spring Creek aquifer is much larger and is located approximately 4.8 miles southwest of the Project area. Water depths in this aquifer range from 11 to 110 feet bgs.

Four water wells, three domestic/stock wells and one test well, are located within the Project area (NDSWC 2017). These wells range from 14 to 210 feet bgs and found water between 10 and 60 feet bgs.

7.11.2 Impacts

Impacts of the proposed Project to geological resources are anticipated to be minimal. There are no active oil and gas wells or coal mines within or near the Project area (NDDMR 2017). Viable sand and gravel resources occur within and around the Project area. If sand and gravel resources are found during Project construction, Foxtail Wind will coordinate with landowners to facilitate any future development of these resources. If the Project does impact any sand or gravel resources, the regional supply of these materials would not be adversely impacted due to the abundance of this resource in the area.

Likewise, impacts of the proposed Project to groundwater resources are anticipated to be minimal. Major groundwater withdrawals will not be necessary due to the limited amount of water needed for Project development. Based on the relatively small amount of increased impervious surface at each turbine and large distance between each turbine foundation, the Project would not contribute to significant impacts on groundwater flow or recharge. If groundwater is disturbed by the construction of turbine foundations, it is anticipated that it would resume its natural course of flow upon construction completion. Additionally, each turbine would be located a minimal distance of three times the turbine height from existing occupied residences, consequently minimizing impacts to private wells, which are assumed to be in the near vicinity to the residences.

7.11.3 Mitigative Measures

Wind turbines will be sited to avoid any sand and gravel resources identified within the Project area. Where these resources cannot be avoided, coordination will be done with landowners regarding impacts and any requested mitigation. If dewatering of excavations is necessary during foundation construction and as long as the water is known to be uncontaminated, all water would be discharged according to items outlined in the SWPPP and allowed to infiltrate naturally back into the ground (Grossman 2011). If discharge water is suspected to be contaminated, application for a temporary discharge permit (NDG-070000) would be completed. If subsurface blasting is required, a blasting plan will be developed and implemented to localize impacts and fracture the minimal amount of bedrock required for construction.

7.12 Surface Water and Floodplain Resources

7.12.1 Description of Resources

The entire Project area lies within the prairie pothole region of North Dakota. This region formed when glaciers retreated north, leaving a plethora of shallow depressions that are now shallow lakes and wetlands. USFWS National Wetlands Inventory (NWI) data and U.S Geological Survey (USGS) National

Hydrography Dataset (NHD) data were used to identify potential surface waters within the Project area (USFWS 2017, USGS 2017). This data was used as a precursor for field delineations. Small drainages and streams are found within the Project area, all eventually draining east into the Elm River. These water complexes may be used for hunting, bird watching, and potentially fishing; however, they are not likely utilized for boating activities other than small watercraft on larger waters used for hunting or fishing.

Due to the Project area's rural location, no Federal Emergency Management Agency (FEMA) flood rating maps have been developed for the area (USDHS, FEMA 2017).

7.12.2 Impacts

Construction of wind turbines, access roads, and associated facilities will temporarily and permanently disturb land within the Project area and, as a result, have the potential to impact surface water resources. Field surveys to map surface waters within the temporary and permanent impact areas will be completed in July of 2017. Stream crossings and ponds surveyed through June 2017 are shown in **Figure 7-7**.

Because no flood rating map has been developed for the Project area, floodplain resources will not be impacted.

7.12.3 Mitigative Measures

The turbines and associated facilities will be built to avoid the intermittent streams, drainages, and ponds as much as possible. Access roads to turbines will be built to avoid surface water impacts to the maximum extent possible and to allow runoff from the upper portions of the watershed to still flow, unrestrictedly, to the lower portions of the watershed. Construction zones will be minimized crossing the delineated streams to ensure permanent impacts are kept under 0.10 acres, as described is Section 7.13.

Coverage under the North Dakota Department of Health's (NDDOH's) National Pollutant Discharge Elimination System (NPDES) general construction permit would be obtained prior to the start of construction, and sediment runoff into surface waters would be minimized and/or avoided through the use of BMPs outlined in the accompanying SWPPP.

7.13 Wetlands

7.13.1 Description of Resources

Wetlands are an important natural resource providing a number of critical ecosystem functions. Some of these functions include flood flow attenuation, streambank stabilization, discharge and recharge of ground water, detention and removal of sediments, and the detention, removal, and transformation of nutrients and contaminants. Wetlands also may provide habitat for wildlife and sites for human recreation, education, and aesthetic enjoyment.

Wetlands are defined in the 1977 Executive Order 11990 – Protection of wetlands and in Section 404 of the Clean Water Act (CWA) of 1986, as areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The three parameters that define a wetland, as outlined in the U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual, are hydric soils, hydrophytic vegetation, and hydrology (Environmental Laboratory 1987). Wetlands generally include swamps, marshes, bogs, and similar areas such as slough, potholes, and river overflows. The functions of wetlands include providing habitat for wildlife, improving water quality through filtration and purification, storing floodwaters, and recharging groundwater.

The prairie pothole region's numerous wetlands, rich soils, and warm summers has made it be known as one of the most important wetland regions in the world (USEPA 2016). More than 50 percent of North American migrating waterfowl depend on this region for breeding and feeding grounds.

A desktop analysis, using NWI, NHD, and aerial photography data, was performed to identify probable locations of wetlands and waterbodies prior to field work. The initial desktop analysis was followed by a site visit to microsite turbine locations in September 2016 and May 2017. Field wetland delineations were conducted in November 2016, April 2017, and June 2017. The study areas for field delineations covered the proposed turbine locations, access roads, collection substation, O&M building, Met tower, batch plant, switchyard, collection lines, and construction laydown yard. The delineations followed methodology from the USACE Wetlands Delineation Manual (Environmental Laboratory 1987) and Regional Supplement to the USACE Wetland Delineation Manual: Great Plains Region (Version 2.0) (USACE 2010). Delineated wetlands will be avoided where feasible and to the maximum extent possible. Each wetland was identified and sufficient information was gathered for the preparation of jurisdictional determinations, should they be warranted. A report of findings will be provided to the Commission upon completion.

The USACE has jurisdiction of waters of the US (WOUS) under Section 404 of the CWA and navigable waters under Sections 9 and 10 of the Rivers and Harbors Act of 1899 (RHA). The USACE Nationwide Permits (NWPs) 12: Utility Line Activities and 14: Linear Transportation Projects, authorize the discharge of dredged or fill material into non-tidal WOUS given that there is not a loss of greater than ½-acre of WOUS for any "single and complete project" or that permanent access roads are not constructed above grade in WOUS for a distance of more than 500 feet. "Single and complete project" refers to each discrete intersection between proposed Project infrastructure and jurisdictional wetlands and other WOUS. Both NWPs require a preconstruction notification (PCN) to the USACE. However, for permanent impacts less than 0.10 acre, no PCN would be required. Based on wetland and other WOUS surveys, all permanent impacts are minimized to less than 0.10 acres per each single and complete crossing.

7.13.2 Impacts

Foxtail Wind has committed to minimizing impacts to jurisdictional wetlands and other WOUS to the extent practicable. Based on desktop analysis and preliminary field surveys, the proposed Project is not expected to have any "single and complete project" that would meet or exceed the 0.10-acre impact threshold that would require a PCN to the USACE Bismarck Regulatory Office. Horizontal directional drilling may be used where necessary to avoid impacts to wetlands from collection line trenching during construction.

Based on discussions with the USACE, the proposed Project would likely meet the authorization criteria for a Section 404 NWP 12 (Utility Line Activities) and/or NWP 14 (Linear Transportation Projects). No Section 404 written permit is anticipated to be required as a result of construction of this proposed Project because it is not anticipated that the proposed Project would exceed the 0.10-acre threshold for PCN for NWP 12 or NWP 14. Nevertheless, if the proposed Project does cause minor impacts less than 0.10-acre in jurisdictional wetlands/WOUS, then NWP requirements will be adhered to.

Wetland surveys are ongoing and will be completed in July of 2017. A wetland survey report is underway and will be submitted to the Commission upon completion.

7.13.3 Mitigative Measures

Foxtail Wind has committed to avoiding and minimizing impacts to potentially jurisdictional waters with the goal of not exceeding the 0.10-acre threshold of permanent impacts, which would trigger the need for a PCN. Wetlands will be delineated and flagged prior to construction when in close proximity to proposed

Project features. Since the initial field delineations, access roads and turbine placements have been shifted to avoid wetlands as much as feasible. Sediment runoff into wetlands would be minimized and/or avoided through the use of BMPs outlined in the SWPPP. Coverage under the NDDOH NPDES general construction permit would be obtained prior to the start of construction. As noted in Section 7.3.1, Foxtail Wind has avoiding placing infrastructure on any USFWS grassland or grassland/wetland combination easement and is working with USFWS Refuge staff to avoid impacts to protected basins with the USFWS wetland easements through micrositing.

7.14 Vegetation

7.14.1 Description of Resources

The Project area is in a rural location where farming and livestock grazing are the dominant land use. The Project area is representative of the prairie pothole region topography with wetlands occurring in nearly every low area with larger bodies of water frequently connected by wetland channels. This region is associated with mixed-grass prairie (Dyke et al. 2015). Vegetation of the mixed-grass prairie consists mainly of Western wheatgrass (*Pascopyrum smithii*), little bluestem (*Schizachyrium scoparium*), purple prairie clover (*Dalea purpurea*), and common yarrow (*Achillea millefoium*) with prairie cordgrass (*Spartina pectinata*), and reed canary grass (*Phalaris arundinacea*) occurring in low areas. Much of the native prairie within the Project area has been largely replaced by wheat, alfalfa, and other commercial crops.

Approximately 61 percent of the Project area consists of grasslands and other herbaceous vegetation. Grasslands within the Project area consist of remnant areas of native prairie and tame grasslands (Tetra Tech 2014). Native prairie is typically found on unbroken soils whereas tame grasslands occur on tilled soil that has been replanted into grassland. The grasslands within and surrounding the Project area provide valuable habitat to a wide variety of upland bird species as well as provided nesting and brooding habitat for many species of waterfowl. Locations where native prairie exists adjacent to wetlands are some of North America's best waterfowl nesting habitat (DU 2016).

Hayland, cropland, and pasture comprise approximately 21 percent of the Project area collectively, and are managed for the production of cereal crops and livestock forage. Management practices in the Project area may include reseeding, fertilization, weed control through herbicide application, and allowing land to go fallow. These management practices can often introduce non-native grasses and forbs. During field visits in the fall of 2016, croplands within the Project area were planted in spring wheat and corn, with evidence of hayland rotation. Haylands were planted in alfalfa, sweet clover, and mixed grasses. Crop species in the area may fluctuate from year to year depending on market demands.

Approximately 8.56 percent of the Project area consists of shrub/scrub vegetation, and 0.26 percent consists of deciduous forest. Trees and shrubs in the Project area are sparse and limited to shelterbelts between fields, windbreaks surrounding farmsteads, along drainages, and near wetlands.

7.14.2 Impacts

Wind turbines, access roads, and associated facilities will be constructed on grasslands, including both native prairie and tame grasslands, and haylands. Access road and turbine pad construction will result in the greatest permanent impacts to native vegetation with approximately 48.26 acres of grassland permanently impacted. Temporary impacts will come from temporary construction areas and the installation of underground utility cables; 361.67 acres of grassland will be temporarily impacted. High quality native prairie was avoided where feasible, and USFWS grassland easements were avoided completely in the site design.

During the micrositing surveys (May 18 through 20, 2017), native prairie and Dakota skipper habitat suitability evaluations were completed for each proposed turbine location. The purpose of the micrositing field survey was twofold; 1) to identify turbines sited in native prairie remnants, and 2) to evaluate the overall butterfly habitat quality of the identified native prairie. Each proposed turbine location was visually surveyed to determine if it contained remnant native prairie or tame grassland that had been previously cultivated based on the composition of native and non-native species, presence of forbs, topography, and other factors. Grassland quality was then determined by evaluating plant diversity, current grazing level, and dominant composition (native or non-native) to define three levels of grassland quality – poor, good, and excellent. In locations that were identified as good to excellent, surveyors then determined if appropriate habitat was present for the Dakota skipper (unlikely, possible, excellent). These areas were evaluated for plant community composition (native, non-native, woody species) and current grazing level to define three levels of grassland quality – poor/unlikely, good/possible, and excellent/likely.

- Poor/unlikely habitat was heavily grazed or ungrazed, had moderate to heavy invasion of non-native species, and was surrounded by either poor quality or existing disturbances (e.g. roads, cropland).
- Good/possible habitat was lightly grazed, had moderate to low invasion from native species, and was surrounded by similar quality native prairie.
- Excellent/likely habitat was lightly grazed, had little to no invasion from non-native species (0-25 percent), and was surrounded by similar excellent native prairie.

Based on the micrositing surveys, no turbines were sited on excellent/likely habitat.

7.14.3 Mitigative Measures

There are 11 state noxious weeds and one additional noxious weed listed for Dickey County: absinth wormwood (*Artemisia absinthium*), Canada thistle (*Cirsium arvense*), dalmatian toadflax (*Linaria genistifolia*), diffuse knapweed (*Centaurea diffusa*), leafy spurge (*Euphorbia esula*), musk thistle (*Carduus nutans*), purple loosestrife (*Lythrum salicaria*), Russian knapweed (*Acroptilon repens*), Saltcedar (*Tamarix chinensis, T. parviflora, T. ramosissima*), spotted knapweed (*Centaurea maculosa*), yellow toadflax (*Linaria vulgaris*), and downy brome (*Bromus tectorum*) (NDDA 2017). Absinth wormwood, Canada thistle, and leafy spurge were observed during surveys, often in invaded grasslands, along roadsides, and on the edge of croplands. Invasive or noxious species will be replaced by similar non-invasive or non-noxious species suitable for North Dakota growing conditions as recommended by the North Dakota Forest Service and in coordination with landowner preferences.

Where feasible, access roads were positioned along section lines and field edges to lessen the impact of fragmentation of grasslands. Following construction, impacts to temporarily disturbed grassland areas will be mitigated by reseeding with a weed-free seed mixture consistent with the surrounding vegetation and landowner preference. Proper BMPs will be utilized to ensure successful revegetation. Areas currently in cropland or hayland will be replaced in coordination with landowner preferences. Once revegetated, these areas would be available to return to their present use.

Foxtail wind is committed to avoiding impacts to existing trees and shrubs. If trees and shrubs need to be removed for construction purposes, coordination with the landowner will be conducted along with preparing a tree and shrub mitigation plan to be submitted to the Commission. Trees and shrubs that would be removed will be inventoried and documented for replacement purposes. Tree replacement would be on a 2-to-1 basis with 2-year-old saplings; shrub replacement would be on a 2-to-1 basis with stem cuttings. Trees and shrubs will be replaced by the same species or similar species, except in the case of invasive or noxious species.

7.15 Wildlife

7.15.1 Description of Resources

Wind energy provides a clean, renewable energy source. In order to minimize the potential to negatively impact wildlife during construction and/or operations, the following desktop assessments and field studies to document wildlife and habitat within the Project area in accordance with the voluntary USFWS Land-Based Wind Energy Guidelines (USFWS 2012b), are currently completed or underway:

- Desktop habitat assessments for bats and whooping crane (*Grus americana*) (Tetra Tech 2017a, 2017b).
- Native prairie and pollinator surveys were conducted in 2014 and 2015 (Tetra Tech 2014, Tetra Tech 2015a).
- Biweekly eagle use surveys were conducted in August 2014 through September 2015, for a total of 26 rounds of survey (Tetra Tech 2015b).
- General avian use surveys were conducted in fall 2014 and spring 2015 (Tetra Tech 2015c).
- A spring raptor nest inventory and sharp-tailed grouse (*Tympanuchus phasianellus*) lek survey was conducted, consisting of an initial aerial survey in April 2017, before the deciduous trees regained leaves, and a follow-up ground-based survey in May 2017 (Tetra Tech 2017c).
- Additional eagle point-count surveys for bald and golden eagles were conducted in March through June 2017 (for nine rounds of survey) and are ongoing.

Avian Species

Based on the location of the proposed Project area and field observations of the habitat present, it is expected that the majority of avian species present within the proposed Project area will be those typically associated with grassland and agriculture habitats (Tetra Tech 2015c). The most common species observed during fall 2014 and spring 2015 avian surveys were the snow goose (*Chen caerulescens*), Canada goose (*Branta Canadensis*), and mallard (*Anas platyrhynchos*) for waterfowl and red-winged blackbird (*Agelaius phoeniceus*), brown-headed cowbird (*Molothrus ater*), and horned lark (*Eremophila alpestris*) for songbirds. All of these species are common in North America and have large populations. Additionally, birds migrating between breeding and wintering grounds may also pass through the proposed Project area given its position within the Central Flyway (USFWS 2015c). Breeding, wintering, and migratory bird habitat within the Project area is primarily grassland or agriculture, but there are also wetlands and small, scattered wooded, riparian areas available.

Bat Species

Eleven bat species are found in North Dakota (Gullickson 1999, Gullickson n.d., BCI 2017). Based on the presence of suitable habitat, known distribution ranges, and documented occurrences five of these species are expected to have a moderate to high potential to occur within the Project area: the little brown bat (*Myotis lucifugus*), the big brown bat (*Eptesicus fuscus*), the silver-haired bat (*Lasioncycteris noctivagans*), the Eastern red bat (*Lasiurus borealis*), and the hoary bat (*Lasiurus cinereus*) (**Appendix B**). These bat species are often found roosting in attics, barns, or in trees underneath a canopy of leaves. The remaining six species including the federally threatened northern long-eared bat (NLEB) (*Myotis septentrionalis*) are expected to have a low potential for occurrence in the Project area.

Suitable natural roosting habitats in the Project area are limited to individual trees, windrows, woodlots, buildings, bridges, and riparian zones. The availability of tree-roosting habitat in the Project area is limited due to the small size and fragmented nature of the wooded habitat and accounts for less than 1 percent of the Project area. Farmstead buildings (houses, barns, etc.) could also provide potential roosting locations within the Project area; however, the suitability of these man-made structures has not been evaluated. Therefore, bat use of the Project area is likely to be low given the limited availability of roosting habitat.

7.15.2 Impacts

Potential impacts from the Project to avian and bat species include collisions with wind turbines and guyed Met towers, as well as loss of and fragmentation of habitat. Potential impacts to sensitive species are discussed in more detail in Section 7.16.2 below.

Avian Species

The collision risk for birds at the proposed Project will likely be low based on records of fatalities at other wind energy facilities in the region. Recent meta-analyses relevant to the proposed Project have estimated an average all-bird fatality rate of 1.81 birds/MW/year in the Great Plains (Loss et al. 2013) and 2.29 small birds/MW/year in the Prairie biome (Erickson et al. 2014). Discrepancies between the two rates are most likely due to differences in the way geographic areas were defined in the studies; however, both regions encompassed the proposed Project area and it is likely that rates of collision at the proposed Project would be similar to rates reported by these studies.

Bat Species

According to the Bat Habitat Assessment (Tetra Tech 2017a), highly suitable habitats for bats are largely absent from the Project area. Natural roosting habitat (individual trees, windrows, woodlots, and riparian zones) is limited to less than one percent of the Project area and is highly fragmented. Lower quality habitat in the form of grasslands and agriculture lands compose the majority (approximately 80 percent) of the Project area. The Eastern red bat, silver-haired bat, and the hoary bat are mainly migratory and travel at high altitudes, making them more susceptible to collisions with wind turbines than other bat species because they typically fly at heights that overlap the rotor-swept zone. These species have been the predominant species found during post-construction mortality monitoring studies at operational wind energy facilities in North America. The NLEB, little brown bat, and other species make short distance seasonal movements between summer roosts and winter hibernacula. NLEB and other bat species may transit through the Project area during spring and fall migration; however, identifiable migration and movement corridors for bats are absent from the Project area. There are no large forested riparian corridors for bat species to follow or utilize as stopover day roosting sites. Forested areas within the Project area consist of a few small wooded parcels that are disconnected from each other. Given the lack of large, forested riparian corridors and limited roosting habitat within the Project area, use of the Project area by migrating bats, and thus risk of collision, is likely to be low.

Specifically, the NLEB is expected to have a low likelihood of occurrence within the Project area during the summer residency period and during migration due to lack of suitable habitat, which consists of a wide variety of wooded habitats used for roosting, foraging, and travel (Tetra Tech 2017a). Although the species is believed to occur statewide in suitable habitats, there are no known occurrences of NLEB within Dickey County and no known hibernacula in the state (USFWS 2015b). This species is addressed in greater detail below.

Habitat Loss

As stated in the USFWS voluntary wind energy guidelines, a species of habitat fragmentation concern is a species “for which a relevant federal, state, tribal, and/or local agency has found that separation of their habitats into smaller blocks reduces connectivity such that the individuals in the remaining habitat segments may suffer from effects such as decreased survival, reproduction, distribution, or use of the area” (USFWS 2012b). The USFWS North Dakota field office has developed a list of species of habitat fragmentation concern for several avian species in the state (USFWS 2013d). Habitat fragmentation from the construction of a wind energy project may potentially reduce habitat available for these species. Some short-term displacement in grassland areas would be expected, but the effects would be mostly limited to the construction period and the immediate area around the turbines (Pearce-Higgins et al. 2012, Shaffer and Buhl 2016). Additionally, turbine locations have been sited outside of high quality

grasslands during micrositing surveys, thus, minimizing habitat fragmentation in high quality grassland. For bats, the limited and highly fragmented nature of existing habitat in the Project area suggests that development of the Project will be unlikely to reduce or fragment bat habitat.

7.15.3 Mitigative Measures

Foxtail Wind is conducting environmental studies of the Project area to assist in the placement of turbines, roads, and associated facilities to minimize and potentially avoid impacts to wildlife and native habitat. The following measures will be used, to the extent practicable, by Foxtail Wind to help avoid potential impacts to wildlife in the Project area during selection of the turbine locations and subsequent development and operation:

- Siting turbines and access roads away from wetlands and waterbodies to the greatest extend possible.
- All turbines will sit on cylindrical or tubular tower, and not a lattice structure, to minimize perching opportunities for raptors such as eagles and other birds.
- All guy lines on the guyed Met tower will be marked with bird diverters to minimize bird collision hazards. In addition, the Met tower will not be located in sensitive habitats or in areas where ecological resources known to be sensitive to human activities are present.
- Burying collection lines from the turbines to the collection substation to avoid collision risk following the Avian Power Line Interaction Committee (APLIC) suggested practices, if practicable (APLIC 2012).
- Utility lines will be designed following APLIC (2012) guidelines to prevent bird collision, as practicable. The Project interconnection to the existing transmission line will occur at the Project substation, so no new above-ground transmission line will be created.
- To protect birds from electrocution, Foxtail Wind will use pad-mounted transformers
- Temporarily disturbed areas will be reseeded or restored to crop, depending on original conditions and landowner preference. Native prairie will be avoided to the extent practicable, and will be reseeded using a native prairie mix in accordance with landowner preferences.
- Utilizing BMPs to prevent the spread of noxious weeds, such as leafy spurge, Canada thistle, and absinth wormwood, which take over native habitat.
- Siting turbines at least 300 feet from active raptor nests and 500 feet from leks. Turbines were specifically sited to avoid active raptor nests and leks.
- Implementing a Wildlife Response and Reporting System (WRRS) once turbine construction has been completed. The WRRS would include protocols for field technicians to report and document bird and bat mortalities during routine maintenance operations. If any dead or injured birds or bats are found within the proposed Project boundaries by Project personnel, its location will be marked and reported promptly to the on-duty Plant Lead/Site Supervisor. Dead or injured birds or bats will not be moved by any unpermitted individual.
- Conducting post construction mortality surveys for one year following construction of the Project.
- Developing a voluntary Wildlife Conservation Strategy (WCS), which includes an adaptive management approach, so that information gathered and experience gained from post-construction monitoring can be used to inform future management decisions at the proposed Project.
- Proposing to minimize the number of aviation hazard lights acceptable to the FAA to avoid attracting avian and bat species to turbines.
- During construction, disturbance to raptor nests within the Project area will be avoided by establishing a 300-foot radius non-disturbance buffer on the center of each active nest during the nesting season.
- During construction, disturbance to sharp-tailed grouse leks within the Project area will be avoided by establishing a 500-foot radius non-disturbance buffer on the center of each active lek during the breeding season.

- During construction, limiting road speeds to 25 mph within the Project area to minimize wildlife collisions.

7.16 Rare and Unique Natural Resources

7.16.1 Description of Resources

The Endangered Species Act (ESA) is administered by the USFWS and mandates protection of species federally listed as threatened or endangered (T&E) and their associated habitats. An endangered species is a species that is in danger of extinction throughout all or a significant portion of its range. A threatened species is a species that is likely to become endangered in the foreseeable future. Critical habitat for these species can be designated if that habitat includes specific areas that are occupied by a species at the time of listing or unoccupied areas that are considered essential to the conservation of a species. Candidate species receive no statutory protection from the USFWS unless they are formally listed.

North Dakota does not have a state T&E species list; however, it recognizes those federally listed under the ESA. North Dakota does list Species of Conservation Priority, which are ranked into three priority levels (NDGFD 2015). Level I species are those of either high level conservation priority due to declining status either in North Dakota or across their range or those whose rate of occurrence in North Dakota constitutes the species core breeding range but are at-risk range wide. Level II species are those having a moderate level of conservation priority or having a high level of conservation priority but non-State Wildlife Grant funding is available to the conservation of the species. Level III species are those who have a moderate level of conservation priority but are believe to be non-breeding in North Dakota.

Eleven species are federally listed in North Dakota; however, the USFWS Information for Planning and Conservation (IPaC) tool (USFWS 2015d), indicated that five T&E species could potentially occur within the Project area. These species include three birds and two mammals: piping plover (*Charadrius melodus*) (threatened), red knot (*Calidris canutus rufa*) (threatened), whooping crane (*Grus Americana*) (endangered), gray wolf (*Canis lupus*) (endangered), and NLEB (threatened). Foxtail Wind has also contacted the USFWS to evaluate if Dakota skippers (*Hesperia dacotae*) (threatened) occur in the vicinity of the Project area. No federally-listed species were observed during onsite surveys.

Additionally, bald and golden eagles (*Haliaeetus leucocephalus* and *Aquila chrysaetos*, respectively) have been observed within the Project area, primarily during late winter and early spring; both species are protected under the Bald and Golden Eagle Protection Act (BGEPA). The BGEPA protects bald eagles and golden eagles throughout their range in the U.S. Although it does not designate critical habitat, BGEPA protects individual eagles and nests from disturbance, which can be caused by impacts to habitat.

These federally protected species and their state conservation priority status are described in greater detail below.

Piping Plover (Federally Threatened)

Piping plovers are small shorebirds with a gray to brown back and a white belly (NDGFD 2015). Adults have orange legs and a black tipped orange bill. Males have a distinct black band that runs across the forehead and a single black band that encircles the body at the breast. Females will have the same but paler features. Their preferred nesting habitat is limited to sandy or gravelly beach and sandbars or alkaline wetlands while feeding on insects near the waterline. More than three-fourths of piping plovers in North Dakota nest on prairie alkali lakes, while the rest use the Missouri River (USFWS 2015e). The piping plover is a federally threatened species, likely to become endangered within the foreseeable future, and is considered a Level II Species of Conservation Priority in North Dakota.

Piping plover populations are threatened by habitat loss due to vegetation encroachment, shoreline development, anthropogenic and animal disturbances, and water management activities, such as dam construction and channelization. Critical habitat has been federally designated for the piping plover in North Dakota. This habitat runs mainly along the shores of the Missouri River and Lake Sakakawea, but encompasses some surrounding wildlife refuge areas as well. No designated critical habitat is located within the Project area, and no suitable piping plover habitat was observed in the Project area during the onsite surveys. The closest designated critical habitat is located approximately 10 miles west so it is unlikely, although possible, the piping plover would occur within the Project area.

Red Knot (Federally Threatened)

Red knots are medium sized shorebirds with a red head and breast, a white abdomen and under tail, thick black legs, and finely mottled gray, black, and brown back wings (NDGFD 2015). In the winter, the adults turn a mottled pale gray color. They prefer to breed and nest in drier tundra areas with sparsely vegetated hillsides. The red knot is a federally threatened species and is considered a Level II Species of Conservation Priority in North Dakota. There is no federally designated critical habitat for this species in North Dakota.

The USFWS listed the rufa subspecies of red knot as threatened on December 11, 2014. The red knot is noted for its long-distance migrations of up to 9,320 miles between circumpolar breeding habitats and marine wintering habitats in southern latitudes of South America. Most of the known migration routes for the rufa subspecies are along coastal regions of Canada and the U.S. However, an interior migratory route was identified to and from the Arctic passing through Saskatchewan and Alberta Canada through the Great Plains states to non-breeding areas mostly in Texas and Louisiana along coastal areas of the Gulf of Mexico (Skagen et al. 1999). Population sizes for knots are in decline around the world, especially C. c. rufa, which declined from about 82,000 individuals in the 1980s to fewer than 30,000 in 2010 (Baker et al. 2013). Threats to the red knot include the loss of habitat in both breeding and nonbreeding areas; disruption of natural predator cycles on the breeding grounds; reduced prey availability at stopover areas and throughout the nonbreeding range; and increasing frequency and severity of asynchronies (“mismatches”) in the timing of the birds’ annual migratory cycle relative to favorable food and weather conditions (USFWS 2014d). No suitable red knot habitat was observed in the Project area during the onsite surveys. However, it is possible, but unlikely, that red knots may encounter the turbines within the proposed Project area during migration.

Whooping Crane (Federally Endangered)

Whooping cranes are North America’s tallest bird, standing five feet tall when erect (NDGFD 2015). Their plumage is all white with the exception of black wing tips and a red/black crown. They have long black legs and can have a wing span of over seven feet. The whooping crane is a federally listed endangered species and is considered a Level III Species of Conservation Priority in North Dakota. There is no federally designated critical habitat for this species in North Dakota.

The whooping crane was considered endangered in the United States in 1970 and the endangered listing was ‘grandfathered’ into the ESA of 1973 (CWS and USFWS 2007). The whooping crane population was reduced to 16 individuals belonging to one flock that migrated between Wood Buffalo National Park in Canada and the Aransas National Wildlife Refuge in Texas. With conservation efforts the Aransas-Wood Buffalo National Park population, the single self-sustaining wild population, has been steadily rising with the population estimated at 329 birds (with a 95 percent probability of actual flock size being between 293 to 371 birds) as of the 2015/2016 winter whooping crane survey conducted by USFWS (USFWS 2016b). At the time of this writing, results of the 2016/2017 USFWS winter survey are pending. A 200-mile wide migration corridor has been delineated for this population that contains 95 percent of all verified sightings. Spring migration occurs primarily in April and May whereas fall migration occurs primarily in October and November (Lewis 1995). Stopover habitat during migration includes a

variety of croplands with roosting occurring in shallow, freshwater inland wetlands. Four additional areas associated with major stopover areas are designated as critical habitat: Quivira National Wildlife Refuge and Cheyenne Bottoms State Wildlife Management Area in Kansas; a section of the Platte River in Nebraska; and the Salt Plains National Wildlife Refuge in Oklahoma (USFWS 2012b). Wind energy development has been identified as a threat to the species due to the potential for displacement due to the presence of the turbines, and potential for collisions with operational wind turbines and new power lines.

A desktop landscape-scale analysis was conducted to evaluate whooping crane stopover habitat within the vicinity of the Project (Tetra Tech 2017b) (**Appendix B**). The methods used to determine potential whooping crane habitat suitability within and around the Project were designed by The Watershed Institute (TWI), and adapted to fit non-linear projects such as wind energy facilities. The assessment identified 763 wetlands as potentially suitable stopover habitat within the Project area and a surrounding 1-mile buffer, consisting of 2,170 acres of emergent wetlands, 135 acres of pond, and 214 acres of lacustrine wetlands (wetlands surrounding a lake). Although potentially suitable habitat was identified within and around the Project area, these habitat features are not unique on the landscape. As a result, whooping cranes are no more likely to use stopover habitat within this area than on the surrounding landscape. This conclusion is supported by the absence of whooping crane sightings recorded by USFWS in the vicinity of the Project as of fall 2016.

The proposed Project area is located near the eastern edge of the approximate 200-mile-wide migratory corridor, with the majority of whooping crane sightings occurring farther west in central North Dakota. Therefore, whooping cranes may pass through the Project area during spring and fall migration between known stopover sites, which may put them at risk of colliding with Project infrastructure. However, to date, no whooping crane fatalities have been recorded as a result of collisions with wind turbines.

Although flying at the height of the rotor swept area represents a collision risk, sandhill and whooping cranes have been documented altering flight direction in response to turbines at wind facility in South Dakota (Nagy et al. 2012). The marking of overhead utility and power lines has been shown to reduce the risk of collisions as the marked utility lines are more visible to birds. Studies have documented sandhill cranes gradually climbing as they approach marked power lines (Morkill and Anderson 1991, Murphy et al. 2009). However, no overhead transmission lines are proposed for the Project. The avoidance behavior observed and lack of documented turbine-related fatalities of whooping and sandhill cranes suggests a low risk of Project-related fatalities.

Gray Wolf (Federally Endangered)

The gray wolf was listed as endangered in 1974 (USFWS 2014b, USFWS 2014c). Gray wolves previously inhabited a large portion of the United States in a variety of habitats including tundra, forests, grasslands and deserts. Gray wolves, also called Eastern timber wolves, are the largest undomesticated member of the canid family (NDGFD 2015). Males can reach over 100 pounds while the females can reach 75 pounds. Generally gray in color with a lighter underside, they can vary from pure white to dark black. Their habitat range is vast, occupying wherever large ungulates are found. In the Midwestern states, habitat currently used by wolves ranges from mixed hardwood forests to forest and prairie landscapes dominated by agriculture and pasture lands. In North Dakota, likely gray wolf habitat is in the forested areas in the north central and north east counties. There are no known breeding populations in North Dakota; however, transient wolves dispersing from the Great Lakes population may occasionally occur. The gray wolf is a federally listed endangered species and is not a listed Species of Conservation Priority. There is no federally designated critical habitat for this species in North Dakota.

The Project area lacks forested areas known to support wolf pack establishment and persistence (USFWS 2012a). Therefore, there is a low likelihood of the species transiting the Project area.

Northern Long-Eared Bat (Federally Threatened)

The NLEB is a medium sized brown bat three to four inches in length with a nine to 10 inch wingspan (NDGFD 2015). These bats have the largest ears of the Myotis genus. These bats either roost singularly or in colonies underneath bark, in cavities, or in crevices of trees. They are also seen roosting in cool caves or mines. The NLEB is a federally listed threatened species and is considered a Level I Species of Conservation Priority species of conservation priority – Level I in North Dakota.

The NLEB was listed as threatened on April 2, 2015, under an interim Section 4(d) rule. The final 4(d) rule was released on January 14, 2016 (USFWS 2016a). The USFWS determined that white-nose syndrome (WNS) is the primary threat to NLEB and regulating other sources of mortality or harm, such as from general habitat loss, will not effectively conserve this species. Additionally, in 2016 the USFWS determined designating critical habitat for NLEB was not prudent (USFWS 2016b).

The 4(d) rule limits the prohibition of take to counties affected by WNS and an additional 150-mile buffer around these counties (the WNS Zone). The Project area is located within the WNS Zone. However, under the final 4(d) rule, incidental take by wind turbine collision is not prohibited. Regulatory mechanisms for wind energy facilities were not included in the final 4(d) rule because the primary factor causing the rapid population decline in NLEB is WNS, and the best available information suggests that NLEB fatalities caused by wind facilities are not contributing significantly to the species' decline. Incidental take is prohibited within known NLEB hibernacula, and if tree removal occurs at an occupied hibernaculum during any time of year or maternal roost site from June 1 through July 31 (USFWS 2016a). However, as noted above there are no known NLEB hibernacula or maternal roost sites within or in the vicinity of the Project.

NLEB have been found from Maine to North Carolina on the Atlantic Coast, westward to eastern Oklahoma and north through the Dakotas, reaching into eastern Montana and Wyoming (USFWS 2013a). The NLEB is considered common only in discrete portions of its western range, including the Black Hills of South Dakota. This species roosts in trees during the spring, summer, and fall. The species prefers large, contiguous tracks of upland forested habitat during the summer residency period. Natural roosting habitats in the Project area are limited to individual trees, wind breaks, and woodlots. NLEB do not undertake long-distance seasonal migrations between summer and winter ranges, but do undertake shorter distance movements between summer roosts and winter hibernacula. These seasonal movements are generally between 35 miles and 55 miles, but may be substantially longer in some areas, perhaps as great as 168 miles. Information on habitat use during migration is limited, but individuals in transit are likely to use foraging habitats at least part of the time. NLEB spend winter hibernating in caves and mines. However, there are no known wintering hibernacula within North Dakota.

NLEB have been found during post-construction mortality monitoring studies at wind energy facilities (Arnett et al. 2005, Jacques Whitford 2009), and take is possible if NLEB migrate through the Project area during operation. However, occurrence of the species in North Dakota is expected to be uncommon or rare (USFWS 2013a), and the likelihood of the species occurring in the Project area during the summer residency period is low due to the lack of potentially suitable roosting and foraging habitat. Further, with the exception of fatalities documented in Missouri, all records of NLEB fatalities at wind energy facilities have occurred east of the Mississippi River (USFWS 2015b). Therefore, there is a low likelihood of Project-related impacts to this species.

Dakota Skipper (Federally Threatened)

The Dakota skipper is a species of butterfly formally listed as threatened under the ESA on October 23, 2014. The species' historic range was once consisted of vast unbroken native prairie in the north-central U.S. and south-central Canada (USFWS 2015a). The Dakota skipper population has declined due to

sensitivity to disturbances, such as grazing and fire, and the loss of native prairie habitat. Generally, the species does not occur in areas that have previously been plowed or otherwise converted to tame or non-native plants even if native grass has been replanted. The USFWS proposed to designate 50 units, ranging in size from 31 acres to 2,887 acres, in North Dakota, Minnesota, and South Dakota as critical habitat (USFWS 2014a). No designated critical habitat is located within the Project area. The Dakota skipper is not known to occur in Dickey County, and as a result, there is a low likelihood for the species to occur within the proposed Project area. The proposed Project area is mostly fragmented into agriculture, hay land, and grasslands of which much of the grasslands appear to be invaded by nonnative species and encroached by woody shrubs.

Foxtail Wind has evaluated potential habitat for the Dakota skipper for areas within the Project area. The areas mapped identified 1.2 percent as good habitat and 98.8 percent as poor or unsuitable habitat (Tetra Tech 2015). No areas of excellent habitat that would be likely to support Dakota skippers were identified during native prairie delineations or micrositing.

Bald Eagle (Federally Protected under BGEPA)

Bald eagles occur throughout the contiguous United States, Alaska, and Canada (Buehler 2000). Bald eagles may occur in North Dakota as breeders, winter residents, migrants or year-round residents. The nesting period in North Dakota begins with nest building or maintenance in January-February and ends when the young fledge, typically in July. Nests are relatively close to water, typically less than 2 miles. Although bald eagle nests have historically been found primarily along the Missouri River and Red River, the number of bald eagle nests has increased in North Dakota over the last 20 years as the species continues to recover from population declines, primarily due to environmental contaminants. Nesting bald eagles now occur in more than half of the counties in the state (Dyke et al. 2015). Most of the nests occur near streams and mid- to large-sized lakes, but bald eagles are also initiating nests in areas not considered traditional nesting habitat such as cottonwood trees surrounded by cropland or grassland (Dyke et al. 2015). The home range size of bald eagles is variable. Populations in Oregon and Washington have home ranges of 2.7 to 18.1 square miles, with an average of 8.5 square miles (Watson et al. 1991), and in Montana the average home range size was 3.5 square miles (Stangle 1994). Along the Mississippi River in Minnesota, nests were located an average of 0.94 mile from the nearest neighboring nest (Mundahl et al. 2013).

During the non-breeding season (September through January), bald eagles will concentrate near large bodies of water where the water remains unfrozen and will roost up to 20 miles from foraging sites, depending on abundance of prey (Buehler 2000, USFWS 2013b). Bald eagles are opportunistic foragers that prey primarily on fish, but also feed on other aquatic and terrestrial vertebrates, as well as on carrion (Buehler 2000).

Based on the full year of eagle use surveys conducted at the Project from 2014 to 2015, plus one season of ongoing 2017 eagle use surveys, bald eagle use within the Project area appears to be low during most seasons, but increases slightly in the late winter to early spring. Wintering bald eagles may be attracted to the general vicinity by large bodies of water that remain unfrozen to the east of the Project area. Bald eagles are unlikely to breed within the proposed Project area due to a lack of suitable habitat, and no bald eagle nests were found within the Project area during systematic nest surveys in 2015 and 2017. The closest known eagle nest, documented as in-use (occupied) in 2017, is located approximately three miles to the northeast of the Project in a shelterbelt.

Golden Eagle (Federally Protected under BGEPA)

Golden eagles are common in western North America west of the 100th meridian with small populations also present in the eastern portions of Canada and the United States (Kochert et al. 2002). Golden eagles in the western U.S. are most commonly associated with open and semi-open habitats such as

shrublands, grasslands, woodland-brushlands, and coniferous forests as well as in farmland and riparian habitats. Both year-round and migratory golden eagles occur in North Dakota (NDFG 2015). Golden eagles nest on cliffs, utility poles, and in large trees in open areas from late January through August (Kochert et al. 2002). Golden eagles in North Dakota nest mainly west of the Missouri River (Dyke et al. 2015), and egg-laying occurs from late March to early May (Stewart 1975, DeLong 2004). The species feeds upon a wide variety of prey species, but tends to hunt small to medium-sized mammals such as hares, rabbits, ground squirrels, marmots, and prairie dogs depending upon local availability (Bloom and Hawks 1982, Kochert et al. 2002). Based on the full year of eagle use surveys conducted at the Project from 2014 to 2015, plus one season of ongoing 2017 eagle use surveys, golden eagle use within the Project area appears to be very low during most seasons, but increases slightly in the late winter to early spring.

No golden eagle nests were found within the proposed Project area or 10-mile buffer surrounding the proposed Project area during nest surveys conducted in March 2015 and April and May 2017. Golden eagles may potentially occur in the proposed Project area during any time of the year, but are unlikely to be breeding within the proposed Project area due to a lack of suitable habitat.

7.16.2 Impacts

Based on operational data from the WRRS protocol in use at NEER's operating wind farms in North Dakota, there have been no fatalities of any federally-listed species. Per the WRRS protocol, if a dead or injured federally protected species is found, it must be left undisturbed and reported to USFWS.

Piping Plover

There were no piping plover observations during avian surveys and the species is not known to occur in Dickey County; however, possible habitat does exist along the edge of larger lakes within the Project area. Collisions with turbines, Met towers, or transmission lines are potential impacts on piping plovers from the Project; however, the probability of such impacts is low given that the species has not been recorded within the Project area or on the USGS Breeding Bird Survey nearest to the Project area or the National Audubon Society's Christmas Bird Count in the vicinity of the Project area (National Audubon Society 2010, Sauer et al. 2017). The potential for indirect impacts such as habitat loss is unlikely as impacts to wetlands and lakes are proposed to be minimal.

Red Knot

There were no red knot observations during avian surveys within the Project area. Additionally, there were no red knot observations during the USGS Breeding Bird Survey nearest to the Project area or the National Audubon Society's Christmas Bird Count in the vicinity of the Project area. With the lack of red knot observations during avian surveys and since there is no preferred stopover habitat identified within the Project area, it is unlikely that the Project will affect the red knot (National Audubon Society 2010, Sauer et al. 2017). However, it is possible, but unlikely, that red knots may encounter the turbines within the proposed Project area during migration.

Whooping Crane

Collisions with turbines, Met towers, or transmission lines and the complete avoidance of the area around the Project are the two most likely impacts of wind development on whooping cranes. In South Dakota, sandhill cranes, which whooping cranes often fly with, have been observed altering flight paths in response to turbines (Nagy et al. 2012), and have been documented gradually climbing in altitude as they approach marked power lines (Morkill and Anderson 1991). This avoidance behavior could minimize potential collisions.

Although potentially suitable habitat was identified within and around the Project area, these habitat features are not unique on the landscape. This is because the potential stopover habitat within the proposed Project area is minimal compared to the area surrounding the Project. Based on location of the proposed Project area within the migration corridor and the avoidance and minimization measures discussed in Section 7.16.13 (e.g., buried collection systems), the proposed Project is not likely to impact the whooping crane. Furthermore, no whooping crane fatalities have been recorded at wind facilities, suggesting that likelihood of collision may be low (USFWS 2009). As noted above, this conclusion is supported by the absence of whooping crane sightings recorded by USFWS in the vicinity of the Project as of fall 2016.

Gray Wolf

The gray wolf is uncommon in North Dakota; however, individual wolves occasionally pass through parts of the state. Most wolf sightings are in the north eastern part of the state, far away from the Project area. Additionally, there is a high degree of agricultural use within the Project area as well as roadways associated with this use. The resulting combination of human population density and road density exceeds optimal levels for wolves (Mech et a. 1988, Fuller et al. 1992, Erb and Sampson 2013). Therefore, it is unlikely gray wolves would occur in the vicinity of, and therefore be affected by, the Project.

Northern Long-Eared Bat

There is little suitable roosting or foraging habitat in the Project area and no known hibernacula in North Dakota for the NLEB. The species could potentially collide with operational turbines during the spring and fall periods when migrating between summer roosts and winter hibernacula; however migratory movements by the species are short, which reduces the likelihood of individuals encountering the Project area. Due to the limited amount of forested habitat within the Project area, and with all recorded instances of the NLEB occurring within regions with more topographic relief than the Missouri Coteau, the NLEB's likelihood of occurrence within the Project area is low; therefore, likelihood of Project-related impacts is also low.

Dakota Skipper

The Dakota skipper is not known to occur in Dickey County. Foxtail Wind has completed micrositing studies to avoid locating Project facilities on lands classified as good where practicable. The nearest designated critical habitat is in Ransom County, approximately 70 miles northeast of the Project area. It is unlikely that Dakota skippers travel greater than 0.62 miles between patches of suitable habitat (Fitts Cochrane and Delphey 2002). Therefore, the impacts of the Project on the Dakota skipper are likely to be low.

Bald Eagle

Six bald eagle mortalities associated with wind energy facilities within the U.S. were reported from 1997 through June 2012 (Pagel et al. 2013). To date, one bald eagle mortality has been reported at a wind energy facility in North Dakota (Public Prairie Broadcasting 2015). Bald eagles are believed to be at less risk of turbine collision than golden eagles because they tend to focus their hunting efforts for fish and waterfowl in lakes and rivers (Buehler 2000). Although the landscape within the Project area does not support any large waterbodies or an abundance of smaller waterbodies that would attract bald eagles for nesting or foraging, there is one known occupied bald eagle nest located approximately 3.0 miles to the northeast of the Project area as of spring 2017. The presence of occupied bald eagle nests in the vicinity of the Project area suggests that the species may potentially forage in or pass through the Project area during the breeding season. Observations of bald eagles within the Project area during late winter and early spring indicate that the species makes seasonal use of the general area while overwintering. However, surveys to date indicate bald eagle use may be lower within the Project area than the

surrounding vicinity due to a lower concentration of water bodies; therefore, the impacts of the Project on the bald eagle are likely to be low.

Golden Eagle

Seventy-nine golden eagle mortalities associated with wind energy facilities within the United States were reported from 1997 through June 2012, excluding the Altamont Pass Wind Resource Area in California (Pagel et al. 2013.); however, to date no golden eagle mortalities have been reported at wind energy facilities in North Dakota. Golden eagles are believed to be more at risk of turbine collision than bald eagles because they hunt for land-based prey along topographic contours where turbines are often located (Kochert et al. 2002).

As of 2017, there are no known or potential golden eagle nests within 10 miles of the Project area. The landscape within the Project area lacks any buttes or rock or dirt cliff faces suitable to support eagle nests, and most potentially suitable trees are close to homes or other sources of disturbance; therefore, it is unlikely that golden eagles would nest within the Project area. Golden eagles occasionally forage in or pass through the Project area; however, there are no known features that would concentrate golden eagles within the Project area compared to the surrounding area. Therefore, the impacts of the Project on the golden eagle are likely to be low.

7.16.3 Mitigative Measures

General avoidance and minimization practices for vegetation and wildlife are discussed in Sections 7.14 and 7.15, respectively; however, Foxtail Wind is committed to the following additional avoidance and minimization measures more specific to T&E species.

- In addition to the training provided via the WRRS (see Section 7.15.3), Foxtail Wind will provide all construction and maintenance staff with training in federally listed species identification and will provide identification guides for whooping cranes to be kept in all vehicles.
- If an injured or dead endangered or threatened animal is found in the Project Area, Foxtail employees will promptly immediately notify the USFWS after completing the WRRS documentation process.

7.17 Summary of Impacts

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

Table 7-5 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.	None proposed.

Resource	Impact	Mitigation
Land Use	Up to 97.74 acres of land will be affected by turbines, associated access roads, and a substation during operation. Temporary impacts during construction for turbine installation, road construction, cable trenching, laydown and contractor staging, and turbine storage would require an additional 630.43acres.	Foxtail Wind will work with landowners and regulatory agencies to minimize impacts of the Project.
Public Services	No impacts to public services are anticipated.	The Project 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	Minor impacts are anticipated to one occupied residence, which is predicted to have more than 30 hours per year of shadow flicker. No other impacts to human health and safety are anticipated.	Foxtail Wind is working to obtain a waiver from the owner of the residence where shadow flicker exceeds 30 hours per year. Turbines will be lighted to comply with FAA and Commission requirements. A variety of security measures will be implemented to reduce the chance of physical and property damage.
Noise	Impacts are anticipated to two noise-sensitive resources (inhabited residences). Noise modeling results indicated that received sound levels would be above 50 dBA within 100 those two residences.	Foxtail Wind is working to obtain a waiver from the owner of the residences where 50 dBA would be exceeded. If a waiver cannot be obtained Foxtail Wind will ensure that the 50 dBA requirement is met.
Cultural Resources	No impacts to cultural resources are anticipated as the Project layout avoids all documented sites. The sites are not shown on Figure 3-1 due to confidentiality.	Sites near the Project will be fenced prior to construction. An unanticipated discoveries plan will be prepared prior to construction.
Recreational Resources	Impacts to recreational resources will be mainly visual in nature.	No turbines, access roads, or associated facilities would be placed on WPAs. Turbines will be setback at least 2.5 miles from the Whitestone Hill Battlefield Site to mitigate visual impacts. A lighting-mitigation system will be installed on turbines to reduce potential night effects of flickering lights, which will reduce impacts to night-sky viewing.
Land Based Economies	Up to 97.74 acres of land will be permanently impacted by access roads, turbines, and the Met tower. An additional 630.43 acres will be temporarily disturbed for turbine installation, road construction, cable trenching, laydown and contractor staging, and turbine storage.	Foxtail Wind has worked with landowners to minimize impact to their land. Only land needed for the facility will be permanently affected. Temporarily disturbed areas will be restored.

Resource	Impact	Mitigation
Soils	Up to 97.74 acres of land will be permanently impacted by access roads, turbines, and the Met tower. An additional 630.43 acres will be temporarily disturbed for turbine installation, road construction, cable trenching, laydown and contractor staging, and turbine storage.	BMPs for erosion and sediment control will be utilized to minimize wind and water erosion at the site in association with the project SWPPP. 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.	None proposed.
Surface Water and Floodplain Resources	Access roads, turbines, and other Project facilities will be located and constructed in such a manner that no impacts are anticipated.	Impacts to surface waters will be avoided. Foxtail Wind will implement BMPs to minimize erosion and sedimentation at the site in association with the project SWPPP.
Wetlands	Impacts to wetlands and WOUS will be avoided and minimized to the maximum extent practicable.	Wetlands in close proximity to the construction easement will be delineated and flagged prior to construction. Horizontal directional drilling will be used where necessary to avoid permanent impacts to wetlands from collection line trenching during construction.
Vegetation	Up to 97.74 acres of land will be permanently impacted. An additional 630.43 acres will be temporarily disturbed during construction.	Foxtail Wind 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 or restored to crop, depending on original conditions and landowner preference. Native prairie will be avoided to the extent practicable and will be reseeded using a native prairie mix in accordance with landowner preferences.
Wildlife	Potential avian and bat collisions may occur, but are anticipated to be minimal based on avian and bat studies conducted within the Project area.	A variety of mitigative measures will be implemented, as discussed in Section 7.15.3. A WCS will be developed and implemented for the Project. The Project's WRRS will be implemented after construction of the Project as described in Section 7.15.3, and the Project will complete one year of post-construction mortality monitoring.

Resource	Impact	Mitigation
Rare and Unique Natural Resources	Bald and golden eagles occur seasonally within the Project area, and may be exposed to collision risk at these times.	A variety of mitigative measures will be implemented as discussed in Sections 7.15.3 and 7.16.3. A WCS will be developed and implemented for the Project.

8.0 PUBLIC AND AGENCY COORDINATION

Per Section 69-06-01-05 of the NDAC, Foxtail Wind and its representatives have contacted key local, state, and federal agencies in March 2017 to inform them of the Project and for assistance in identifying concerns or issues within the Project area. Agency correspondence and responses received as of June 30, 2017 are included in **Appendix C**; **Table 8-1** summarizes the responses received from agencies to date.

Principal stakeholders for the Project are landowners that have entered into agreements with Foxtail Wind to provide wind rights for the Project. Foxtail Wind will continue to meet with county officials as the Project moves forward and Foxtail Wind seeks any necessary local permits (e.g. building permit). Additionally NEER has notified 16 Tribes in North Dakota, South Dakota, and Montana of the proposed Project. Eight Tribes (Cheyenne River, Crow Creek, Northern Cheyenne, Rosebud, Sisseton, Spirit Lake, Standing Rock, and Yankton Sioux) met with NEER, NSP/Xcel, and AECOM on March 23, 2017 in Aberdeen, SD in order to establish an agreement for avoidance of tribal resources (see Section 7.1 for more details).

Table 8-1 Summary of Agency Responses

Agency	Response Date	Response Summary
ND Department of Health	March 7, 2017	Recommends minimizing impacts to water bodies during construction. Projects disturbing one or more acres must have a permit to discharge storm water. Recommends avoiding impacts to groundwater quality and report all spills immediately.
ND Department of Transportation	March 16, 2017	The project should have no impacts on NDDOT highways. For work done on a highway right-of-way obtain the appropriate permits.
ND Department of Transportation	March 21, 2017	During the spring, there are load restrictions on ND Highways 11 and 56. All temporary or permanent access points will need to be requested by submittal of SFN 5918 Driveway Application and Permit.
ND Game and Fish Department	April 26, 2017	Primary concern is disturbance of native habitats (native prairie, wetlands and woodlands). Recommends field visits to areas of native habitats to supplement results of desktop studies.
ND School Trust Land	March 22, 2017	The ND School Trust has five tracts of land within or adjacent to the proposed Project area. Online applications can be submitted at https://land.nd.gov/surface/Right-of-Way.aspx for review.
ND School Trust Land	April 3, April 18, May 22, and May 31, 2017	Discussion of local zoning approval, application fee, and site visit with NEER's environmental team.
ND State Water Commission	March 28, 2017	Currently, no permits are required according to an initial review of the project. However, if surface water or groundwater will be diverted, a water permit will be required. A permit to drain or a construction permit may be needed under certain conditions. There is a small dam located at Moores Lake within the project boundary.
ND Township Officers Association	March 10, 2017	The North Dakota Township Officers Association did not have an issue with the project as long as local township rules and regulations are followed, and the townships where the project is located approve of the project.

Agency	Response Date	Response Summary
U.S. Army Corps of Engineers	March 16, 2017	The USACE administer Section 10 of the RHA and Section 404 of the CWA. The project may need a CWA Section 404 permit, which can be applied for online or through email.

9.0 POTENTIAL PERMITS/APPROVALS

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

Table 9-1 Potential Permits and Approvals Required for Construction and Operation of the Proposed Facility

Agency	Type of Approval	Status*	Need
Federal Approvals			
USACE	NWP 12 and 14	3	Wetland surveys are currently underway to ensure that the proposed Project minimizes impacts to WOUS and stays below the PCN threshold.
FAA	Form 7460-1, Notice of Proposed Construction	1	Notice and approval are required for structures over 200 feet in height. FAA approval of lighting and marking of turbines is required.
EPA	SPCC Plan	2	Required if more than 1,320 gallons of oil storage is located on-site.
USFWS	Special Use Permit	3	Foxtail Wind is committed to siting all Project infrastructure outside of USWFS easements.
State of North Dakota			
Commission	Certificate of Site Compatibility	1	Required for construction of generation facility over 0.5 MW in size.
SHSND	Concurrence with effect determinations	2	Reports for the Class III cultural resources inventories will be submitted to SHSND for review when complete.
North Dakota Department of Health	NPDES Permit: General Construction Storm Water	2	Required for disturbance of over 1 acre of land. Must prepare a SWPPP.
North Dakota Highway Patrol	Overheight/Overweight Permit	2	Permit required for hauling construction equipment and materials on State Highways.
NDDOT	Road Approach/Access Permit	2	Permit required for construction of access roads from State Highways.
	Utility Permit/Risk Management Documents	2	Permit required for utility crossings on State Highway right-of-way.
ND State Water Commission	Drainage Permit	3	Required if draining a wetland with a drainage area of 80 acres or more.
	Water Permit	3	Required if drilling a well for the O&M facility.

*Status Explanation:
1 Applied and/or Decision Pending
2 Will Apply for Prior to Construction
3 Final Layout will Determine whether Permit/Approval is Needed

10.0 FACTORS CONSIDERED

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

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

The preceding sections discuss the research and investigations relating 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 Section 7.17.

10.2 Technologies to Minimize Adverse Environmental Effects

Foxtail Wind will utilize BMPs that minimize impacts to the environment. Current wind turbine technologies, including the equipment and siting tools, optimize the wind and land resources.

10.3 Potential for Beneficial Uses of Waste Energy

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

10.4 Unavoidable Adverse Environmental Effects

Unavoidable adverse environmental effects are described for each resource area in Section 7. The proposed Project is expected to impact up to 97.74 acres of land during operation, which will not be available for other uses. An additional 630.43 acres of land will be temporarily affected due to turbine pad construction, road construction, collection line trenching, laydown and contractor staging areas, and construction of the Met tower. Additional unavoidable effects include visual effects and increased habitat fragmentation.

10.5 Alternatives to Proposed Site

Foxtail Wind believes that the proposed site is the most viable alternative. Foxtail Wind is committed to being flexible on the preliminary site layout and will work closely with landowners to examine all reasonable alternatives to the preliminary site layout.

10.6 Irreversible and Irretrievable Commitment of Natural Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the use of these resources have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable timeframe. 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 proposed Project that are irreversible and irretrievable, but these include those resources primarily related to construction.

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 seven 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 overall anticipated

environmental and economic benefits of the proposed Project will balance the irretrievable commitment of resources resulting from the construction of the proposed Project (see Section 10.7).

10.7 Direct and Indirect Economic Impacts

Economic impacts include impacts associated with the temporary disturbance of up to 630.43 acres of land during construction, which could potentially interrupt farming and ranching for landowners. Permanent impacts will be lower, at approximately 97.74 acres. In general, agricultural areas surrounding each turbine can still be farmed, and landowner compensation has been established in 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 Dickey County will contribute to the total personal income of the region. Additional personal income will be generated for residents in the county and the state by circulation and recirculation of dollars paid out by the Applicant as business expenditures and state and local taxes. Expenditures made for equipment, energy, fuel, operating supplies, and other products and services benefit businesses in the county and the state.

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

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

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

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

10.9 Effect of Site on Cultural Resources

As described in Section 7.7, a Class I Literature Review was conducted and a Class III Cultural Resources Inventory for archaeology was completed in the fall of 2016 and spring of 2017. The literature review results identified 31 previously recorded archaeological sites and seven site leads within the Project area. Foxtail Wind will avoid directly impacting all cultural resources sites. Once complete, the Class III Cultural Resources Inventory Report will be submitted to the SHSND for review and concurrence and a summary will be provided to the Commission.

10.10 Effect of Site on Biological Resources

The impact of the proposed Project on wildlife is expected to be low. Foxtail Wind has sited the proposed Project following the voluntary USFWS Wind Energy Guidelines (USFWS 2012b) and designed the proposed Project following suggested APLIC practices (APLIC 2012). There is potential for avian and bat collisions with facility turbines and the Met tower, as well as the potential for habitat loss and fragmentation; however, Foxtail Wind will implement measures to avoid and minimize potential impacts to biological resources from the proposed Project. Collection lines will be buried to avoid collision risk (APLIC 2012). The Project interconnection to the existing transmission line will occur through a wire tap

at the Project substation, so no new above-ground transmission line will be created. Risks of collision will be minimized by siting facilities away from wetlands, and burying collection lines. Similarly, risk of impacts to habitat will be avoided and minimized by reseeding or planting disturbed areas with native material, if approved by landowner.

The Project is unlikely to affect the northern long-eared bat, piping plover, red knot, gray wolf, Dakota skipper, or whooping crane. Eagle use surveys and raptor nest surveys were conducted in 2014, 2015, and 2017 to evaluate the risk of proposed Project activities to bald and golden eagles; no bald or golden eagle nests found were found within the proposed Project area and one bald eagle nest was found within the 10-mile buffer surrounding the proposed Project area. Foxtail Wind will prepare a Project-specific WCS documenting all bird and bat avoidance, minimization, and mitigation commitments.

Detailed discussion of potential impacts and proposed mitigation measures on biological resources is provided in Section 7.14 (Vegetation), Section 7.15 (Wildlife), and Section 7.16 (Rare and Unique Natural Resources).

10.11 Cumulative Effects

Activities that currently exist within the proposed Project area and vicinity are primarily limited to agriculture. Sand and gravel mining is an existing industrial component of the landscape in and near the Project area. In addition to the proposed Project, there are two existing wind farms in the vicinity of the proposed Project. It is likely that wind energy development will continue in southeastern North Dakota.

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 is stimulated and local energy production is diversified. The potential negative cumulative impacts are anticipated to be primarily on land use, mineral resources, vegetation, and wildlife.

With the increase in the amount of land being used for wind energy generation activities, farming activities may decrease slightly. This potential shift in land use in rural communities that have historically made their living from agricultural activities may lead to a decrease in agricultural activities; however, the additional income to farmers from wind development may make it more feasible for them to keep most of their land in agricultural uses rather than being developed for residential, commercial, or industrial uses. By enabling farmers to keep land in agriculture, wind energy development may lead to a net positive cumulative impact as less total land is converted from agricultural use than other forms of development.

With regard to the potential cumulative impacts to wildlife resources, there is potential for the proposed Project to affect local wildlife both directly (mortality) and indirectly (habitat loss and fragmentation). Both direct and indirect potential impacts will be avoided and minimized to the extent practicable, and therefore, are not expected to cause cumulative impacts. Although the wind turbines will contribute to the utility/industrial component of the existing landscape, the area will remain primarily agricultural in nature. As these agricultural lands are of minimal value to wildlife compared to native vegetation, the proposed Project is not expected to result in a cumulative loss of quality wildlife habitat. Based on the existing land use, location of existing and planned facilities, and known impacts from similar wind facilities in the area, it is expected that the proposed Project will have minimal cumulative impacts to wildlife.

10.12 Agency Comments

Agency coordination and potential permits/approvals are discussed in Section 8 and Section 9, respectively. A copy of agency response letters is included in **Appendix C**.

11.0 QUALIFICATIONS OF CONTRIBUTORS

Name Project Role	Education and Professional Experience
Kimberly Wells, PhD Environmental Services Project Manager NEER	Dr. Wells has 16 years of environmental permitting experience including experience as both a consultant and environmental manager in the renewable industry. Her primary expertise is technically challenging and interdisciplinary projects on private and public land, with a focus on large environmental impact assessment and permitting projects with the National Environmental Policy Act (NEPA) and state equivalents; the Endangered Species Act, the Clean Water Act, and associated natural resource laws. She is a certified wildlife biologist and wetland delineator, and obtained her BS in Natural Resource Management from the University of Arizona, her MS in Fisheries and Wildlife Ecology from Oklahoma State, and her PhD in Fisheries and Wildlife Sciences from the University of Missouri–Columbia. Dr. Wells and her team are responsible for all environmental permitting in the Mid-Continent Region that includes North Dakota.
Ashley Nasby Wind Development NEER	Ms. Nasby has over 2 years of experience with development of wind energy projects. Her responsibilities included financial feasibility analysis, cost and schedule management, coordination of functional project team and customer relationship management. Ashley has over 10 years of experience in the utility industry including roles of increasing responsibility in human resources, integrated supply chain and engineering & construction. She holds a Bachelor of Arts in Criminology & Law and a Masters of Business Administration from the University of Florida.
Chris Westrick NEER	Mr. Westrick is responsible for the management and oversight of early stage phases of project planning, engineering, and construction of wind projects. Duties also include budget development, contract execution, procurement, logistical planning, and ultimately transition to the construction execution team. Chris has more than four years of experience in the development of wind energy projects, including 300 MW of wind projects that were constructed in North Dakota in 2016. Chris also has over 12 years of experience in construction management and holds a Bachelor of Science in Construction Management from the University of Florida.
Lindsey Churchill, PhD, PWS Project Manager AECOM	Dr. Churchill has 10 years of environmental permitting experience in wetland and natural resources. Her responsibilities included project management, application preparation, and oversight of the wetlands and cultural resources surveys. She has a PhD in Natural Resources Management from North Dakota State University (NDSU), a Master of Science in Natural Resources Management from NDSU, and Bachelor of Science in biology and mathematics from University of Jamestown. She is registered as a Professional Wetland Scientist and a USACE certified wetland delineator.
Glenn Carpenter Senior Environmental Specialist AECOM	Mr. Carpenter has 42 years of permitting and natural resource management experience as both a consultant and working for the Bureau of Land Management. His responsibilities included tribal outreach and senior review of the application. He has a Bachelor of Science in Range Science from Brigham Young University.
Melinda McCarthy, MA, RPA Archaeologist/GIS Analyst AECOM	Ms. McCarthy has 9 years of cultural resources and historic preservation experience. Her responsibilities included leading the cultural resources archaeology and architecture surveys, GIS, and tribal outreach. She has a Bachelor of Arts in Anthropology with an emphasis in Archeology and a Master of Arts in History with a specialization in Historic Preservation, both from Southeast Missouri State University. She is permitted as a Principle Investigator through NDSHPO in North Dakota.
Dirk Churchill Environmental Specialist AECOM	Mr. Churchill has 6 years of experience in environmental assessment, permitting, and compliance services. His responsibilities included application preparation and leading the wetland surveys with Mr. King. He has a Bachelor of Science in Natural Resources Management from NDSU. He is a USACE certified wetland delineator.

Ryan King, MNRM Environmental Specialist AECOM	Mr. King has 5 years of experience in biological assessments, wildlife and botanical surveys, and wetland delineations surveys. His responsibilities included application preparation and leading the wetland surveys with Mr. Churchill. He has a Bachelor of Science in Construction Management and a Masters of Natural Resources Management, both from NDSU. He is a USACE certified wetland delineator.
Brita Woeck, MS Senior Biologist Tetra Tech	Ms. Woeck has more than 15 years of experience in environmental planning and permitting, environmental resource analysis, and terrestrial and aquatic ecosystems monitoring. Her responsibilities included leading the preparation of updated biological survey reports, coordination with the USFWS Kulm wetland management district, and application review. Ms. Woeck has a Bachelor of Science in Wildlife Science from the University of Washington and a Masters in Wildlife Ecology from the University of Missouri-Columbia.
Christopher Farmer, PhD Principal Biologist DNV GL	Dr. Farmer is an ecologist with 19 years of experience studying birds, ungulates, and carnivores; specializing in eagle surveys and take permitting, habitat studies, capture techniques, survival analysis, population ecology, population modeling, and statistical ecology. As DNV GL's Principal Biologist, Dr. Farmer is responsible for leading innovative technological and commercial efforts that provide solutions to complex energy facility-wildlife interactions. He has a Bachelor of Science in Biology and a Master of Science Education degree, both from SUNY Albany, as well as a PhD in Ecology from SUNY College of Environmental Science and Forestry.

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13.0 ACRONYMS AND ABBREVIATIONS

AADT	Average Annual Daily Traffic
ADLS	aircraft detection lighting system
APLIC	Avian Power Line Interaction Committee
AWEA	American Wind Energy Association
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground service
BMPs	Best Management Practices
Certificate	Certificate of Site Compatibility
Commission	North Dakota Public Service Commission
CRP	Conservation Reserve Program
CWA	Clean Water Act
CWS	Canadian Wildlife Service
dBA	decibel, A-weighted
DoD	Department of Defense
DHS	U.S. Department of Homeland Security
DPP	Definitive Planning Phase
DU	Ducks Unlimited
EMF	electromagnetic fields
EPC	engineering, procurement, and construction
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FmHA	Farmer Home Administration
FSA	Farm Service Agency
IPaC	Information for Planning and Conservation
Jacques Whitford	Jacques Whitford Stantec Limited
kV	kilovolt
MDU	Montana-Dakota Utilities
Met	meteorological evaluation tower
mph	miles per hour
MW	megawatts
MISO	Midcontinent Independent System Operator
NASA	National Aeronautics and Space Administration
NASS	National Agricultural Statistics Service
NDAA	North Dakota Department of Agriculture
NDAC	North Dakota Administrative Code
NDCC	North Dakota Century Code
NDCRS	North Dakota Cultural Resources Survey
NDDMR	North Dakota Department of Mineral Resources
NDDOH	North Dakota Department of Health
NDDOT	North Dakota Department of Transportation
NDDTL	North Dakota Department of Trust Lands

NDGFD	North Dakota Game and Fish Department
NDGIS	North Dakota GIS Technical Committee
NDGS	North Dakota Geological Survey
NDIAC	North Dakota Indian Affairs Commission
NDSHPO	North Dakota State Historic Preservation Officer
NDSWC	North Dakota State Water Commission
NEER	NextEra Energy Resources, LLC
NHD	National Hydrography Dataset
NIEHS	National Institute of Environmental Health Sciences
NLEB	northern long-eared bat
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NSP	Northern States Power Company
NTIA	National Telecommunications and Information Administration
NWI	National Wetlands Inventory
NWP	Nationwide Permit
NWR	National Wildlife Refuge
O&M	operations and maintenance
PCN	preconstruction notification
PLOTS	Private Land Open to Sportsmen
Project	Foxtail Wind Energy Center
PSA	Purchase & Sale Agreement
PTC	Production Tax Credit
RHA	Rivers and Harbors Act
SCADA	Supervisory Control and Data Acquisitions
SHSND	State Historical Society of North Dakota
SPCC Plan	Spill Prevention, Control, and Countermeasures (SPCC) Plan
SWPPP	Storm Water Pollution Prevention Plan
T&E	threatened and endangered
Tetra Tech	Tetra Tech, Inc.
TWI	The Watershed Institute
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOE	U.S. Department of Energy
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WCS	Wildlife Conservation Strategy
WOUS	waters of the United States
WPA	Waterfowl Production Area
WRRS	Wildlife Response and Reporting System
Xcel	Xcel Energy

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Legend

- Proposed Project Boundary
- Municipal Boundary

Transportation

- Railroad
- State Highway
- County Road
- Substation

Existing Electrical Transmission (Ventyx 2017)

- 115kV Transmission Line
- 138kV Transmission Line
- 230kV Transmission Line
- 345kV Transmission Line

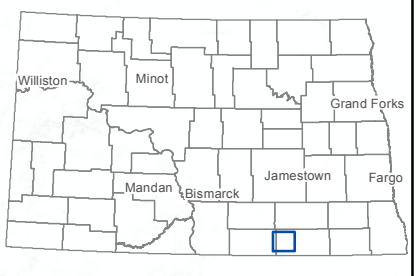

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Figure 1-1
Project Location
Foxtail Wind Energy Center
Dickey County, ND

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Service Layer Credits: Sources: Esri, USGS, NOAA

Legend

- Proposed Project Boundary
- County Roads
- State Highway

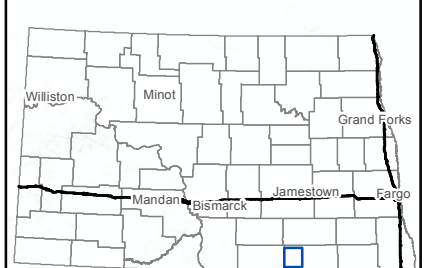

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Figure 1-2
Project Area (Aerial)
Foxtail Wind Energy Center
Dickey County, ND

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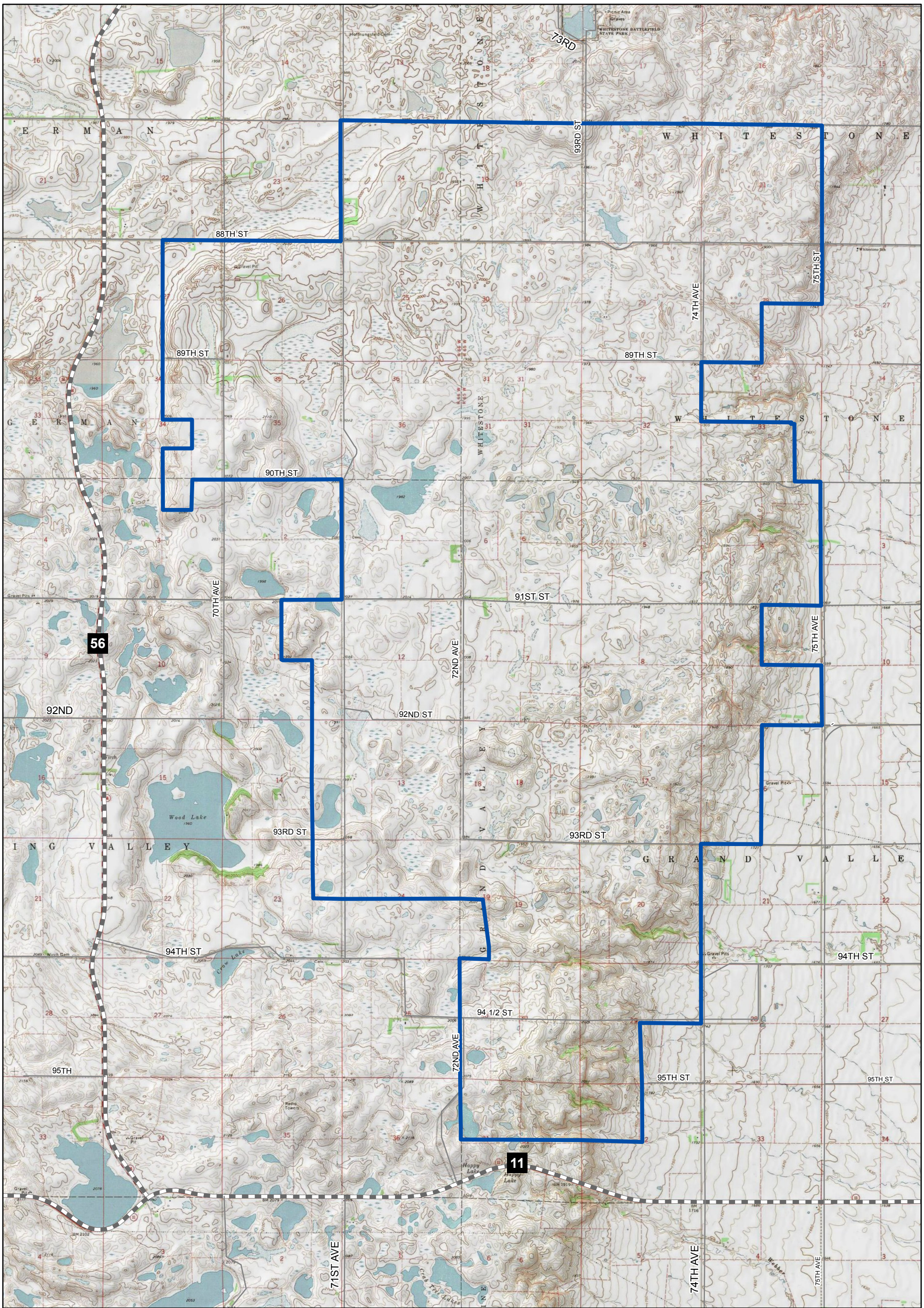

Figure 1-3
Project Area (Topographical)
Foxtail Wind Energy Center
Dickey County, ND

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Built to deliver a better world

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Impact Buffer Inset

5

Service Layer Credits:

Legend

Proposed Project Features

- Alternative Turbine (05-26-2017)
- Met Tower (05-26-2017)
- Turbine (05-26-2017)
- Collection System (06-08-2017)
- Service Road (05-26-2017)
- Project Boundary (01-03-2017)
- Switchyard
- Substation
- O&M Building
- Laydown
- Batch Plant

Proposed Impact Assumptions

- Permenant Service Road Impact Buffer
- Permenant Turbine Impact Buffer
- Temporary Collection Line Buffer
- Temporary Service Road Impact Buffer
- Temporary Turbine Impact Buffer

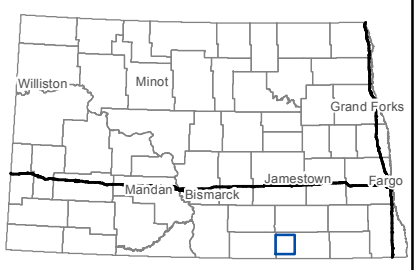

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Figure 1-4
Project Impact Assumptions
Foxtail Wind Energy Center
Dickey County, ND

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Legend

Proposed Project Features

- Alternative Turbine (05-26-2017)
- Met Tower (05-26-2017)
- Turbine (05-26-2017)
- Collection System (06-08-2017)
- Service Road (05-26-2017)
- Project Boundary (01-03-2017)
- Switchyard
- Substation
- O&M Building
- Laydown
- Batch Plant

Exclusion Areas*

- USFWS Wetland Easement
- Prime Farmland
- USFWS Grassland Easements
- Waterfowl Production Area
- ND Game & Fish PLOTS Lands

Avoidance Areas

- Historical Resource
- Mine
- Surveyed Wetlands
- NWI Wetlands
- NLCD Forest

* Archaeological sites not show due to confidentiality.

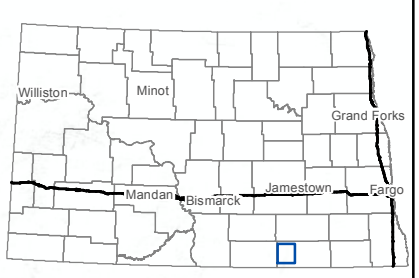

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Figure 3-1
Exclusion and Avoidance Areas
Foxtail Wind Energy Center
Dickey County, ND

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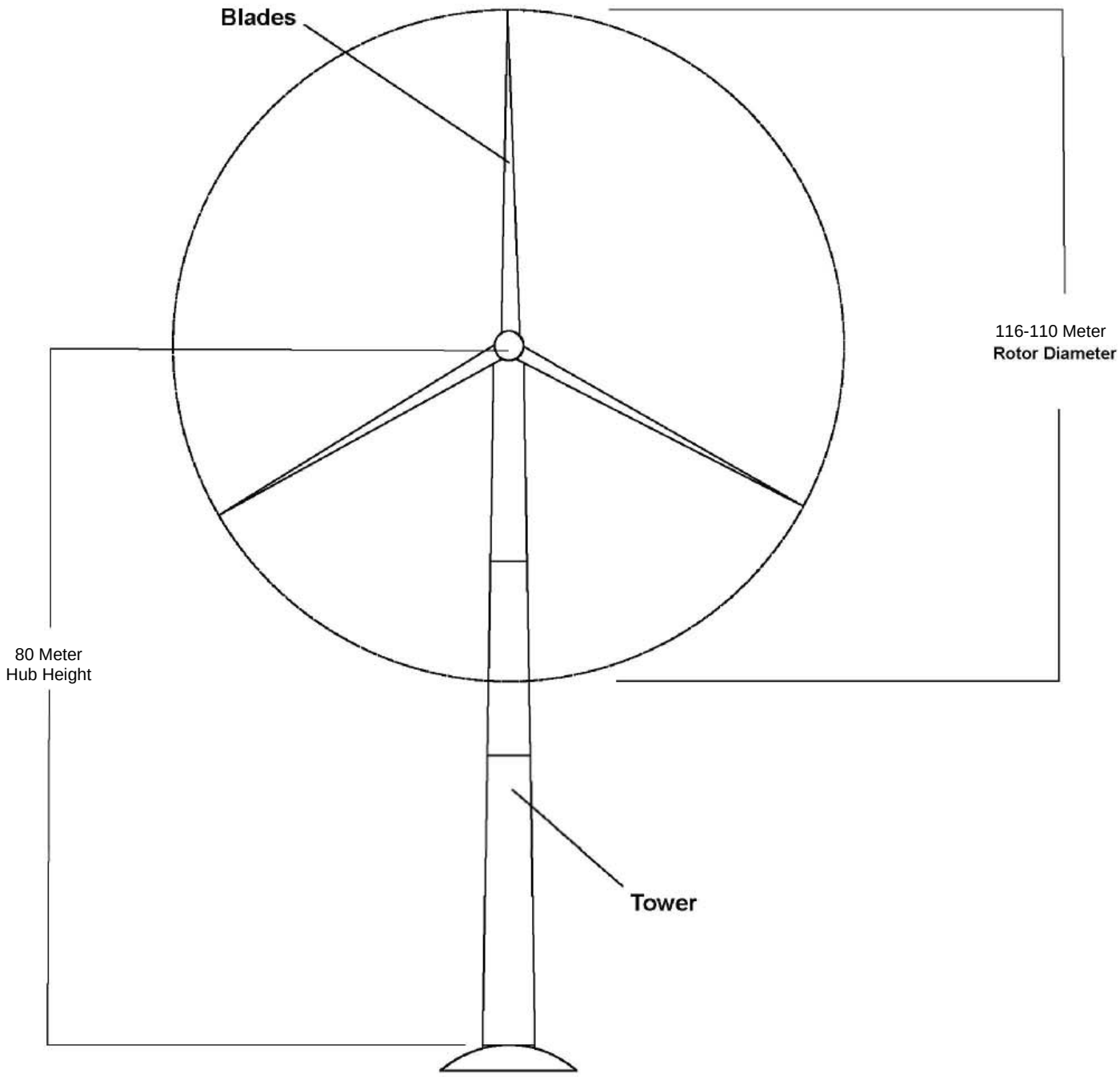

Vestas V-116 and V-110 Turbine

Figure 4-1

Wind Turbine Design Features

Foxtail Wind Energy Center

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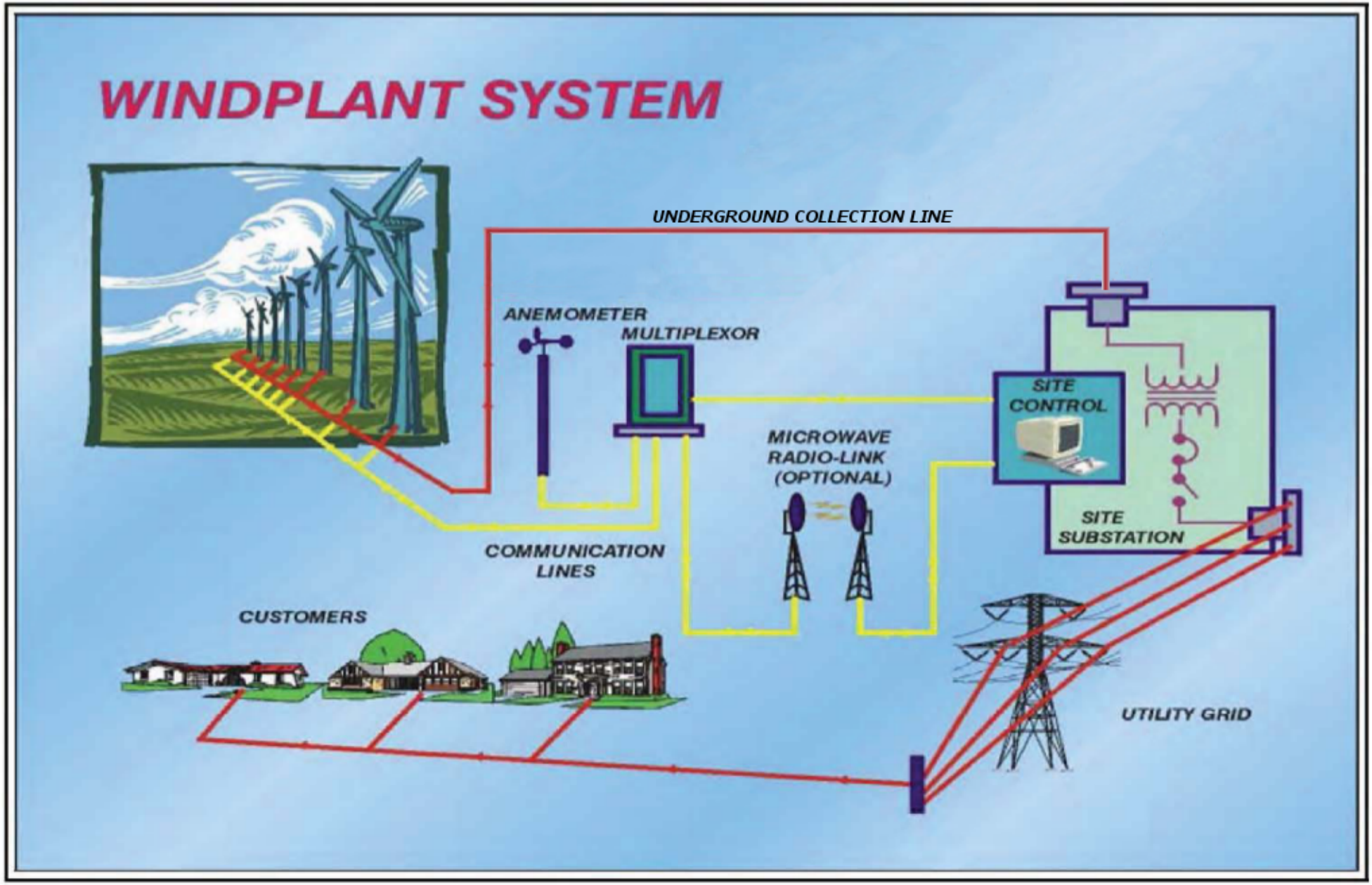

Path of Energy Diagram

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Typical Wind Energy Center Layout

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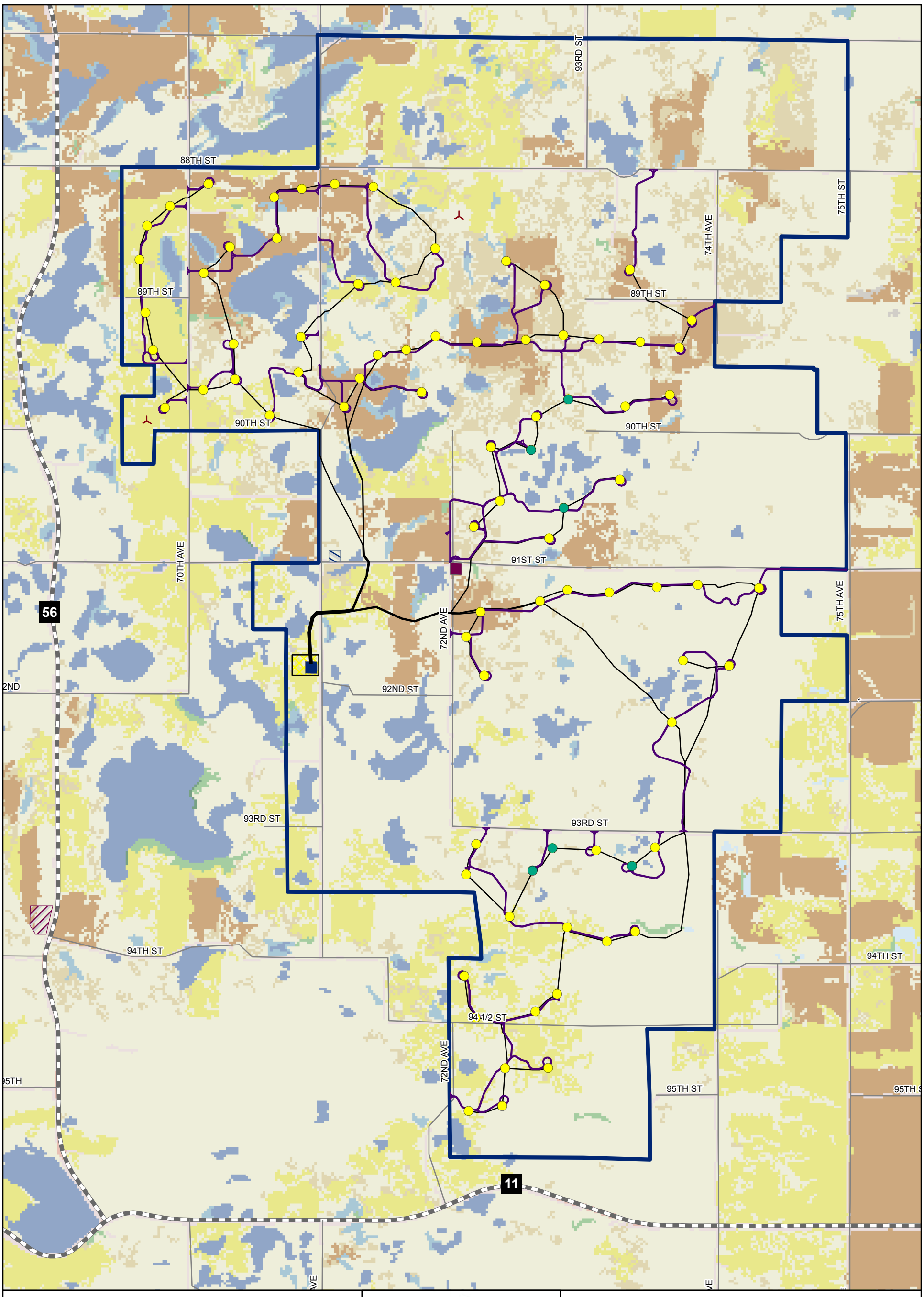

Figure 7-1
Land Cover Map
Foxtail Wind Energy Center
Dickey County, ND

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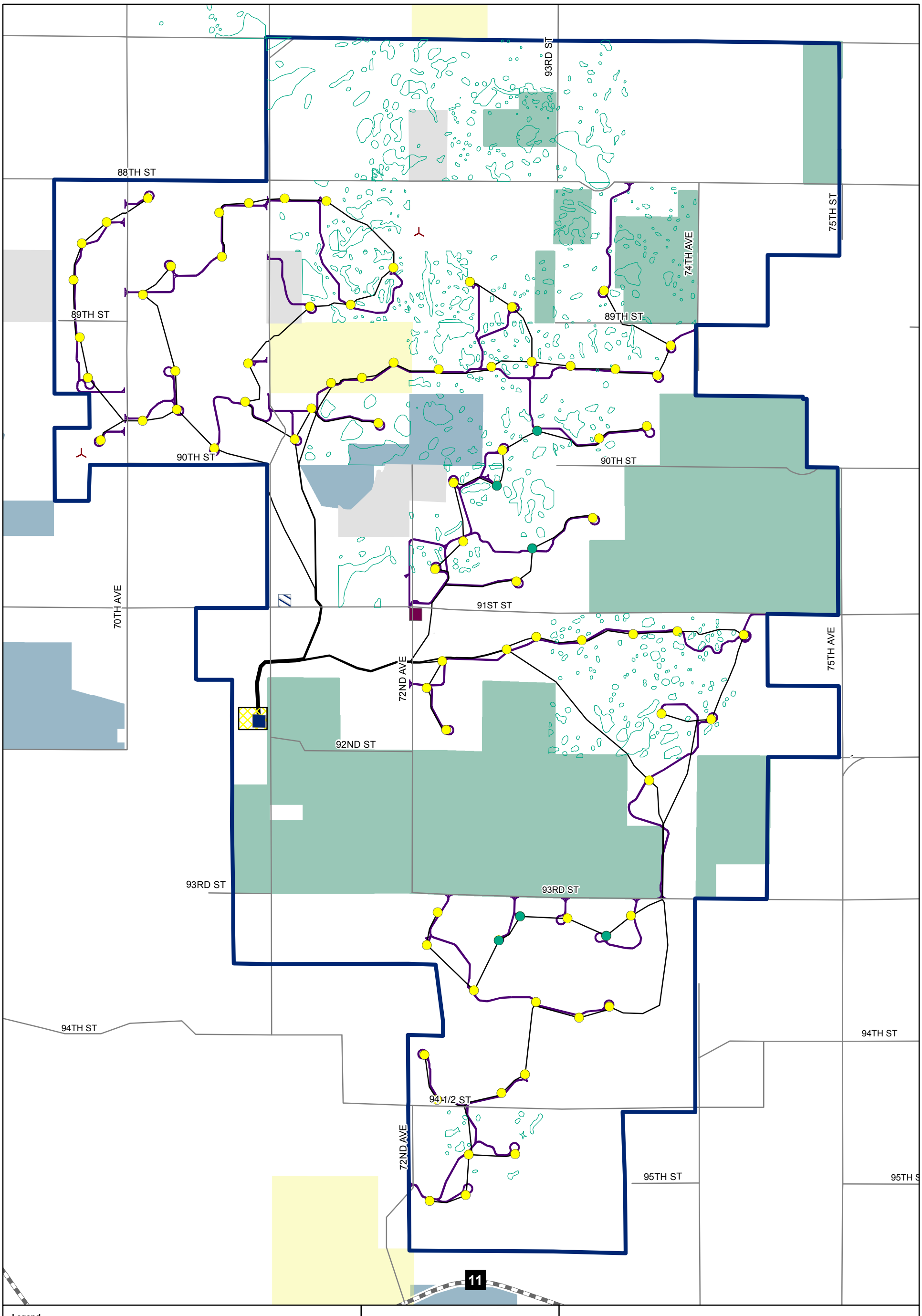

Figure 7-2
Public Lands and Easements
Foxtail Wind Energy Center
Dickey County, ND

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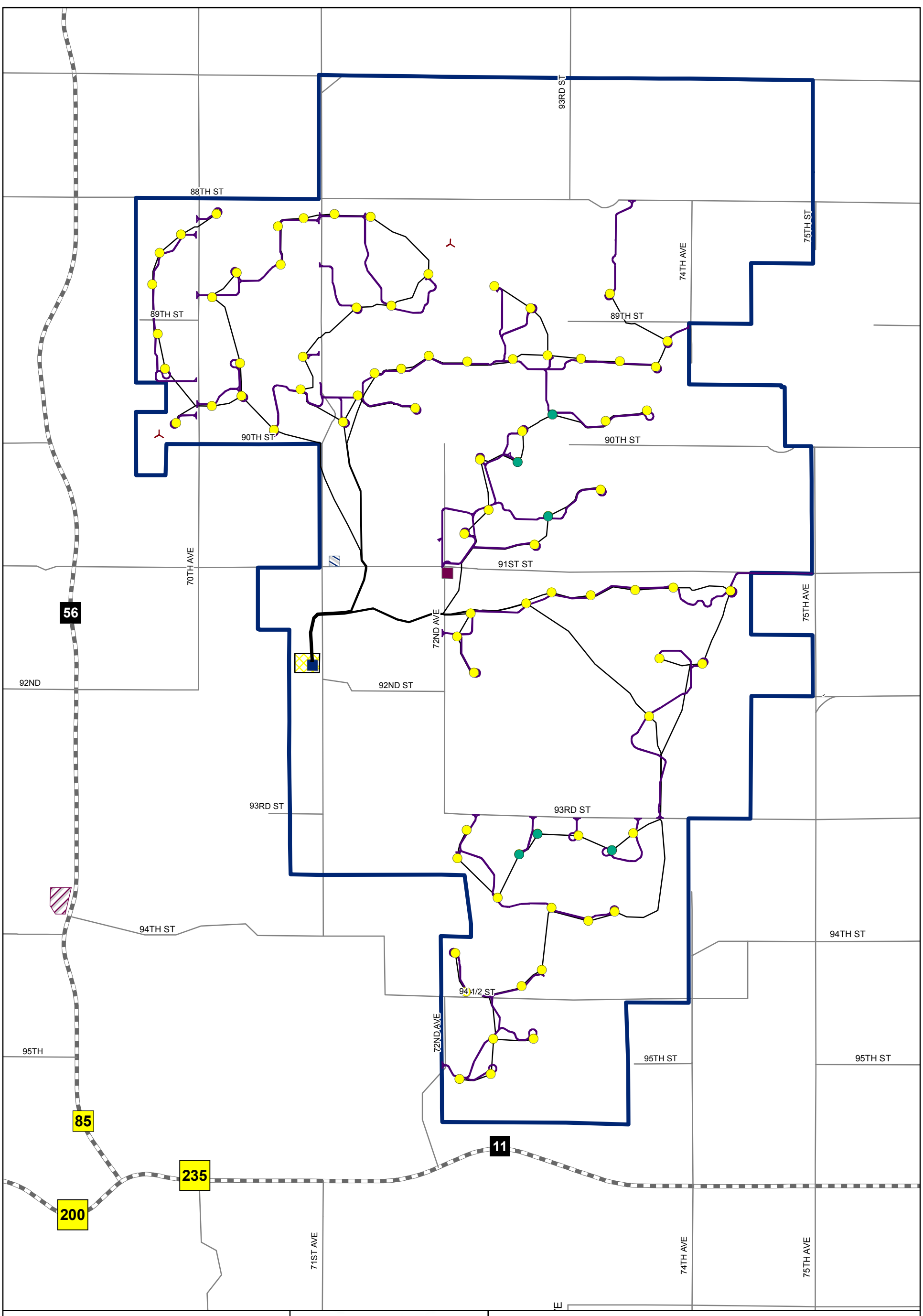
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Legend
Proposed Project Features
Alternative Turbine (05-26-2017)
Met Tower (05-26-2017)
Turbine (05-26-2017)
Service Road (05-26-2017)
Collection System (06-08-2017)
Switchyard
Substation
O&M Building
Laydown
Batch Plant
Project Boundary (01-03-2017)
Transportation
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Average Daily Traffic Count (NDDOT 2016)
County Roads
State Highway
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Grand Forks
Mandan
Bismarck
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Figure 7-3
Average Daily Traffic Map
Foxtail Wind Energy Center
Dickey County, ND
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Figure 7-4. Typical Landscape Photos
Photos show cropland (top) and grassland (bottom).

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Legend

Proposed Project Features

- Alternative Turbine (05-26-2017)
- Met Tower (05-26-2017)
- Turbine (05-26-2017)
- Collection System (06-08-2017)
- Service Road (05-26-2017)
- Project Boundary (01-03-2017)
- Switchyard
- Substation
- O&M Building
- Laydown
- Batch Plant

Prime Farmland (NRCS SSUGO 2017)

- Prime Farmland
- Farmland of Statewide Importance

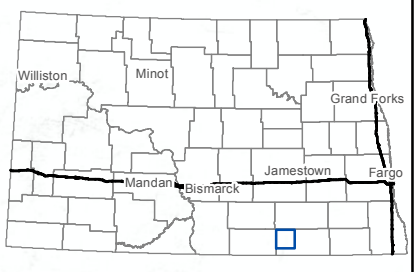

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Figure 7-5
Prime Farmland Soil Distribution Map
Foxtail Wind Energy Center
Dickey County, ND

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Legend

Proposed Project Features

- Alternative Turbine (05-26-2017)
- Met Tower (05-26-2017)
- Turbine (05-26-2017)
- Service Road (05-26-2017)
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- Switchyard
- Substation
- O&M Building
- Laydown
- Batch Plant

Hydrology (USGS 2017)

- Intermittent Stream

Wetlands (USFWS 2017)

- NWI Wetlands

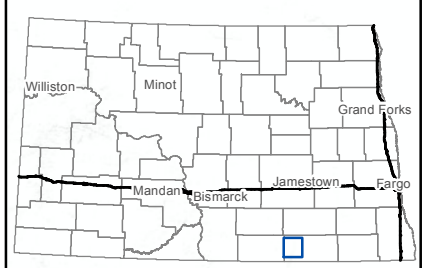

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Figure 7-6
National Wetlands Inventory and Surface Waters Map
Foxtail Wind Energy Center
Dickey County, ND

NEXTera ENERGY RESOURCES

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Appendix A

Excerpt of NextEra Energy, Inc.’s 2016 Corporate Responsibility Report

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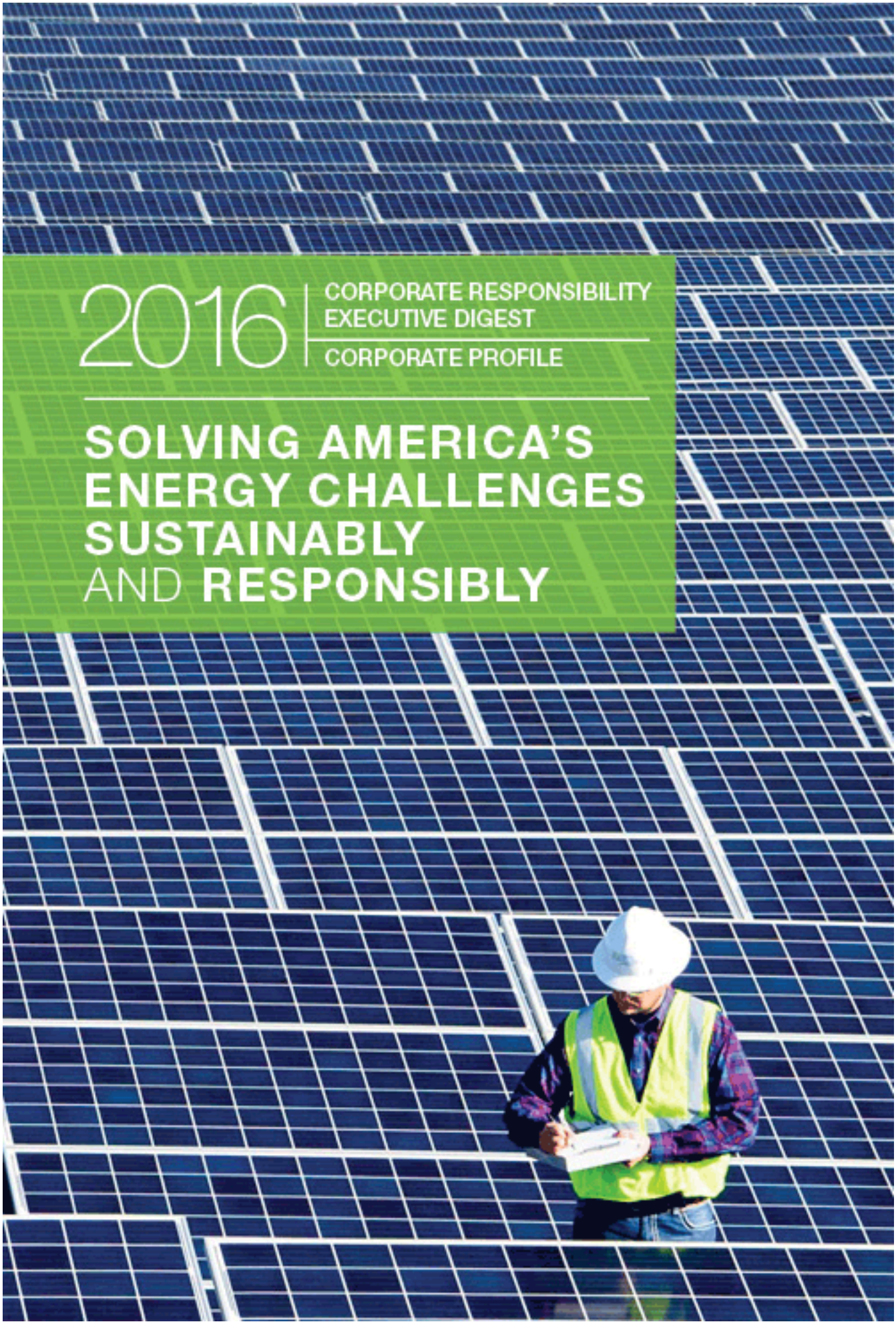

Project totals for NextEra Energy, Inc. and NextEra Energy Resources, LLC include those in which NextEra Energy Partners, LP holds a minority interest.

Our Story

At NextEra Energy, we're proud of the role we're playing in helping solve America's energy challenges and in creating a more affordable clean energy future ... sustainably and responsibly.

To us, being sustainable and responsible means respecting our environment, investing in customer value, sustaining and growing our communities, investing in our team, and growing shareholder value.

As we continue to pursue our vision of becoming America's clean energy leader, we do so with a commitment to ensuring we are providing benefits daily for our environment, our customers, our communities, our employees and our shareholders.

We're pleased you've taken the time to learn about the NextEra Energy story, and we invite you to join us in our journey to create a more affordable clean energy future we can all be proud of.

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Delivering for OUR ENVIRONMENT

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Highlights

1. NextEra Energy achieved its lowest-ever emissions rates of SO2, NOx and CO2 in 2015 – rates that were 97-, 79- and 52-percent lower, respectively, than the U.S. utility sector
2. We continue to be the world’s largest generator of renewable energy from the wind and the sun
3. We are committed to interacting with nature in a positive manner and have developed wildlife protection programs to protect a number of species and their habitats, including eagles, kestrels, sea turtles, crocodiles, and ospreys

Environmental Stewardship

At NextEra Energy, we're committed to being an industry leader in environmental protection and stewardship. We're all stakeholders in the protection of the earth's environment. As an energy company, we recognize that protecting the environment is essential to the way we do business and critical to the value we deliver for our stakeholders.

Our Environmental Policy establishes our core environmental expectations and provides actionable guidance for all employees as we strive to foster a culture of environmental excellence and challenge ourselves to continuously improve. The policy is incorporated in our Code of Business Conduct & Ethics and Supplier Code of Conduct, which apply to our employees and suppliers, respectively. Everyone at NextEra Energy understands that protecting the environment is a collective responsibility. It's why our senior executives are actively involved in our environmental accountability, management and stewardship programs that are intended to:

- Design, construct, operate and maintain our facilities in an environmentally sound and responsible manner;
- Prevent pollution, minimize waste and conserve natural resources;
- Avoid, minimize and/or mitigate impacts to habitat and wildlife; and
- Engage stakeholders to build trust and partner toward common goals for environmental stewardship and protection.

We want to be the first and best source of information for our stakeholders to learn about our environmental performance and programs. That's what it means to be the clean energy leader. And that's how we deliver for the environment.

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The protection of our environment is a fundamental part of our goal to be North America's clean energy leader and is important to our employees, customers and communities. Our environmental performance and clean energy portfolio demonstrate our commitment to protecting the environment. Protection of the environment is what further enables NextEra Energy to deliver outstanding value to our customers and shareholders.

-Randy LaBauve, vice president of environmental services

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Toward Cleaner Air

At NextEra Energy, we're committed to being an industry leader in environmental protection and stewardship, and one of the key ways in which we've demonstrated this commitment is by making business decisions to invest in emissions-free and clean generation. This enables us to reduce our impact on the air we all breathe. In fact, NextEra Energy's generation fleet has significantly lower rates of emissions of CO2, SO2 and NOx compared to the U.S. electric power industry as a whole.

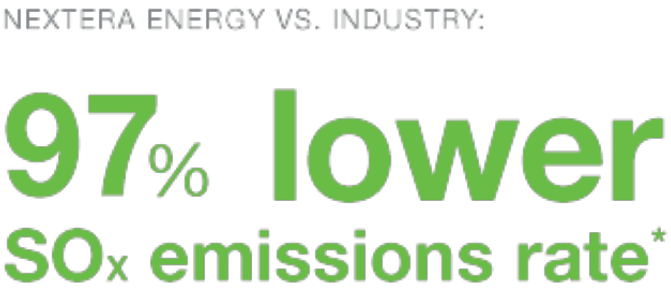
At year-end 2015, NextEra Energy Resources was the world's largest generator of renewable energy from the wind and the sun. We ended 2015 with more than 12,400 MW of wind power capacity and over 1,100 MW of solar power capacity.

At FPL, we are continuing to modernize our fossil generation fleet by replacing older, inefficient oil-fired generation with state-of-the-art combined-cycle, natural gas generation. Since 2001, FPL's investments in clean, fuel-efficient power plants have saved customers more than $8.1 billion in fuel costs and helped reduce the company's use of foreign oil by 99 percent. Because of these modernization efforts, FPL has been able to avoid using more than 40 million barrels of oil, using less than 1 million barrels of oil for generation in 2015. These investments have also enabled FPL to significantly reduce power plant emissions rates and have prevented more than 85 million tons of carbon emissions to date. FPL now operates one of the most modern, clean, fuel-efficient and low-carbon generation fleets in the nation.

We have positioned our business to meet the challenges of new federal environmental regulations, which we anticipate will significantly advance the need for low- emitting and zero-emitting electric generation. At NextEra Energy, we've positioned our business to manage the opportunities and risks presented by these new regulations while simultaneously lowering emissions.

Reducing Our Emissions

SO_2 Emissions Rate



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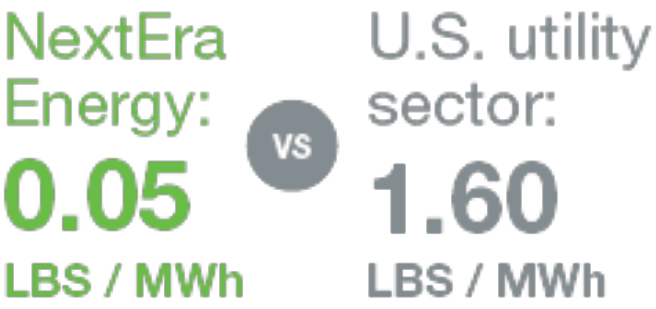
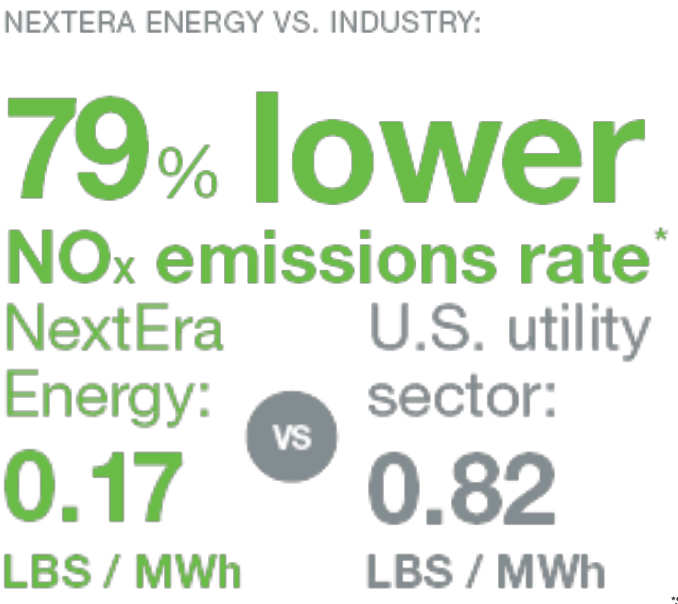


*Source for Electric Sector: U.S. Department of Energy

*The environmental attributes of NextEra Energy's electric generating facilities, such as renewable energy credits, emissions reductions, offsets, allowances and the avoided emission of greenhouse gas pollutants, have been or likely will be sold or transferred to third parties, who are solely entitled to the reporting rights to any federal, state, foreign or voluntary emissions trading program and to ownership of such environmental attributes.

NO_X Emissions Rate



*Source for Electric Sector: U.S. Department of Energy

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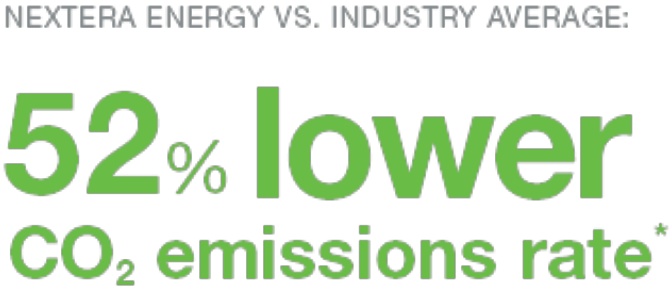
CO_2 Emissions Rate



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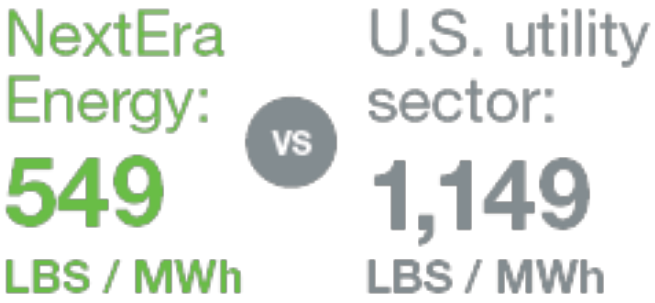

*Source for Electric Sector: U.S. Department of Energy

*The environmental attributes of NextEra Energy's electric generating facilities, such as renewable energy credits, emissions reductions, offsets, allowances and the avoided emission of greenhouse gas pollutants, have been or likely will be sold or transferred to third parties, who are solely entitled to the reporting rights to any federal, state, foreign or voluntary emissions trading program and to ownership of such environmental attributes.

- FPL has been modernizing its power plant fleet with clean, highly efficient combined-cycle natural gas plants such as this one.

In 2015, 97 percent of the power produced by NextEra Energy facilities was generated from a diverse mix of clean or renewable sources, including wind, solar, combined-cycle natural gas and nuclear.

FPL Powers Formula E Electric Race with Clean Solar Energy; Student Focus Garners Statewide Honors

FPL powered the vehicles racing in the country's first-ever electric car race, held in downtown Miami in March 2015. Part of the FIA Formula E Championship, the Miami ePrix featured the highest class of competition for electrically powered racing cars.

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"Our partnership with Formula E and the Miami ePrix is another example of our commitment to advancing zero-emissions solar energy and the use of electric vehicles in Florida," said Eric Silagy, president and CEO of FPL. "By the end of 2016, we will triple the energy we are able to produce from the sun, furthering our mission to provide low-cost, reliable and clean energy to our 4.8 million customers."

FPL announced its partnership with Formula E at its Martin Next Generation Solar Energy Center, along with famed race car driver Michael Andretti and drivers in the Miami ePrix. During the announcement event, electric race cars were charged with power generated from the Martin Next Generation Solar Energy Center, one of three solar power plants operated by FPL. Earlier in the year, FPL announced plans to install more than 1 million solar panels at three additional solar power plants by the end of 2016. These new plants, combined with community-based solar installations and other small-scale arrays that FPL is installing, would total more than 225 megawatts of new solar capacity. This would effectively triple FPL's solar capacity, which currently totals approximately 110 megawatts.

"The Formula E Miami ePrix is all about sharing our passion for electric vehicles," said Alejandro Agag, CEO of Formula E Holdings. "The race series is exciting, it's entertaining, and we hope it will turn the world's attention to the potential electric vehicles have to change the way we power transportation. We are pleased to partner with FPL – a company that shares our vision for powering the future with affordable, clean energy."

"It's an honor for us to have been selected as one of the 10 founding Formula E teams for the inaugural season," said Michael Andretti, chairman and CEO of Andretti Sports Marketing.

Formula E hosts races in 10 cities around the world, including London, Beijing, Monaco and Buenos Aires. The Miami ePrix was the first Formula E race in the United States.

Education tie is applauded

As part of its Formula E partnership, FPL also sponsored a student electric vehicle race. Students from schools throughout FPL's service area who are involved in science, technology, engineering and math (STEM) programs assembled 10 electric kit cars. The student teams competed in the Formula E School Series, racing on the same track as the Miami ePrix. The grand prize was $5,000, second-place $2,500 and third-place $1,500. All prizes support STEM or robotics initiatives of the winning school teams.

The effort was hailed by Miami-Dade County Public Schools Superintendent Alberto M. Carvalho, who chose FPL for the Florida Commissioner of Education's Corporate Business Recognition Award. "Miami-Dade County Public Schools and its students have benefitted tremendously from FPL's support of STEM initiatives," said Superintendent Carvalho. "Their commitment has enriched the learning environment by providing additional resources in our classrooms and giving students invaluable real-life learning experiences."

"We are proud of our long-time partnership with Miami-Dade County Public Schools and of the difference we are making in our classrooms," said Eric Silagy, president and CEO of FPL. "FPL is honored to be recognized for our involvement inside and outside the classroom. Together with the school district, we are making Miami an even better place to work and raise a family."

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Conserving and Managing Water

Water is critical to the thermoelectric (steam electric) process, which uses water to create steam and drive electric generators. To ensure sustainable access to this natural resource, we're active stewards for sourcing, utilizing and managing water in the communities in which we operate. And we're taking measures to reduce our water consumption, including investing in both "water free" power generation from wind and solar photovoltaic and in more efficient thermoelectric generation plants.

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Conserving Water

Just as water plays a critical role in the generation of reliable, affordable power, we understand the vital need to conserve and protect our water resources. We embed water conservation management strategies into our business planning and operational practices to mitigate risks posed by water availability and lower our costs. We reduce consumption through efficiency, technology and operational improvements, including:

- *Investing in "water-free" power generation:* We have made a conscious decision to invest in wind and solar photovoltaic generation, which together comprise more than a quarter of our company's generating capacity. Neither technology uses water for power generation.
- *Using sustainable water sources:* Nearly 75 percent of the water we withdrew in 2015 came from seawater sources, which are non-potable and drought proof. We also use reclaimed water for cooling purposes when feasible, for example at our West County Energy Center in Florida and our recently sold Forney Energy Center in Texas. Doing so offsets the demand for higher-quality water and reduces water supply risk.

As a result of our efforts to conserve water, our water withdrawal rate has steadily improved since we began centrally tracking it in 2007. In 2015, we achieved a 33-percent reduction in our withdrawal per megawatt hour (MWh) compared to our withdrawal rate in 2007. This overall improvement is due to increased efficiencies at our thermoelectric power generation facilities, as well as increased generation from "water free" (e.g., wind and photovoltaic solar) generation sources, among other things. Importantly, the majority - about 98 percent - of water withdrawn for use at our thermoelectric plants is withdrawn via a once-through cooling system and then returned to its original source. The remainder of the water withdrawn is "consumed" through evaporation or deep well injection.

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Managing Water

At NextEra Energy, water management is a critical business planning activity for us to deliver clean, reliable and affordable energy. While we're currently the world’s largest generator of renewable energy from the wind and the sun, a significant amount of our generation comes from thermoelectric power plants. In fact, water is used in two separate systems at thermoelectric power plants, as shown below.

MANAGING WATER

Seeking opportunities to maximize efficiencies at our thermoelectric plants

As in other areas of our operations, we emphasize adopting best management practices to minimize our environmental footprint while optimizing operational and financial performance. Existing facilities are constantly challenged to be innovative and to fine-tune their operations. For example:

- Facilities constantly monitor water quality parameters to ensure proper quality for plant use, as well as adherence to discharge permitting requirements, which protect receiving water bodies. Water quality changes can also help identify potential issues in the system such as leaking pipes or valves.
- We use Six Sigma and quality improvement (QI) processes to address water problems and identify opportunities to reduce water use and for cost savings at our facilities, which can ultimately save our customers money.
- Modernizations completed at two of our power plants in Florida (a third modernization at our Port Everglades plant is underway) increase the efficiency with which we use water. The modernized plants have greater generation capacity when compared to the previous plants, without using additional water for that capacity.

FPL plan to improve conditions near Turkey Point's cooling canal system reaches important approval milestone with State

Florida Department of Environmental Protection, FPL agree to science-driven solutions to improve water quality

Plan reviewed and supported by environmental groups and independent experts

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FPL in June 2016 reached an agreement with the Florida Department of Environmental Protection that finalizes a long-term plan to remove hypersaline water from underneath and near the cooling canal system at the company’s Turkey Point Power Plant. The long-term plan complements the actions FPL has taken over the past year to successfully reduce the salinity in the Turkey Point cooling canal system and improve the overall efficiency of the canals.

"We are now positioned to realize further improvements in water quality in and around the cooling canals at Turkey Point," said Eric Silagy, FPL's president and CEO. "I'm confident that the fact-based solutions we'll be implementing at Turkey Point will have a lasting positive impact."

FPL's Turkey Point Nuclear Power Plant continues to operate safely as it has for more than 40 years, generating zero-carbon energy to power hundreds of thousands of homes and businesses. The site's recent water quality challenges involving the cooling canal system do not impact the safety of the plant or public health.

The plan announced in June is the result of a months-long process and was developed in consultation with regulatory agencies and independent experts in hydrology, environmental conservation and wildlife protection. As part of the plan, FPL will install a recovery system to capture hypersaline groundwater and safely put it deep underground in bedrock that is separate from drinking water sources.

In addition to removing hypersaline water, FPL will immediately undertake restoration projects on the east side of the cooling canals designed to protect the quality of surface water in Biscayne Bay. The projects include restoring an area called Turtle Point to its previous natural state, helping encourage marine and plant life in the area. FPL is also currently constructing a system that will refresh the canals with up to 14 million gallons per day of Floridan aquifer water, helping keep salinity levels in balance with Biscayne Bay.

For more information, visit FPL's educational website, www.TurkeyPointFacts.com.

Preserving Wildlife and Habitat

At NextEra Energy, we're committed to being an industry leader in environmental protection and stewardship, and that includes wildlife and habitat protection. We have operations across the U.S. and Canada, so we're keenly aware of the potential impacts that existing and future operations may have to wildlife and their habitat. This is why we have environmental policies and programs in place at both the corporate and local levels to avoid and minimize these impacts and to address any remaining impacts through appropriate mitigation measures. Here's what we do:

- Before we build a power plant or other electric facilities, we work hard to make sure we understand the local ecosystem and what it takes to be a partner in its preservation and to be a good neighbor to all the species that live there.
- As part of that work, we consider the presence of any threatened or endangered species and the proximity to valuable wildlife corridors, wetlands or other ecologically important areas. We make efforts to avoid these areas entirely. If we can't do that, we seek to minimize and mitigate the impact of our developments to affected areas.
- Once a project is operating, we continue to monitor potential impacts to biodiversity that may occur. For example, at wind sites, we implement a voluntary Wildlife Response and Reporting System (WRRS) to monitor long-term avian and bat interactions. We also voluntarily adhere to the FWS Wind Energy Guidelines issued in 2012, and conduct a minimum of one year of formal post-construction mortality monitoring at all U.S. wind sites constructed after March 2012.
- In Ontario, our company complies with Ministry of Natural Resources guidance, which requires that we perform a minimum of three years of post-construction mortality monitoring for birds and bats, in addition to other project-specific monitoring conditions.
- At several of our solar sites in California, we’re required to conduct two years of post-construction monitoring as defined by our Bird and Bat Conservation Strategies.

We have long adhered to numerous policies and programs to protect threatened and endangered species. We follow all federal and state regulations including the Endangered Species Act (ESA), which is administered by the U.S. Fish and Wildlife Service (FWS) and the U.S. National Marine Fisheries Service (NMFS). We also go above and beyond those regulations by making important contributions to protect a number of vulnerable species and habitat areas. Some examples of our wildlife-related programs are featured below.

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- FPL has donated 130 concrete power poles to an artificial reef program managed by St. Lucie County, Florida. The poles provide additional habitat for marine life. Area fishing and diving businesses also benefit.

Eagle Nest Platforms

Nesting platform success in Florida

- Bald eagles are found in all 50 U.S. states, including throughout FPL's service territory in Florida.
- A few years ago, a bald eagle built its nest on a 230-kV transmission line in Volusia County, Fla. To protect the nest and the eagles that would be raising their family in it, and because the surrounding area lacked viable nest trees, FPL for the first time ever constructed an independent pole and platform to provide the birds with a nearby nest location. With input from the Florida Fish and Wildlife Conservation Commission (FWC) and the FWS, the platform was designed to provide long-term support of the nest. Within 45 days of the nest transfer, a pair of eagles began to add onto and occupy the nest, and not long after that, a baby eaglet hatched in the nest!

Duette Preserve – Kestrel Boxes

- The colorful Southeastern American Kestrel is the smallest falcon in North America. Unfortunately, its numbers have dwindled so much that researchers cannot say how many of the threatened species still exist in Florida.
- In March 2013, while installing new, more storm-resilient power line poles and replacing old wooden poles in an area of its service territory, FPL identified an opportunity to assist the kestrel. Line workers attached kestrel boxes to four of the new poles - a first for the company - and also preserved the old wooden poles that contained inactive nests.
- In 2015, as FPL continues to upgrade the poles in this area of Kestrel habitat, we've included nest boxes on an additional 20 poles. We're also working with the Audubon Society toward a program to monitor the boxes for nesting success.

Concrete Pole Donation for Artificial Reefs

- According to the Florida Department of Environmental Protection, Florida is the only state in the continental United States to have extensive shallow coral reef formations near its coasts. Coral reefs create specialized habitats that provide shelter, food and breeding sites for numerous plants and animals, including spiny lobster, snapper and other commercial and recreational species.
- In addition, the FWC administers an artificial reef program to enhance private recreational and charter fishing and diving opportunities, provide a socio-economic benefit to local coastal communities, and increase reef fish habitat.
- A few years ago, FPL removed 130 concrete poles in Port St. Lucie, Fla., and replaced them with about 60 poles that are more storm resilient. The next year, FPL donated the 130 original poles, weighing about 2,000 tons, or the equivalent of 1,250 mid-sized cars, to St. Lucie County to create two new artificial reefs. These new reefs are in addition to an artificial reef created several years before that using FPL-donated material. The reefs provide additional habitat for marine life, while also generating economic opportunities for area businesses that provide services for divers and anglers enjoying the reefs.

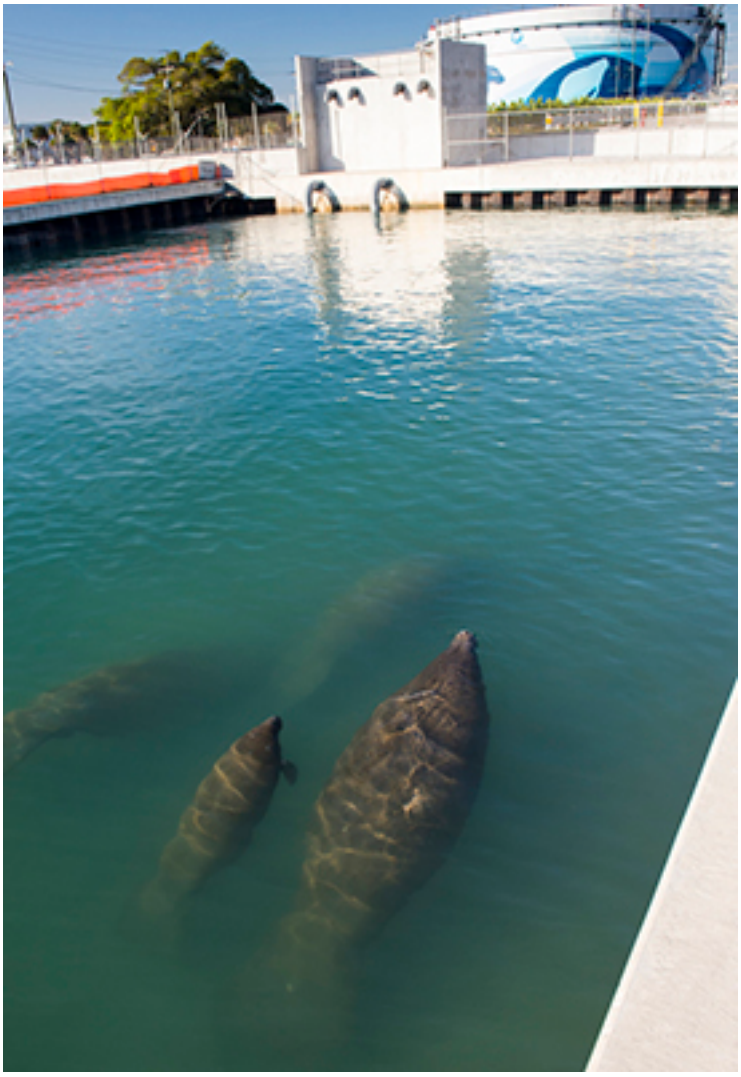
Sea Turtle Program: St Lucie Nuclear Plant

- We have sponsored monitoring of sea turtle nesting activities in South Florida since 1971. In 2015, 7,878 loggerhead, 860 green, and 365 leatherback nests were recorded on South Hutchinson Island. During summer, FPL employees conduct popular turtle walks along the beach to allow visitors to observe nesting turtles in their native habitat.
- Artificial light on or near nesting beaches can negatively affect the nesting process by interfering with normal nocturnal behaviors of threatened and endangered sea turtles. That's why we turn off about 500 streetlights when turtle-nesting season in Florida begins -- every year in March in six counties on the Atlantic coast and in May in all other counties -- and we turn them back on when the season is over at the end of October. We've also equipped dozens more of our streetlights with special shields to re-direct light away from the beach and away from sea turtle nests.

Sea Turtle Program: St Lucie Nuclear Plant

- Due to the location of the plant and the design and operation of its intake cooling water system, sea turtles sometimes inadvertently enter the St. Lucie Nuclear Plant's cooling canal system. A net system keeps the turtles safely corralled in the canal, and trained biologists on site from the Inwater Research Group systematically gather, measure, weigh, tag, and release the turtles. During 2015, 465 sea turtles were removed from the intake canal, including 274 loggerheads, 181 greens, 7 Kemps' ridley, two leatherbacks and one hawksbill. Nearly all are released back to the ocean. Turtles with injuries or health issues are transported to an animal rescue center that the FWC recommends. Through this program, FPL performs a valuable service to researchers by providing sea turtle data, which is normally hard to obtain (especially for males).

Manatee Program



- The Florida manatee is Florida's state marine mammal and is an endangered species. Manatees play an important role in the habitat of the shallow rivers, bays, canals and coastal waters they call home.
- During cold weather, these graceful, grazing creatures congregate at the warm water outflows near power plants. FPL has worked closely with regulatory agencies and environmental organizations for more than 30 years to ensure that manatees are protected, and our leadership role has been recognized by numerous environmental organizations worldwide. We have conducted hundreds of aerial surveys, published and distributed thousands of pieces of educational literature, and sponsored extensive research on manatee habitat and behavior.
- FPL is supporting telemetry studies at two facilities where biologists will tag and track a total of 15 manatees. Data collected during the studies will support an understanding of where these animals travel during winter months and the environmental conditions of the areas they frequent.
- Several FPL's facilities where manatees congregate have been or are being modernized. During construction, FPL installed temporary heating systems so manatees could continue to benefit from warm water during that period.
- On the Lake Worth Lagoon, FPL’s new manatee education center, next to its Riviera Beach Clean Energy Center where manatees have long gathered to keep warm during the winter months. helps raise awareness about the importance of protecting this gentle species.

Crocodile Management Program

- In the late 1970s, the American crocodile was on the brink of extinction. In the 1980s, FPL initiated a crocodile management program at its Turkey Point Nuclear Power Plant south of Miami, to benefit these ancient reptiles. Given the 5,900-acre, man-made cooling canal system at the plant offers ideal nesting conditions, the management program includes protecting these nesting areas, completing population surveys, relocating hatchlings within the canal system for better survival, and regulating plant activity at night and during nesting season. Over the past 37 years, 7,131 hatchlings have been tagged from 554 nests at Turkey Point.
- FPL recently added two new monitoring components for crocodiles to assist in crocodile research.
- In recent years, the crocodile population has rebounded, and in 2007, the U.S. government down-listed the American crocodile from an endangered species to a threatened species - a notable accomplishment. In fact, FPL's conservation efforts were recognized by the Fish and Wildlife Service for supporting this improvement.

Everglades Mitigation Bank

- The Everglades is known the world over for its extraordinary diversity of wildlife ? from Florida panthers, to manatees, crocodiles and birds such as roseate spoonbills, egrets and wood storks. The National Wildlife Federation reports that more than 300 species of birds alone call the Everglades home.
- A critical link to the success of restoring the Everglades ecosystem to its natural condition is FPL's Everglades Mitigation Bank, a nearly 14,000-acre project located in southern Miami-Dade County adjacent to our Turkey Point Power Plant. Mitigation banking generally involves creating, enhancing, or preserving wetlands on a large tract at one location to provide mitigation credits to companies to offset unavoidable wetland impacts elsewhere.
- This location is home to 46 protected wildlife species and is a major contributor to a seamless wildlife corridor between the Everglades and Biscayne National Park.
- Numerous projects in the mitigation bank have been completed, including removal of historic roads and canals, removal of hydrologic barriers, replanting of vegetation and

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the installation of over 40 control structures to restore historical water distribution patterns for more than 9,000 acres of sawgrass marsh, high marsh, forested tree islands, and mangrove habitat. FPL also took its extensive knowledge and lessons learned from its crocodile management program at the Turkey Point Plant and established a similar crocodile habitat in the mitigation bank.

- For more details on our mitigation banking activities, please visit https://www.fpl.com/environment/wildlife/mitigation-bank.html

FPL Avian Protection Plan

- More than 500 species of birds are estimated to exist in Florida and countless others migrate to or through our state. It is not uncommon for many of these birds to take refuge on or otherwise interact with electric utility poles or other equipment.
- FPL has been committed to the protection of endangered and migratory birds for nearly three decades. In 2007, FPL developed an Avian Protection Plan (APP), which provides employees with a single resource for avian risk mitigation that is consistent with industry and federal guidelines. In the field, FPL operates in strict adherence to the APP. The APP also provides the framework for implementation of FPL's Avian Protection Program to reduce bird mortalities, document utility actions, and improve service reliability.
- As part of this industry-leading program, FPL proactively retrofits poles and equipment to make them more bird friendly. To identify high-risk distribution structures, FPL uses an Avian Risk Assessment Model, a first of its kind in the energy industry. Through 2015, we have invested millions of dollars to retrofit or construct thousands of poles to avian-friendly standards.
- As an example, osprey will sometimes try to build nests on power line structures, which can cause outages. FPL builds nesting platforms next to osprey nests to lure the birds away from the power lines and installs special devices on the poles’ cross arms to keep the birds from nesting there again.

Barley Barber Swamp

- The 400-acre Barley Barber Swamp in Martin County, Fla., consists of an ancient cypress-stand ecosystem that is home to diverse fauna, including alligators, otters, wading birds and bald eagles, providing a rare glimpse of "old Florida."
- In 1972, when constructing its Martin power plant and cooling pond nearby, FPL set aside Barley Barber as a wildlife preserve.
- To improve the state of this natural area, FPL has implemented a non-native invasive species removal program. For example, the Old World climbing fern, an invasive weed with origins in Africa and Asia, grows very quickly and creates a mat that covers native species, blocking sunlight and strangling anything growing beneath it. If left unchecked, it ultimately destroys the ecosystem and eliminates habitat for native flora and fauna. FPL is partnering with researchers to document the effectiveness of bio-controls for this invasive species at the swamp.
- In addition to being a wildlife sanctuary, the area is also significant from an archaeological perspective. Pottery fragments and other artifacts have been found on the site, indicating use by Native Americans between 300 and 900 years ago.
- FPL has partnered with the Treasured Lands Foundation, a local nonprofit organization, to provide free, public tours of the swamp. For more information, please visit www.BarleyBarber.org.

Seabrook Station Estuary Project

- The 5,000-acre Hampton-Seabrook Estuary is home to the largest expanse of salt marshes in New Hampshire. These marshes, along with their tidal flats, offer important habitat for a variety of breeding and migratory birds, especially salt marsh sparrows and shorebirds.
- NextEra Energy Resources supports the New Hampshire Estuary Project to improve water quality in this area, as well as to work with various state and federal agencies to identify ways to prevent entrainment and impingement of aquatic species at our nearby Seabrook Station nuclear plant.
- In addition, Seabrook's National Pollutant Discharge Elimination System (NPDES) permit requires the monitoring of soft shell clam populations in the Hampton-Seabrook harbor to demonstrate that the clam populations are not being impacted by plant operations. Voluntarily, and at no charge, we provide the clam data to the Piscataqua Region Estuaries Partnership (PREP) for use in its State of the Estuaries assessments. NextEra Energy Seabrook has maintained this excellent partnership with PREP for about 20 years.
- Seabrook Station is also home to The Seabrook Science & Nature Center, which gives people the opportunity to learn about nuclear energy and the thriving ecosystem that surrounds the plant. For more information, please visit: http://www.nexteraenergyresources.com/what/nuclear_seabrook_center.shtml

Jamaica Bay Project

- In New York we partnered with the Gateway National Recreation Area in New York City to improve marine habitat and water quality in Jamaica Bay with a donation of $100,000. Located near the NextEra Energy Resources Bayswater and Jamaica Bay clean energy centers in Far Rockaway we provided timely financial support and data to the Park Service enabling them to restore Bay seagrasses and other marine habitat as well as provide public education facilities concerning Bay wetlands.

NextEra Energy Research Partnerships

Research is the key to understanding our impact on local ecosystems and wildlife and what we can do better to enable both to prosper.

As the largest producer of wind energy in the U.S., NextEra Energy is committed to better understanding bat and avian interactions with wind turbines to reduce impacts. To improve our understanding, we have partnered with government agencies, education institutions and other industry representatives. Below are the major wildlife initiatives we are currently participating in at the national level. We hold leadership positions in many of these collaborations, and in many cases, we have founded the cooperative effort, as well as provided major funding:

- National Wind Coordinating Collaborative (NWCC) Wildlife Working Group – core member
- Bats and Wind Energy Cooperative – founding member
- Avian Power Line Interaction Committee – founding member, chairman 2002-2006
- Wind Turbine Guidelines Advisory Committee – NextEra Energy Resources participated as a committee member and a committee alternative, both requiring White House and Congressional approval
- Great Plains Wind Energy Habitat Conservation Plan – partner
- Draft Midwest Wind Energy Multi-Species Habitat Conservation Plan Within Eight-State Planning Area – participant
- New Mexico Wind and Wildlife Collaborative – member
- The TCU / Oxford / NextEra Energy Wind Initiative

Project totals for NextEra Energy, Inc. and NextEra Energy Resources, LLC include those in which NextEra Energy Partners, LP holds a minority interest.

Site Remediation and Restoration

Companies like ours that have been operating for many years or have acquired sites from other companies have a responsibility to comply with all laws and regulations concerning petroleum and chemical contamination at those sites and to prevent future occurrences. At NextEra Energy, we're committed to addressing these issues, so that our soils and groundwater are not degraded and we live up to our strategy to be the clean energy leader. Site remediation activities are conducted in compliance with all local, state and federal requirements and range from remedial activities associated with the removal of underground storage tanks (UST) to sites where we are decommissioning assets as part of our efforts to modernize our power generation fleet. While remediation is often driven by regulation, we also look for opportunities to implement best practices that go beyond regulatory requirements.

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NextEra Energy is the world's largest generator of renewable energy from the wind and sun, and has one of the lowest emissions profiles of any utility in North America. Our strategy is based on generating and delivering clean energy that's reliable and affordable. Executing this strategy is providing numerous benefits.

- Our environment is benefitting from the non-emitting and low-emitting fuel choices we've made for power generation and from our stewardship of natural resources;
- Our customers are benefitting from affordable, reliable and clean energy to power their homes and businesses;
- Our communities are benefitting from our investments that drive job creation and other economic activity in their communities;
- Our employees are benefitting by being challenged daily to work together to innovate, grow our company and improve continuously; and
- Our shareholders have benefitted from a total return over the 10 years ending Dec. 31, 2015 that far exceeded the total return for both the S&P 500 Index and the S&P 500 Utilities Index over that same period.

We expect that our strategic investments - in emissions-free wind and solar generation, low-emissions natural gas generation, safe and emissions-free nuclear power, industry-leading energy efficiency programs and transmission lines designed to deliver renewable energy where it's needed - will help us maintain and grow our position as a clean energy leader while continuing to provide benefits for our stakeholders.

From our commitment to environmental stewardship, pride in the communities we serve and the superior customer value we deliver – being a clean energy leader is not just the way we do business, it is our business.

NextEra Energy **avoided** an estimated **66.1 million tons of CO_2 emissions** in 2015*

*The environmental attributes of NextEra Energy's electric generating facilities, such as renewable energy credits, emissions reductions, offsets, allowances and the avoided emission of greenhouse gas pollutants, have been or likely will be sold or transferred to third parties, who are solely entitled to the reporting rights to any federal, state, foreign or voluntary emissions trading program and to ownership of such environmental attributes.

Project totals for NextEra Energy, Inc. and NextEra Energy Resources, LLC include those in which NextEra Energy Partners, LP holds a minority interest.

We're No. 1 in Wind

At NextEra Energy, we're the No. 1 producer of wind energy in North America. Our wind energy capacity has nearly quadrupled over the past decade.

We own and operate approximately 12,500* MW of emissions-free wind energy with plans to build 1,500 MW in 2016, which in total is more than enough to power a city the size of Chicago ? the "Windy City."

In 2015 alone, our wind energy portfolio grew by approximately 1,200 MW. We added nine wind farms in California, Colorado, Kansas, Oklahoma and Texas, as well as four wind sites in Ontario, Canada.

We now have wind projects in 19 states and four Canadian provinces, representing a total capital investment of more than $20.3 billion and a fleet size that is comparable to the generation capacity of a top-15 utility.

Our wind program helps us deliver reliable and affordable energy to customers with a focus on environmental stewardship. Wind energy is an especially attractive source of electric power because:

- wind farms can be constructed quickly,
- they use no water and produce no solid waste or air emissions,
- there are no fuel costs because wind is free,
- many customers are requesting electricity produced only from renewables such as wind, and
- the price of wind energy is low and competitive with other forms of power generation.

*Includes megawatts associated with non-controlling interests related to NextEra Energy Partners, LP.

NORTH AMERICA'S LARGEST GENERATOR OF WIND POWER

Project totals for NextEra Energy, Inc. and NextEra Energy Resources, LLC include those in which NextEra Energy Partners, LP holds a minority interest.

- Enough emissions-free wind energy can be generated at our Vasco Wind Energy Center in California to power more than 19,500 homes.

Project totals for NextEra Energy, Inc. and NextEra Energy Resources, LLC include those in which NextEra Energy Partners, LP holds a minority interest.

Appendix B

Studies and Assessments

NTIA Notification Letter

DoD Preliminary Screening Tool

Bat Habitat Assessment Report

Whooping Crane Potentially Suitable Habitat Assessment

2017 Raptor Nest and Sharp-tailed Grouse Lek Surveys Memorandum

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NTIA Notification Letter

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Subject: Wind Farm NTIA Notification - Foxtail Wind Project in Dickey County ND

From: Vogliano, Jaclyn
Sent: Wednesday, June 07, 2017 1:46 PM
To: JHenry@ntia.doc.gov
Cc: Nasby, Ashley; Wells, Kimberly
Subject: Wind Farm NTIA Notification - Foxtail Wind Project in Dickey County ND

Ms. Henry:

Please find the attached letter serving as notification to the government that NextEra Energy Resources plans to construct a wind energy facility in Dickey County in North Dakota named Foxtail Wind. Included in the letter are maps showing the project location, project boundary coordinates, and turbine details. Please let me know if anything further is required or of any questions that may arise.

Jaclyn Vogliano
Sr. Resource Modeling Analyst
WindLogics
Cell: 330.280.0459
Jaclyn.Vogliano@nexteraenergy.com

WindLogics

June 07, 2017

Type of Notification: New

Project: Foxtail

Counties: Dickey County

State: North Dakota

Project Sponsor: NextEra Energy Resources

Contact: Jaclyn Vogliano
Email: Jaclyn.Vogliano@nexteraenergy.com
Phone: 330-280-0459

To Whom It May Concern:

This letter and its attachments will serve as notification to the government that NextEra Energy Resources plans to install a wind energy facility in Dickey County in North Dakota called the Foxtail Wind Energy Project. Enclosed are maps and tables that describe the location of this wind energy project.

- Table 1 contains boundary points (WGS84) of the Foxtail Wind Energy Project Area
- Figure 1 is a state level map showing the area where the Foxtail Wind Energy Project is located.
- Figure 2 is a local USGS topographical map of the Foxtail Wind Energy Project Area

The approximate dimensions of the wind turbines to be installed at this facility are as follows:

- Turbine Hub Height AGL: 80 meters
- Turbine Blade Diameter: 116 meters
- Maximum Blade Tip Height AGL: 138 meters
- Estimated Number of Turbines to be Installed: 75

Please review the attached information and contact me if any further information is required.

Sincerely,

Jaclyn Vogliano
Resource Modeling Analyst
WindLogics
700 Universe Blvd
Juno Beach, FL 33408

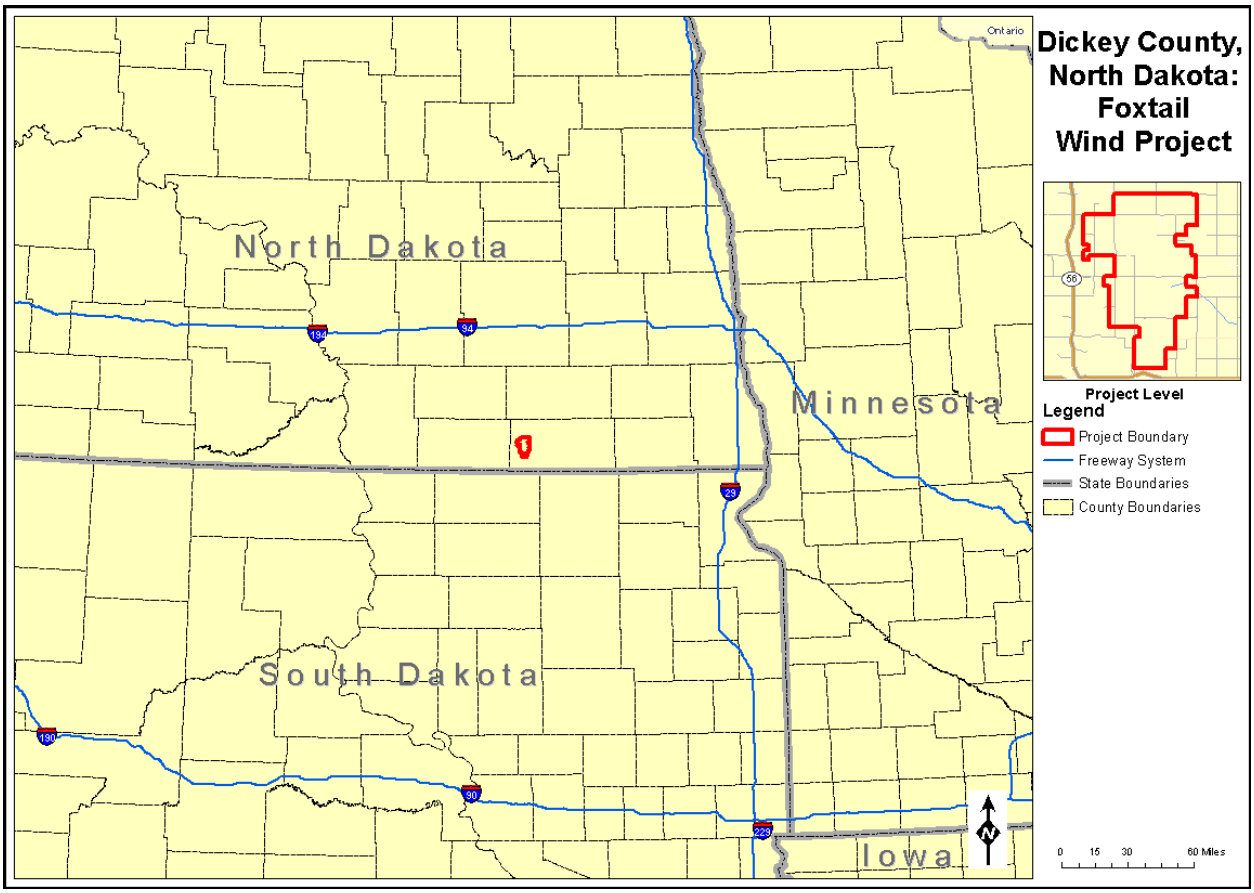

Figure 1: Location of the Foxtail Wind Energy Project

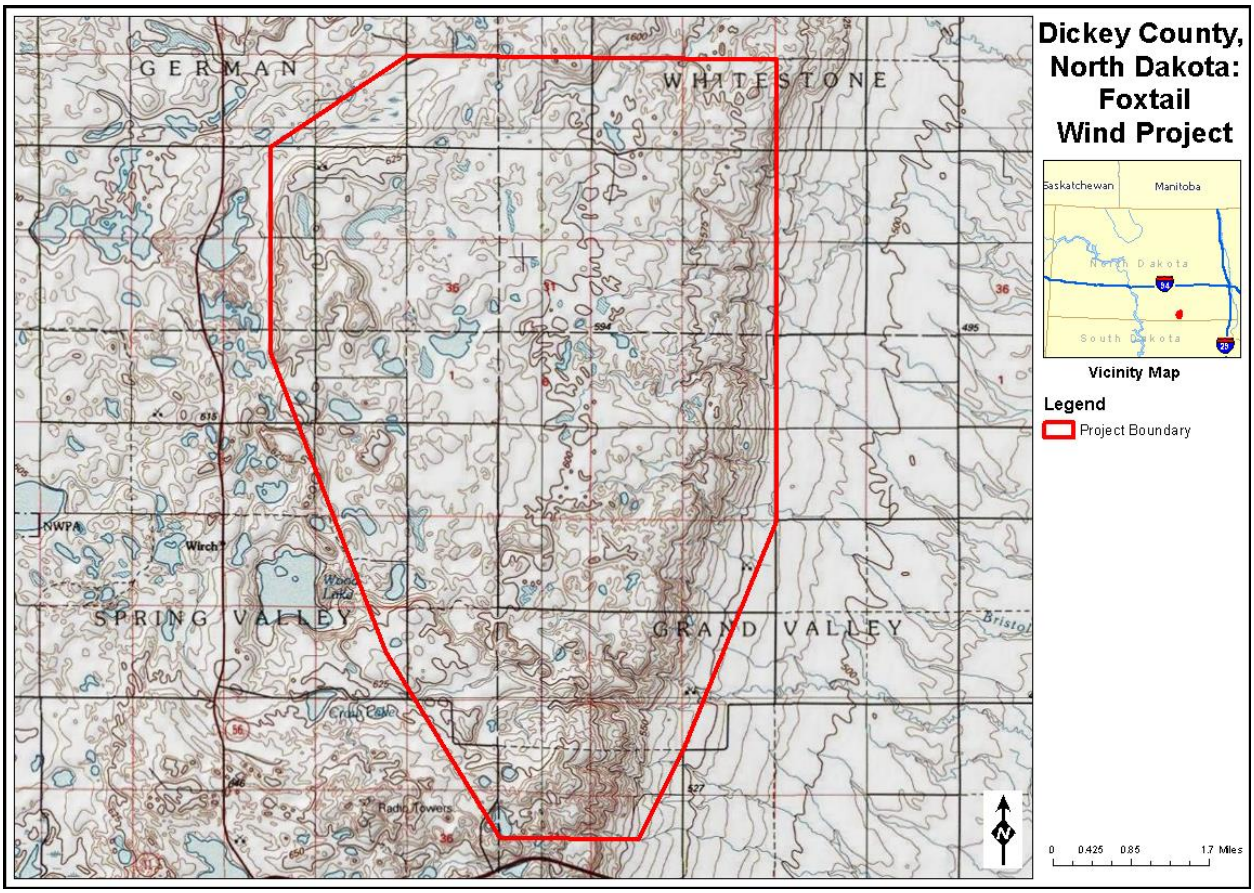

Figure 2: USGS map of the Foxtail Wind Energy Project

Identifier	Latitude	Longitude
1	46 09 24.92013N	098 54 06.57604W
2	46 09 22.33960N	098 49 04.11841W
3	46 05 00.38023N	098 49 05.01510W
4	46 02 50.30336N	098 50 21.24404W
5	46 01 58.62516N	098 50 58.15260W
6	46 01 59.78968N	098 52 51.94046W
7	46 03 45.11617N	098 54 24.30009W
8	46 06 34.89515N	098 55 58.41310W
9	46 08 32.74758N	098 55 58.51165W

Table 1: Project Boundary Coordinates (WGS84) of the Foxtail Wind Project Site

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Screening Type: Long Range Radar ▼ **Geometry Type:** Polygon ▼

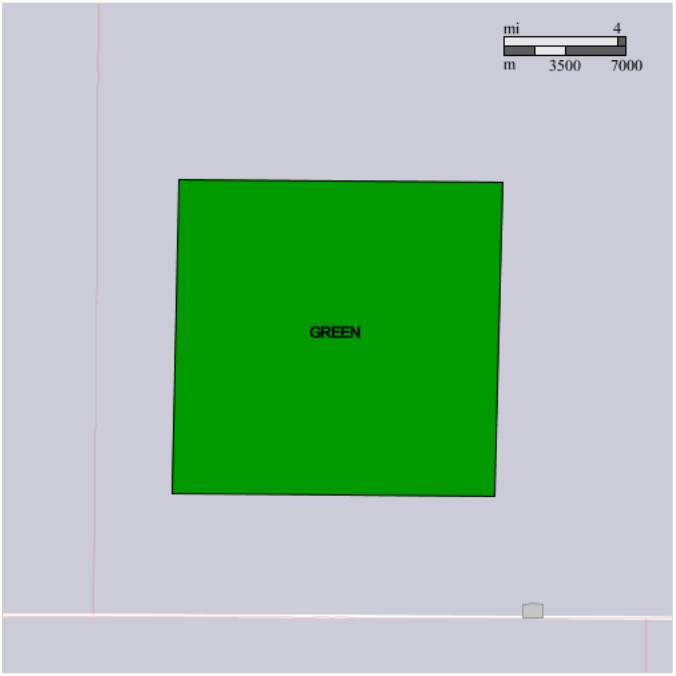
Point	Latitude				Longitude			
	Deg	Min	Sec	Dir	Deg	Min	Sec	Dir
1	46	9	39.04	N ▼	98	47	49.50	W ▼
2	46	0	2.329	N ▼	98	48	5.284	W ▼
3	46	0	8.974	N ▼	98	57	57.02	W ▼
4	46	9	44.58	N ▼	98	57	43.30	W ▼

Horizontal Datum: NAD83 ▼

Map Legend:

- **Green:** No anticipated impact to Air Defense and Homeland Security radars. Aeronautical study required.
- **Yellow:** Impact likely to Air Defense and Homeland Security radars. Aeronautical study required.
- **Red:** Impact highly likely to Air Defense and Homeland Security radars. Aeronautical study required.

Note: Map colors will show as depicted in the map legend when using the 'Polygon' Geometry Type; map colors will be subdued when using the 'Single Point' Geometry Type.



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Screening Type: NEXRAD ▼ **Geometry Type:** Polygon ▼

Point	Latitude				Longitude			
	Deg	Min	Sec	Dir	Deg	Min	Sec	Dir
1	46	9	39.04	N ▼	98	47	49.50	W ▼
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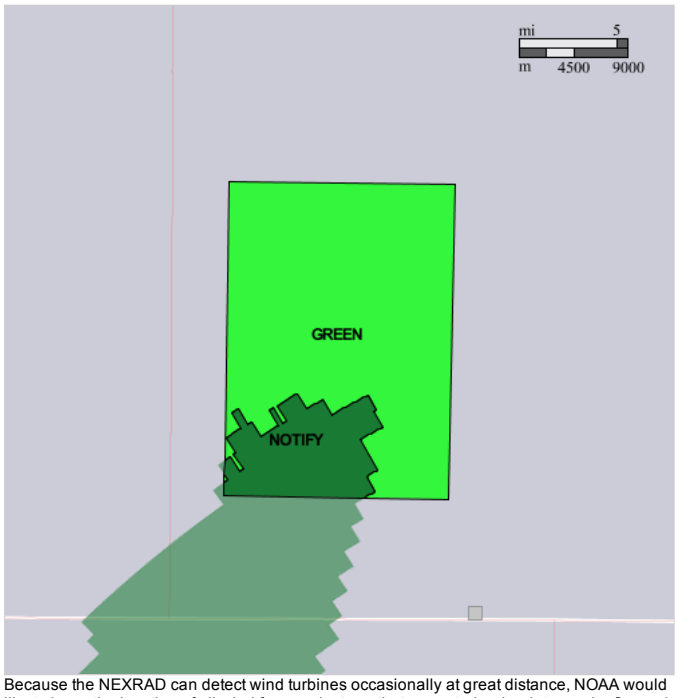
Horizontal Datum: NAD83 ▼

Map Legend:

- **Green: No Impact Zone.** Impacts not likely. NOAA will not perform a detailed analysis, but would still like to know about the project.
- **Dk Green: Notification Zone.** Some impacts possible. Consultation with NOAA is optional, but NOAA would still like to know about the project.
- **Yellow: Consultation Zone.** Significant impacts possible. NOAA requests consultation to discuss project details and to perform a detailed impact analysis. NOAA may request mitigation of significant impacts.
- **Orange: Mitigation Zone.** Significant impacts likely. NOAA will likely request mitigation if a detailed analysis indicates that the project will cause significant impacts.
- **Red: No-Build Zone.** Severe impacts likely. NOAA requests developers not build wind turbines within 3 km of the NEXRAD. Detailed impact analysis required.

Note: Map colors will show as depicted in the map legend when using the 'Polygon' Geometry Type; map colors will be subdued when using the 'Single Point' Geometry Type.



Because the NEXRAD can detect wind turbines occasionally at great distance, NOAA would like to know the location of all wind farm projects so that corrupted radar data can be flagged. Send project information directly to NOAA at wind.energy.matters@noaa.gov or through the National Telecommunications & Information Administration (NTIA) in the Dept. of Commerce. NOAA protects all wind project information as proprietary and sensitive.

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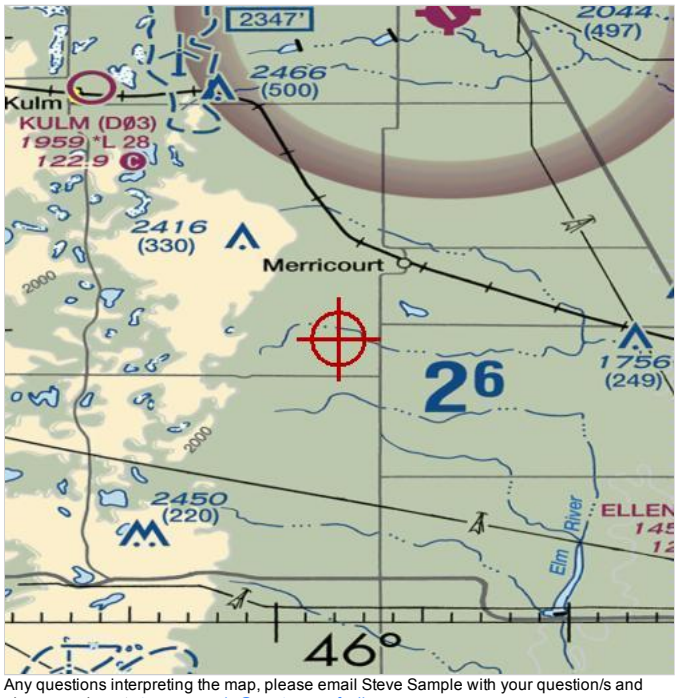

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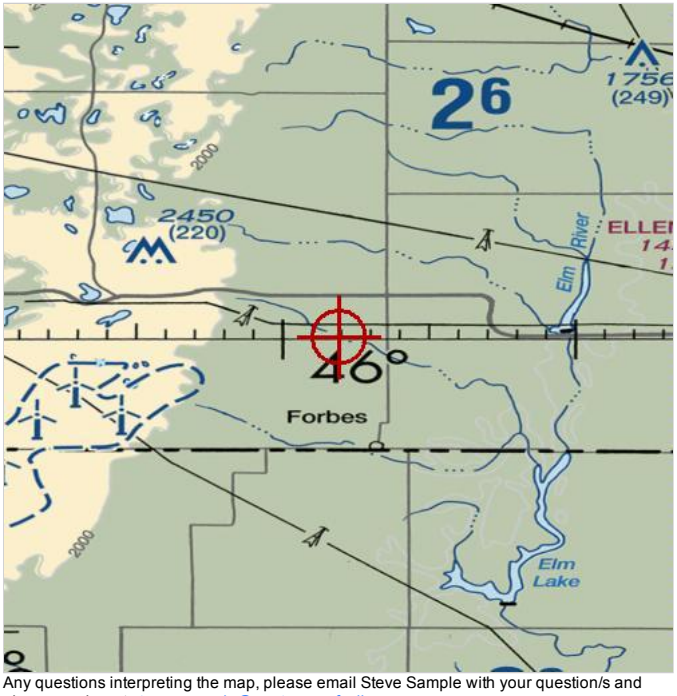

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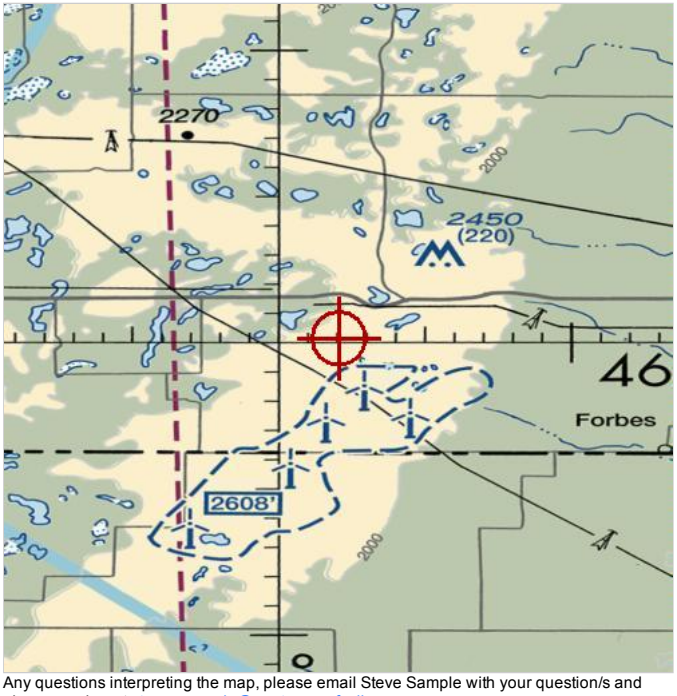

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Bat Habitat Assessment Report

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Bat Habitat Assessment

Foxtail Wind Energy Center
Dickey County, North Dakota

Prepared For:

Foxtail Wind, LLC
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June 2017

TETRA TECH

Executive Summary

Foxtail Wind, LLC contracted Tetra Tech, Inc. (Tetra Tech) to evaluate the suitability of habitat within the Project Area for bats, with a focus on the northern long-eared bat (NLEB), which is listed as threatened under the federal Endangered Species Act. This assessment was conducted in accordance with recommendations in the voluntary U.S. Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines (USFWS 2012), the USFWS recommendations for NLEB impact assessments (USFWS 2014b), and as part of NextEra's due diligence for the Project.

Information on species distributions and habitat requirements was used to develop a list of species potentially occurring in the Project Area. Then, a desktop habitat assessment, taking into account land use and land cover, was conducted to identify potentially suitable habitat for bats within the Project Area. The objective was to identify potentially suitable habitats, and the bat species that may use these habitats, for consideration in designing the Project to minimize interactions between wind turbines and bats. Habitat variables evaluated in this assessment included the amount of suitable foraging and roosting habitat, as well as the presence of potential migration and movement corridors in the Study Area.

Of the 11 bat species known to occur in North Dakota, five species (big brown bat, little brown bat, eastern red bat, hoary bat, and silver-haired bat) are expected to have a moderate or high likelihood to occur within the Project Area. The remaining species, including the listed NLEB, have a low likelihood of occurrence.

The NLEB is expected to have a low likelihood of occurrence within the Project Area during the summer residency period and during migration due to lack of suitable habitat, which consists of a wide variety of wooded habitats used for roosting, foraging and travel. Although the species is believed to occur statewide in suitable habitats, there are no known occurrences of NLEB within Dickey County and no known hibernacula in the state (USFWS 2015a). The Project Area is located at the western edge of the species' range.

The composition of the Project Area and surrounding 2.4-kilometer (1.5-mile) buffer is similar, both being dominated by grassland/herbaceous, pasture/hay and cultivated crops with very little habitat suitable for summer roosting, winter use, or foraging. Less than 1 percent of the Project Area is forested, and forest land cover types (woody wetlands and deciduous forest) is highly fragmented consists of small (average forest patch size is 0.5 hectare [1.2 aces]), disconnected woodlots along riparian areas, and as windbreaks along fields or at homesteads. Therefore, it is unlikely that bats would use the Project Area disproportionately for roosting or foraging over adjacent areas.

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1.0 INTRODUCTION

Foxtail Wind, LLC (Foxtail Wind), a wholly-owned subsidiary of NextEra Energy Resources, LLC (NEER) is proposing to develop the Foxtail Wind Energy Center (Project) in Dickey County, North Dakota (Figure 1). The Project will be constructed and operated by Northern States Power Company (NSP), a subsidiary of Xcel Energy (Xcel). NEER and NSP/Xcel are collaborating on development of the Project to reflect the engineering and design inputs necessary to transfer ownership of the Project to NSP/Xcel at the end of 2017 according to the executed Purchase & Sale Agreement (PSA). NSP/Xcel currently proposes to construct the Project in two phase between 2018 and 2019. Both the NEER and NSP/Xcel teams will be involved in the engineering design of the Project to be constructed, although NSP/Xcel will ultimately construct the Project. The Project has a proposed nameplate capacity of approximately 150 megawatts (MW), anticipated to consist of up to 75 wind turbine generators and associated infrastructure.

Foxtail Wind contracted Tetra Tech, Inc. (Tetra Tech) to evaluate the suitability of habitat for bats within the Project Area and 2.4-kilometer (1.5-mile) buffer (Figures 2 and 3). This desktop habitat assessment addresses all species potentially occurring in the Project Area, with a focus on the northern long-eared bat (*Myotis septentrionalis*; hereafter NLEB), which is listed as threatened under the federal Endangered Species Act (ESA).

The objectives of this desktop habitat assessment are to:

- Assess the likelihood of NLEB and other bat species occurring within the proposed Project Area based on known species' distributions and habitat requirements (Section 4.0).
- Evaluate habitat features within the proposed Project Area and surrounding buffer that may provide potentially suitable habitat for bats (Section 5.0).

Tetra Tech has prepared this desktop bat habitat assessment in accordance with recommendations in the voluntary U.S. Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines (WEG; USFWS 2012), the USFWS recommendations for NLEB impact assessments (USFWS 2014b), and as part of NextEra's due diligence for the Project. This report provides an overview of wind energy and bat issues and applicable regulatory framework, describes the Project Area, identifies the bat species likely to occur in the Project Area, and describes the suitability of habitat within the Project Area for bats. A discussion of the USFWS *Key to the Northern Long-Eared Bat 4(d) Rule for Non-Federal Activities* as it relates to the Project is included in Appendix A.

Letters were sent to the USFWS and North Dakota Game and Fish Department (NDGFD) in February 2017 to request updated information on sensitive biological resources in the vicinity of the Project, including the locations of known bat hibernacula and roost sites. A response was received in April 2017 from the NDGFD which did not make specific reference to bats, but did recommend that the avoidance of impacts to wetlands, woodlands, and other native habitats. No information on bat hibernacula or roost sites has been received from the USFWS to date.

2.0 BACKGROUND

2.1 Wind Energy and Bats

Bat mortality associated with wind turbines has been widely reported in the United States and elsewhere in the world, and wind energy development represents one of the largest sources of anthropogenic mortality for bats (Kunz et al. 2007, Arnett et al. 2008, Rydell et al. 2010, Cryan 2011, Hayes 2013, O'Shea 2016). Rates of overall wind energy-related bat mortality in the U.S. varies by region, with the highest fatality rates occurring in the eastern U.S. at wind energy facilities located along forested ridges in the Appalachian region (Arnett et al. 2008, Baerwald and Barclay 2009, Cryan 2011, Hein et al. 2013). Results from mortalities at various sites in the eastern U.S. have reported annual fatality ranging from 21 to 70 bats per turbine, or 15 to 53 bats per MW (Arnett et al. 2008, Strickland et al. 2011). However, relatively high fatality rates for bats have also been reported at wind energy facilities in agricultural settings in the Central and Midwestern U.S. (Table 1; Jain 2005, Gruver et al. 2009, Poulton 2010, Grodsky and Drake 2011, Jain et al. 2011, Howe et al. 2002, Derby et al. 2007, Johnson et al. 2000).

The reason for the high fatality rate of bats at wind turbines is uncertain, although there are several hypotheses (Kunz et al. 2007, Cryan and Barclay 2009). Collisions with wind turbines may occur randomly, or coincidentally if, for example, wind turbines are placed along a migratory pathway for bats. There are also several theories regarding the attraction of bats to wind turbines, which could put them at risk of collision. These include that bats may mistake wind turbines for potential roost trees (Kunz et al. 2007) or as rendezvous points during the mating season, and thus collide while engaging in mating behaviors (Cryan and Barclay 2009). Alternately, bats may be attracted to the concentration of insects around wind turbines that provide potential feeding opportunities (Rydell et al. 2010). Thus, there are many species-specific, seasonal, and project-specific factors that contribute to mortality risk for bats (Kunz et al. 2007). The probability of mortality events may also increase during periods of low wind speeds, low barometric pressure, and warmer temperatures, which are conditions associated with increased bat activity (Arnett et al. 2008, Baerwald and Barclay 2011).

Regardless of the specific causes of bat fatalities, two general patterns of fatalities are consistent across nearly all wind energy facilities:

1. Migratory tree-roosting bat species represent the majority of fatalities; and
2. The majority of bat fatalities occur during late summer and early fall, coinciding with the fall migratory movements of bats (Arnett et al. 2008, Cryan 2011).

Tree-roosting bats, such as eastern red bats (*Lasiurus borealis*), silver-haired bats (*Lasionycteris noctivagans*), and hoary bats (*Lasiurus cinereus*), make long-distance, latitudinal migrations to warmer climates, and peaks in fatality rates for these species appear to coincide with increasing bat activity levels associated with their southward migration (Cryan 2003, Arnett et al. 2008, Zimmerling and Francis 2016). During migration, these species fly at altitudes that overlap the wind turbine rotor swept area, thereby making them more susceptible to collision. Although these species comprise the majority of fatalities documented at U.S. wind energy facilities, at some individual sites, mortality of non-migratory *Myotis* spp. may occur at similar levels. Species such

as the little brown bat (*Myotis lucifugus*) can fly significant distances between summer roosts and winter hibernacula sites, and may experience higher fatality rates at wind energy facilities that are located along these movement corridors (Arnett et al. 2008, BHE Environmental 2011, Grodsky and Drake 2011).

Table 1. Estimates of Mean Bat Fatalities per Megawatt per Year at Wind Energy Facilities in the Northern Great Plains and Midwest Regions from Publicly Available Data

Wind Facility[1]	State	Habitat	Turbine Model (turbine rotor-swept area)[2]	Estimated mean fatalities/MW/year	Bat Species Recorded as Fatalities (in order of decreasing frequency)	Source
Cedar Ridge	Wisconsin	Agricultural cropland	Unknown, 1.6MW (5,281 m^2)	30.40 (per 169 days)	hoary bat, silver-haired bat, big brown bat, eastern red bat, little brown bat	Poulton 2010
Blue Sky Green Field	Wisconsin	Agricultural cropland	Vestas V-82, 1.65MW (5,281 m^2)	24.57	little brown bat, silver-haired bat, big brown bat, hoary bat, eastern red bat, unidentified bat species	Gruver et al. 2009
Forward Energy Center	Wisconsin	Agricultural cropland	GE 1.5MW (5,027 m^2)	15.63	hoary bat, silver-haired bat, eastern red bat, unidentified bat species, little brown bat, big brown bat	Grodsky and Drake 2011
Top of Iowa (2004)	Iowa	Agricultural cropland	NEG Micon 52 (2,107.69 m^2)	7.94	hoary bat, little brown bat, eastern red bat, big brown bat, silver-haired bat	Jain 2005, Jain et al. 2011
Kewaunee County	Wisconsin	Agricultural cropland	Vestas 0.66MW (1,734 m^2)	6.45	eastern red bat, hoary bat	Howe et al. 2002
Top of Iowa (2003)	Iowa	Agricultural cropland	NEG Micon 52 (2,107.69 m^2)	4.94	hoary bat, little brown bat, eastern red bat, big brown bat, silver-haired bat	Jain 2005, Jain et al. 2011
Ainsworth	Nebraska	Mixed grass prairie	Vestas V82 (5,281 m^2)	1.16	hoary bat, unidentified bat species, big brown bat, eastern red bat	Derby et al. 2007
Buffalo Ridge	Minnesota	Agricultural cropland	Zond Model Z-750 (1,809 m^2)	0.26-2.04	hoary bat, eastern red bat, silver-haired bat, tricolored bat, little brown bat, big brown bat	Johnson et al. 2000, Johnson et al. 2003

[1] Facilities arranged by estimated mean fatalities/MW/year

[2] If varying wind turbine models were constructed at the project, the largest rotor-swept area is given.

m^2 – square meters

There are 41 confirmed records of NLEB fatalities at wind energy facilities (USFWS 2015a). With the exception of fatalities in Missouri, all known NLEB fatalities from wind energy facilities are located east of the Mississippi River (USFWS 2015a). The greatest numbers of NLEB have been found at wind energy facilities on forested ridge tops in West Virginia, where a total of seven fatalities have been documented (Kerns and Kerlinger 2004, Young et al. 2009). NLEB mortality has also been documented in New York, Pennsylvania, and Ontario, Canada (Arnett et al. 2005, Jacques Whitford 2009, Stantec 2011).

Recently, WNS has caused large declines in populations of cave-hibernating species throughout eastern North America and has been especially devastating to *Myotis* spp., including NLEB, prompting federal protection of this species under the ESA (USFWS 2013, USFWS 2015a). Although there was some concern that the large decline in NLEB populations as a result of WNS could be compounded by the loss of even small numbers of the NLEB due to wind energy development, the USFWS has concluded that NLEB fatalities caused by wind energy facilities are not contributing significantly to the species' decline and regulatory mechanisms for wind energy facilities were not included in the final 4(d) rule (USFWS 2016; see Section 2.2 below for additional detail).

2.2 Regulatory Framework

There are relatively few laws or regulations protecting bats and, at the federal level, there are no laws or regulations specific to bats. Environmental laws primarily address the protection of habitat favored by bats, such as caves, and prohibit wanton destruction of wildlife. Bat species determined to be at risk are listed under the federal ESA and/or protected at the state level.

Federal Protection

Of the federally listed bat species, only the NLEB is known to occur in North Dakota. This species is discussed in detail here.

On April 2, 2015, the USFWS announced the NLEB was listed as threatened with an interim Section 4(d) rule. The intent of the 4(d) rule is to provide the USFWS flexibility in implementing the ESA by modifying regulations necessary to provide for the conservation of a threatened species while not overburdening private landowners, state agencies, and others with blanket regulations that do not further the conservation of the species. The final 4(d) rule was released on January 14, 2016 (USFWS 2016a). The USFWS determined that WNS is the primary threat to NLEB and regulating other sources of mortality or harm, such as from general habitat loss, will not effectively conserve this species. Additionally, in 2016 the USFWS determined designating critical habitat for NLEB was not prudent (USFWS 2016b).

The final 4(d) rule prohibits all *purposeful take*[1] within the range of NLEB except: removal of NLEB from human structures, defense of human health (disease monitoring), or removal of hazardous

[1] "Purposeful take is when the reason for the activity or action is to conduct some form of take. For instance, conducting a research project that includes collecting and putting bands on bats is a form of purposeful take. Intentionally killing or harming bats is also purposeful take and is prohibited" (USFWS 2016d).

trees for the protection of human life and property. All take incidental to otherwise lawful activities is allowed outside of the WNS Zone designated by USFWS. The WNS Zone includes all counties affected by WNS and an additional 241-kilometer (150-mile) buffer around these counties (Figure 2; USFWS 2016c). For areas within the WNS Zone, *incidental take*[2] is prohibited only if it (1) occurs within a known hibernaculum at any time of year, or (2) if tree removal activities occur within a quarter-mile of a known, occupied hibernaculum at any time of year or (3) if tree removal occurs within 46 meters (150 feet) of a known, occupied maternity roost tree from June 1 through July 31 (USFWS 2016a).

Under the final 4(d) rule, incidental take by wind turbines is not prohibited. Regulatory mechanisms for wind energy facilities were not included in the final 4(d) rule because the primary factor causing the rapid population decline in NLEB is WNS and the best available information suggests that NLEB fatalities caused by wind facilities are not contributing significantly to the species' decline (USFWS 2016a). The Project Area is inside of the current WNS Zone and therefore incidental take is prohibited within and around NLEB hibernacula, and through tree removal activities described above. However, as noted above there are no known NLEB hibernacula or maternal roost sites within or in the vicinity of the Project. The USFWS database and WNS Zone Map[3] is updated on a monthly basis, if occurrences are verified in new counties (Figure 2).

State Protection

The protection and regulation of bat species not listed under the federal ESA is typically at the discretion of state wildlife agencies. North Dakota does not have a state endangered or threatened species list, but the NDGFD has identified 100 species of conservation priority, or those in greatest need of conservation in the State (Dyke et al. 2015). This designation aids in managing these species and prioritizes their conservation; however, these species are not afforded regulatory protection.

Species are categorized into three levels according to conservation need:

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

There are four bat species on the conservation priority list categorized as Level I: Townsend's big-eared bat (*Corynorhinus townsendii*), big brown bat (*Eptesicus fuscus*), little brown bat, and NLEB. The Townsend's big-eared bat is rare and most suitable habitat in the state exists in the badlands along the Little Missouri River (over 322 kilometers [200 miles] west of the Project Area).

[2] "Incidental take is defined by the Endangered Species Act as take that is incidental to, and not the purpose of the carrying out of an otherwise lawful activity. For example, harvesting trees can kill bats that are roosting in the trees, but the purpose of the activity is not to kill bats" (USFWS 2016d).

[3] http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf

This species has been recently found in the Turtle Mountains region (approximately 306 kilometers [190] miles northwest of the Project Area; Dyke et al. 2015). The Big brown bat and little brown bat are common throughout the state whereas the NLEB is considered to be near the western edge of its range and rare in the state. There have been documented NLEB occurrences in riparian corridors along the Little Missouri and Missouri Rivers, known as the Missouri River System/Breaks, approximately 193 kilometers (120 miles) northwest of the Project Area (Gilliam and Barnhart 2011). The Sheyenne River is also suspected as suitable NLEB habitat (approximately 80 kilometers [50 miles] from the Project Area; NDGFD 2015).

There are no bat species on the conservation priority list categorized as Level II. However, there are three bat species on the conservation priority list categorized as Level III: western small-footed bat (*Myotis ciliolabrum)*, western long-eared bat (*Myotis evotis)*, and long-legged bat (*Myotis volans*). These three species are known to occur in western North Dakota (NDGFD 2015). Based on distribution and habitat preferences, all Species of Conservation Priority (except the little brown bat and big brown bat) have a low likelihood of occurrence in the Project Area.

Voluntary Guidelines for Wind Power Projects

The USFWS developed the voluntary WEG (USFWS 2012), as a non-regulatory, tiered framework for assessing risk and collecting data on wildlife for wind energy projects. This bat habitat assessment is consistent with the USFWS recommendations for Tier 2 – Site Characterization in the voluntary WEG. North Dakota has not developed state-specific wind energy siting guidelines but defers to the USFWS guidelines (ASFWA 2010).

3.0 PROJECT AREA DESCRIPTION

The Project Area is primarily located in the Missouri Coteau subregion of the Northwestern Glaciated Plains ecoregion. The Northwestern Glaciated Plains ecoregion marks the western most extent of continental glaciations and is characterized by gentle topography, fertile soils, significant surface irregularity, and high concentrations of semi-permanent wetlands. Much of the native prairie in the ecoregion has been largely replaced by wheat, alfalfa and other commercial crops. Tame grasslands, including pasturelands mainly used for cattle grazing, are also present and are primarily composed of non-native plant species (Bryce et al. 1996, Samson et al. 1998). The Missouri Coteau subregion consists of glacially carved, rolling hummocks which enclose numerous wetland depressions or potholes. Streams and rivers are nearly absent, as are upland deciduous forests. Some of the far eastern portions of the Project Area fall within the Drift Plains subregion of the Northern Glaciated Plains ecoregion, which is characterized by gentle topography and fertile soils used for agriculture (Bryce et al. 1996).

The Project Area consists of approximately 8,105 hectares (20,029 acres) of privately-owned lands (Figure 1; Project boundary dated January 23, 2017). While most of the Project Area is flat to gently undulating, there is a rise that runs as a north-south oriented spine along the eastern third of the Project Area. Elevations range from approximately 515 to 647 meters (1,690 to 2,123 feet) above mean sea level.

Bedrock geology in the Missouri Coteau subregion is generally shale (Figure 3). Due to the local geology and topography, caves do not form regularly in the shale of the Project Area and there are no known caves within the Project Area or surrounding 2.4-kilometer (1.5-mile) buffer. The closest known caves are Keller's Cave (113 kilometers [70 miles] to the west), Bismarck Cave (161 kilometers [100 miles] to the northwest), and Washburn Cave (225 kilometers [140 miles] to the northwest; Murphy 2007). Potential karst formations and features that include surface landforms such as sinkholes, sinking streams, and springs reflect the presence of subsurface voids or caves, and are rare in this region (Weary and Doctor 2014). This lack of karst formations is due to sedimentary cover defined as carbonate rocks buried beneath more than 15 meters (50 feet) of glacially derived insoluble sediments overlying karst features (Weary and Doctor 2014).

Land use on the flatter portions of the Missouri Coteau is a mixture of hay and spring wheat tilled agriculture, whereas on steeper slopes, cattle grazing occurs (Bryce et al. 1996). The relative scarcity of native grasslands in the region prompted The Nature Conservancy (TNC) to designate the Leola Hills area as a priority conservation area, which overlaps the western edge of the Project Area (TNC 2017). However, bats and bat habitats are not identified specifically as conservation targets within this area (TNC 2017).

Water and riparian areas are important to bats for drinking and foraging, and may also function as travel corridors. Numerous wetlands occur throughout the Project Area, but as noted above there are no major lakes or rivers present. The Missouri River and Lake Oahe are the closest major waterbodies, located approximately 129 kilometers (80 miles) to the east. Trees providing potential roosting habitat are primarily restricted to riparian areas, and windbreaks for fields and residences, although the southern portion of the Project Area contains a few forested ravines.

4.0 SPECIES EXPECTED TO OCCUR IN THE STUDY AREA

Tetra Tech evaluated the potential for bat species known to occur in North Dakota to occur within the Project Area. Known species' ranges and habitat characteristics were used to identify these species. This information, along with behavioral characteristics relative to roosting, foraging, and migratory activity for each species was used to derive a high, moderate, or low likelihood of occurrence rating for each species (see Table 2 for likelihood of occurrence criteria).

All Bat Species Potential Occurrence

A total of 11 bat species are known to occur in North Dakota (Table 2; Gullickson *n.d.,* BCI 2017). Based on the presence of suitable habitat, known species' ranges, and documented occurrences, five bat species are expected to have a moderate or high likelihood of occurring within the Project Area (big brown bat, little brown bat, eastern red bat, hoary bat, and silver-haired bat). The remaining six species (Townsend's big-eared bat, fringed bat, western long-eared bat, long-legged bat, western small-footed bat, and NLEB) are expected to have a low likelihood of occurrence.

Roosting colonies of the big brown bat and little brown bat have a moderate probability of occurring within the Study Area. Little brown bats are thought to be the most common bat in North Dakota (Gullickson *n.d.*), and big brown bats are known to forage in agricultural lands (Whitaker

1995, Rogers et al. 2006). Both species are associated with edge habitats and human-made structures which are present in the Project Area, and can be found year-round in North Dakota (Table 2).

Eastern red bat, hoary bat, and silver-haired bat have a moderate likelihood of occurring in the Project Area, primarily during migration. As noted above, these species have been the predominant species found during post-construction mortality monitoring studies at operational wind energy facilities in the U.S. (Arnett et al. 2008). All three species are associated with forested habitats and would most likely occur within the small woodlots within the Project Area, but may also use other habitats while migrating through (Table 2). These species are found in North Dakota from May through September (Cryan 2003, Cryan and Veilleux 2007).

The Townsend's big-eared bat, fringed bat, western long-eared bat, long-legged bat, western small-footed bat, and NLEB (discussed below) are expected to have a low likelihood of occurrence in the Project Area for several reasons. These include lack of range overlap with the Project Area, lack of suitable roosting or foraging habitat in the Project Area, and/or that the species is only likely to occur rarely during spring and fall migration.

Northern Long-eared Bat Potential Occurrence

The NLEB is expected to have a low likelihood of occurrence within the Project Area during the summer residency period and during migration due to lack of suitable habitat, which consists of a wide variety of wooded habitats used for roosting, foraging and travel (see Section 5.0), and distance to known occurrences. Although the species is believed to occur statewide in suitable habitats, data specific to North Dakota are lacking (Harvey et al. 2011; Gullickson *n.d.*). There are no known occurrences of NLEB within Dickey County (USFWS 2015a). All recorded instances of NLEB in the Dakotas have been in ecoregions with more topographic relief and more trees than the Missouri Coteau subregion, within which the Project Area is located. Surveys conducted in North Dakota from 2009-2011 confirmed the presence of NLEB in the Turtle Mountains (approximately 306 kilometers [190 miles] northwest of the Project Area), Missouri River Valley (approximately 193 kilometers [120 miles] northwest of the Project Area), and in the Badlands regions (more than 322 kilometers [200 miles] west of the Project Area; Gilliam and Barnhart 2011). There are no known NLEB hibernacula in North Dakota, although a thorough assessment of the western part of the state has not been completed (USFWS 2013).

Table 2. Bat Species Known to Occur in North Dakota and their Likelihood of Occurrence at the Foxtail Wind Energy Center, Dickey County, North Dakota

Likelihood of Occurrence[1]	Common Name	Scientific Name	Habitat Association[2]	Wind-energy Fatalities
High	Big brown bat	*Eptesicus fuscus*	Habitat generalist found in deciduous forests, urban development, and agricultural croplands. Roosts in tree cavities, under loose bark, buildings, mines, bridges, caves, and crevices in cliff faces.	Relatively few fatalities documented in North America (Arnett et al. 2008)
High	Little brown bat	*Myotis lucifugus*	Found in close proximity to a water source for foraging and in close proximity to human-made structures. Roosts in tree cavities, caves and human-occupied structures.	Relatively few fatalities documented in North America (Arnett et al. 2008)
Moderate	Eastern red bat	*Lasiurus borealis*	Migratory species. Found in hardwood deciduous forests. Generally found in close association with riparian areas. Roosts in foliage of trees.	One of most common fatalities documented in North America; fatalities assumed to be migratory individuals (Johnson et al. 2002, Kunz et al. 2007)
Moderate	Hoary bat	*Lasiurus cinereus*	Migratory species. Found in forested upland habitats, including bottomland hardwoods. Roosts in foliage of trees along the edge of clearings.	Most common fatality documented in North America; fatalities assumed to be migratory individuals (Kunz et al. 2007, Arnett et al. 2008)
Moderate	Silver-haired bat	*Lasionycteris noctivagans*	Migratory species. Closely associated with conifer and mixed hardwood forests; generally found in association with riparian areas. Roosts in cavities and foliage of trees.	One of most common fatalities in North America; fatalities assumed to be migratory individuals (Johnson et al. 2002, Kunz et al. 2007)
Low	Fringed bat	*Myotis thysanodes*	Found in a variety of habitats. Oak and pinyon woodlands are the most commonly used. Roosts in caves, mines, and buildings.	None documented
Low	Western long-eared bat	*Myotis evotis*	Found associated with forests, and closely associated with human-made structures.	None documented
Low	Long-legged bat	*Myotis volans*	Found in rugged, rocky terrain in variety of habitats. Roosts in trees, rock crevices, and buildings.	None documented
Low	Northern long-eared bat	*Myotis septentrionalis*	Forages along forested hillsides and ridges. Roosts in cavities, caves and mines, underneath bark, or in crevices of trees and snags; rarely roosting in barns. Hibernates in caves and mines.	Relatively few fatalities documented in North America (Arnett et al. 2008)
Low	Townsend's big-eared bat	*Corynorhinus townsendii*	Typically found in arid western desert scrub and pine forest regions. In spring and summer, females form maternity colonies and males roost individually. Hibernates in caves and abandoned mines.	None documented
Low	Western small-footed bat	*Myotis ciliolabrum*	Found in rugged, rocky terrain in a variety of habitats. Roosts in rock crevices, caves, tunnels, buildings, and underneath bark.	None documented

[1] Likelihood of Occurrence: **High** = Suitable habitat, species range overlaps with the Study Area, and known occurrences within and/or near the Study Area. **Moderate** = Species known to occur in habitat similar to the Study Area, species' range overlaps with Study Area, and known occurrences near the Study Area. **Low** = Marginally suitable habitat in the Study Area, species' range does not overlap with the Study Area, no known occurrences within and/or near the Study Area, and/or known as migratory species during spring and fall migration.

[2] Sources: Gullickson *n.d.,* Western Bat Working Group 2015, Harvey et al. 2011, BCI 2017, ASM 2017.

5.0 HABITAT ASSESSMENT

Tetra Tech conducted a desktop habitat assessment, taking into account land use and land cover, to identify potentially suitable habitat for bats within the Project Area and surrounding 2.4-kilometer (1.5-mile) buffer (Figure 4). Identification of potentially suitable habitats, and the bat species that may use these habitats, may prove helpful when designing the Project to minimize interactions between wind turbines and bats (Duchamp et al. 2004). Habitat variables evaluated in this assessment included the amount of suitable foraging and roosting habitat, as well as the presence of potential migration and movement corridors.

Although the presence of suitable summer roosting and winter habitat may indicate the potential for impacts to bats, migrating bats may be at risk of collision with wind turbines regardless of habitat conditions. There is little known about bat migration patterns across North America, although there is speculation that bats may migrate in a similar manner to some birds (northward migration during spring and southward migration during fall; Cryan 2003). Therefore, the likelihood of Project-specific impacts to bats during migration, is difficult to determine based on available data.

5.1 Land Use and Land Cover

Land use and land cover types in the Project Area and surrounding 2.4-kilometer (1.5-mile) buffer (referred to here as the Buffer Area) were characterized using the National Land Cover Database in Geographic Information System (GIS) software (Homer et al. 2015). The composition of the Project Area and surrounding buffer were then assessed to determine whether or not bats would be likely to select habitats within the Project Area in the context of the surrounding landscape based on availability. For example, if the Project Area supported a relatively higher concentration of potentially suitable habitat than the Buffer Area, it is possible that it may receive higher amounts of use by bats than the surrounding landscape.

The composition of the Project Area and Buffer Area is similar (Table 3). Both the Project Area and Buffer Area are dominated by grassland/herbaceous, pasture/hay and cultivated crops (collectively over 80 percent), with suitable bat roosting and foraging habitats (open water, emergent herbaceous wetlands, deciduous forest, evergreen forest, shrub/scrub, and woody wetlands) comprising approximately 17 percent and 15 percent of these areas, respectively. Other cover types comprise less than 3 percent of each landscape. Therefore, it is unlikely that bats would use the Project Area disproportionately for roosting or foraging over adjacent areas.

Table 3. Land Use and Land Cover Present in the Project Area and Surrounding Buffer, Dickey County, North Dakota

Land Use/Land Cover Description	Acres in Project Area[1,2]	Percent of Project Area	Acres in 1.5 mile Buffer Area[1]	Percent of 1.5 mile Buffer Area
Grassland/Herbaceous	12,130	60.6	26,724	52.5
Pasture/Hay	2,420	12.1	7,800	15.3
Cultivated Crops	1,774	8.9	7,293	14.3
Shrub/Scrub	1,715	8.6	2,788	5.5
Open Water	1,321	6.6	4,044	7.9
Developed, Open Space	341	1.7	1,306	2.6
Emergent Herbaceous Wetlands	270	1.4	698	1.4
Deciduous Forest	52	0.3	177	0.4
Woody Wetlands	5	<0.1	68	0.1
Barren Land (Rock/Sand/Clay)	2	<0.1	27	0.1
Developed, Low Intensity	0	N/A	23	0.1
Developed, Medium Intensity	0	N/A	1	<0.1
Evergreen Forest	0	N/A	6	<0.1
Total	20,029	100.0	50,957	100.0

Note: Bold text indicates habitat types that are most suitable for bat foraging and roosting habitat.

[1]Unit conversions: 1 acre = 0.4 hectare; 1 mile = 0.6 kilometer

5.2 Summer Roosting Habitat

Summer roosts provide bats with important shelter from the environment and adverse weather, resting places during migration or regional movements, protection from predators, and are used for social interaction and rearing of young (Kunz and Fenton 2003). Bats depend on roost structures during all stages of their life cycle; therefore, the preservation of summer roosting habitat has been identified as critical for the conservation of bats in North America (Kunz 1982, Kunz and Fenton 2003). Migratory and non-migratory bats use some of the same habitat features, such as tree cavities and bark, as summer roosts during the active period (typically April 15 – November 15).

All Bat Species

Bats may roost in rock formations, caves, human-made structures, live trees (often in the foliage), dead trees (snags), and partially dead trees (partial snags) with cavities and loose bark. North Dakota's bat species can be broadly classified as tree-roosting (those that roost in live trees, snags, and partial snags) and generalists (species adapted to roosting in multiple habitats including natural habitat as well as human-made structures such as barns and abandoned mines; Harvey et al. 2011). Most tree-roosting species prefer large trees in early stages of decay and that can sustain adequate microclimates, which are often found in older forest stands (Crampton and Barclay 1998, Barclay and Brigham 1996). In the absence of mature forest stands, tree-

roosting species may roost in living trees; however, migratory species such as the hoary bat and eastern red bat, often prefer to roost in the foliage of live trees (Kunz 1982, Harvey et al. 2011).

Suitable natural roosting habitat in the Project Area consists of individual trees, windrows, woodlots, and riparian zones, generally located near homes, along riparian corridors, or as planted windbreaks. The availability of this habitat is limited because it accounts for less than 1 percent of the Project Area and is highly fragmented (Table 3). The average forest patch size is 0.5 hectares (1.2 aces) within the Project Area, compared to 0.9 hectares (2.2 acres) in the Buffer Area. Therefore, roost tree availability is almost certainly a factor limiting the likelihood of bat occurrence in the Project Area (Carter and Menzel 2007).

Other potential summer roost locations in the Project Area include human-made structures such as houses and barns. While these structures may provide roost sites for bats, the suitability of individual structures has not been evaluated in this assessment. There are no known abandoned mines within the Project Area or Buffer Area (Figure 3; NDPSC 2013).

Northern Long-eared Bat

During summer, as well as in spring and early fall, NLEB roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags, versus foliage like other tree bats (USFWS 2015a). Less commonly, NLEB summer roost sites may also include human-made structures, including a variety of shelters such as buildings and behind shutters (Harvey et al. 2011). Suitable summer roosting habitat is typically located within 80 kilometers (50 miles) of wintering sites, but can vary (see Section 5.3; USFWS 2013). Reproductive NLEB females will roost colonially during the late-spring and summer maternity period (approximately May to July). Maternity colonies, which typically average 30 to 60 individuals, are most frequently found in mature forests with an abundance of snags. Roosts are often used for a period of 2 to 11 nights, but maternity colonies may be occupied for longer. Because of the NLEB's proclivity for switching roosts, multiple suitable roosting locations in a given forested patch may be indicative of higher quality summer habitat. Summer home ranges for females are estimated to be between 19 and 172 hectares (47 and 425 acres; USFWS 2013).

The only potentially suitable NLEB roosting habitat in the Project Area consists of the forested roosting habitat described above. However, there is evidence suggesting that NLEB select larger forest patches for roosting (10 ac [4.13 ha] to 76 ac [31.1 ha]; Henderson and Broders 2008) than are available in the Project Area. Isolated trees are considered suitable for NLEB when they exhibit the characteristics of a suitable roost tree and are less than 305 meters (1,000 feet) from the next nearest suitable roost tree, woodlot, or wooded fencerow (USFWS 2015a). However, as shown in Figure 4, forested habitats within the Project Area are uncommon and highly fragmented, with patches widely distributed. Therefore, the Project Area and Buffer Area are unlikely to provide suitable summer roosting habitat for NLEB.

5.3 Winter Habitat

During the winter in temperate regions, cold temperatures reduce insect prey densities and a result in a physiologically stressful environment. To compensate for these stresses, bats migrate

to warmer locations where prey is available, or reduce their energy expenditures by entering into hibernation (Fleming and Eby 2003). During hibernation bats are relatively sedentary, expending little energy except for periodic bouts of activity. Most hibernacula occur in caves or mines that provide stable temperature and humidity regimes, although big brown bats sometimes hibernate in buildings (Whitaker and Gummer 1992).

All Bat Species

Of the bat species with a moderate or high likelihood of occurring in the Project Area, the silver-haired bat, hoary bat, and eastern red bat typically migrate to southern latitudes during winters and therefore would not be expected to occur in the Project Area during winter. The big brown bat and little brown bat, which do not make long-distance migrations, hibernate locally or regionally in mines, caves, or buildings. Hibernacula used by these species may also be used by NLEB (Brack et al. 2010).

Northern Long-eared Bat

NLEB do not undertake long-distance seasonal migrations between summer and winter ranges but do move short distances between summer roosts and winter hibernacula. These seasonal movements are generally between 56 and 89 kilometers (35 and 55 miles), but may be substantially longer in some areas, perhaps as great as 270 kilometers (168 miles; USFWS 2013).

NLEB arrive at hibernacula in August or September, begin hibernation in October and November, and exit hibernacula in March or April (USFWS 2013). NLEB prefer hibernacula with large entrances such as caves and mines, as well as less traditional hibernacula including dams, dry wells, and other human-made structures. Individuals may hibernate in cracks and crevices in hibernacula walls, and as such, may be overlooked during winter surveys. Although NLEB are often found with other congeneric species (i.e. *Myotis* spp.), they generally prefer cooler temperatures and higher humidity than other species (USFWS 2013).

There are no known caves or other natural rock or crevice formations in the Project Area or Buffer Area that would be suitable NLEB hibernacula (NDGS and NDDH 2001). The closest known caves are Keller's Cave (113 kilometers [70 miles] to the west), Bismarck Cave (161 kilometers [100 miles] to the northwest), and Washburn Cave (225 kilometers [140 miles] to the northwest; Murphy 2007). None of these caves are known to harbor bats (Murphy 2007). Keller's Cave is a relatively shallow and small cave, and Washburn Cave is a historical record that has not been located in present day (Murphy 2007). As noted above, there are no known abandoned mines within the Project Area or Buffer Area. The closest known NLEB hibernacula occur in the Black Hills of Wyoming and South Dakota more than 402 kilometers (250 miles) to the southwest (USFWS 2013).

5.4 Foraging Habitat

Foraging habitat is used by bats to capture and consume insect prey, and is not necessarily exclusive of roosting or migrating habitat. Bats typically employ either aerial foraging (capturing insects in the air) or glean insects from vegetation, and both foraging methods can occur in open areas, dense forest, and along habitat edges (Adams 2003).

All Bat Species

All bats known to occur in North Dakota are insectivorous, and feed on a variety of prey, including moths, beetles, flies, and mosquitoes (Kunz and Fenton 2003). Bats typically forage in areas with elevated nocturnal insect densities, such as riparian zones (Waldien and Hayes 2001), over waterbodies (Henry et al. 2002, Lacki et al. 2007), and along forest edges (Hayes and Gruver 2000, Rogers et al. 2006). Potentially suitable foraging habitats (open water, forested cover types, wetlands, and scrub/shrub) account for approximately 17 percent of the Project Area, compared to 15 percent in the Buffer Area (Table 3). Although there is evidence indicating some species, such as the big brown bat, prefer foraging over agricultural lands (cultivated crops and hay/pasture; Rogers et al. 2006, BCI 2017), agricultural lands are typically the least preferred cover types for foraging by most bat species. These cover types account for approximately 21 percent of the Project Area, compared to approximately 30 percent of the Buffer Area (Table 3).

Northern Long-eared Bat

Unlike other *Myotis* species in the region that typically forage along streams and within floodplains, NLEB are adapted to gleaning and hawking for insects in the sub-canopy of deciduous and mixed forests, typically along ridge tops and forested hillsides (Harvey et al. 2011). However, foraging may also occur in forest clearings, above roadways, and along trails or near water (USFWS 2013). Open habitats, including agricultural lands (cultivated crops and pasture/hay) and grasslands are the least suitable locations for NLEB foraging and comprise over 80 percent of both the Project Area and Buffer Area (Table 3). Less than 10 percent of the Project Area and Buffer Area provides potentially suitable, but fragmented, foraging habitat for NLEB (forested areas, wind breaks, riparian corridors, and open water; Table 3).

5.5 Bat Migration and Movement Characteristics

Bat migration includes seasonal movements from summer residency areas to wintering areas. Long-distance migratory species, such as the eastern red bat, silver-haired bat, and hoary bat, undertake seasonal movements of between 100 and 1,931 kilometers (62 and 1,200 miles; Cryan 2003, Cryan 2011) on their way to southern latitudes (Fleming and Eby 2003). The NLEB, little brown bat, and other species migrate short distances between summer roosts and winter hibernacula (i.e., partial or short-distance migration; Fleming and Eby 2003). Most species, including NLEB, are thought to move along linear landscape features that provide horizontal connectivity, such as forest edges or riparian corridors, or between forest canopy structures which provide vertical connectivity (Hayes and Gruver 2000, Downs and Racey 2006, Furmankiewicz and Kucharska 2009). Beyond these generalities, the current understanding of bat migration is limited (Baerwald and Barclay 2009, Cryan 2011).

NLEB and other bat species may transit through the Project Area during spring and fall migration; however, identifiable migration and movement corridors for bats are absent from the Project Area and Buffer Area. There are no large forested riparian corridors for bat species to follow or utilize as stopover day roosting sites. Forested areas within the Project Area consist of a few small wooded parcels that are disconnected from each other (Figure 4). Given the lack of large, forested

riparian corridors and limited roosting habitat within the Project Area, use of the Project Area by migrating bats is likely to be low.

5.6 Northern Long-Eared Bat Habitat Suitability Conclusion

The USFWS *NLEB Interim Conference and Planning Guidance* (NLEB Guidance; USFWS 2014) includes a stepwise assessment approach with specific questions intended to facilitate review of potential impacts to the species. The following questions (in bold) and responses are based on our current knowledge of the Project Area and the results of the 2017 desktop bat habitat assessment. Sections 5.1 to 5.5 above provide information requested by the USFWS for habitat assessments, as part of the NLEB Guidance (USFWS 2014, USFWS 2016d).

Is the project within the range of NLEB?

Yes. The Project Area is within the range of NLEB (Harvey et al. 2011, USFWS 2016c).

Is suitable summer or winter habitat present?

No. There are no known hibernacula within the Project Area, and although small forested areas are present, they are not considered suitable summer habitat due to their small size and fragmented nature. Less than 1 percent of the 8,099-hectare (20,013-acre) Project Area is forested. Forested habitat in the Project Area (woody wetlands and deciduous forest) is relegated to small woodlots that are disconnectedly distributed along riparian areas, and as windbreaks along fields or at homesteads. Large, contiguous tracks of upland forested habitat, preferred by NLEB, are not present in the Project Area.

Based on the desktop habitat assessment, the NLEB has a low likelihood to occur in the Project Area during the summer residency period (approximately May 15–August 15) because of the lack of large contiguous woodlots and due to the species being uncommon in the far western extent of its range where the Project Area is located; however, the species could make seasonal movements through the Project Area. Although Tetra Tech has not physically assessed the Project Area for potential winter hibernacula, we are not aware of any available data that indicate the potential occurrence of NLEB hibernacula in the vicinity of the Project, and no NLEB hibernacula have been documented in the state (USFWS 2013).

Is lethal take during migration possible?

Yes. NLEB have been found during post-construction mortality monitoring studies at wind energy facilities (e.g., Arnett et al. 2005, Jacques Whitford 2009), and take is possible if NLEB migrate through the Project Area during operation. However, occurrence of the species in North Dakota is expected to be uncommon or rare (USFWS 2013), and the likelihood of NLEB occurring in the Project Area during the summer residency period is low due to the lack of potentially suitable roosting and foraging habitat. No clear migratory pathways or hibernacula are known to occur in the Project Area or vicinity; however, migration patterns are poorly understood. With the exception of fatalities documented in Missouri, all records of NLEB fatalities at wind energy facilities have occurred east of the Mississippi River (USFWS 2015a).

Is there an existing summer or winter occurrence record near the Project Area (e.g., within 1.5 miles of a known roost tree, three miles of capture location, or five miles of a hibernaculum)?

No. Tetra Tech is not aware of any summer or winter occurrence records within 8 kilometers (5 miles) of the Project Area.

Was the presence of NLEB documented during surveys?

Not applicable. No acoustic monitoring has been conducted for the Project. However, the NLEB is expected to have a low likelihood of occurrence within the Project Area during the summer residency period and during migration due to lack of suitable habitat, and distance to known occurrences. There are no known occurrences of NLEB within Dickey County (USFWS 2015a), and there are no known hibernacula in North Dakota (USFWS 2013). With the exception of fatalities in Missouri, all known NLEB fatalities from wind energy facilities are located east of the Mississippi River (USFWS 2015a).

Is this an existing or ongoing project within the range of the Indiana bat with a prior determination for Indiana bat?

No. The Project Area is outside of the range of the Indiana bat.

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FIGURES

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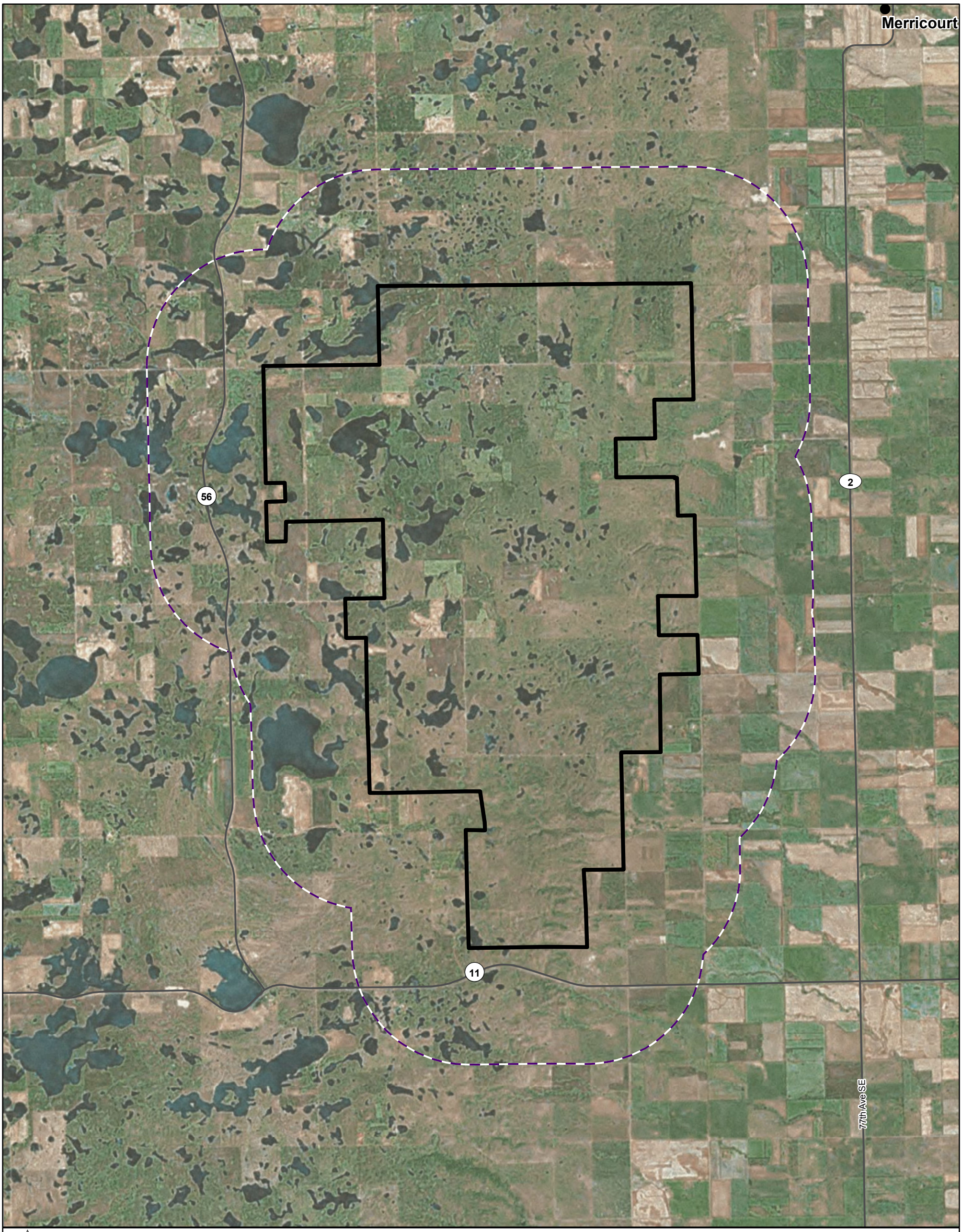


Figure 1

Foxtail Wind Energy Center

NEXTera ENERGY RESOURCES

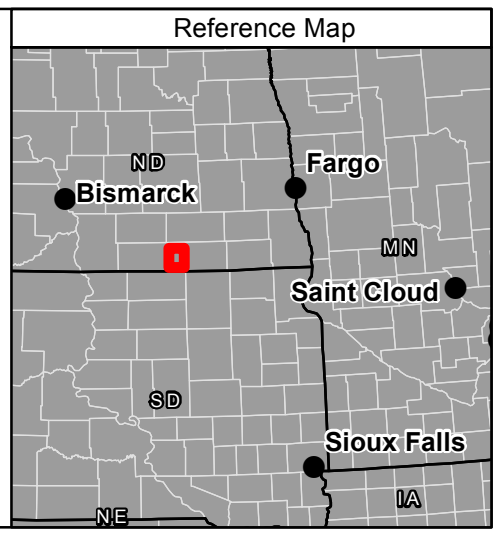
Vicinity Map

DICKEY COUNTY, ND

- Proposed Project Boundary (01-03-2017)
- 1.5 mile Buffer
- City/Town
- County Boundary
- Secondary Road

TETRA TECH

Reference Map



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Saskatchewan
Manitoba
Ontario
North Dakota
Montana
Proposed Project Boundary
Minnesota
Wisconsin
South Dakota
Wyoming
Iowa
Nebraska
Colorado
Missouri
Kansas

1:5,000,000 NAD 1983 StatePlane North Dakota South FIPS 3302 Feet

0 25 50 100 150 200 Miles

Figure 2

Foxtail Wind Energy Center

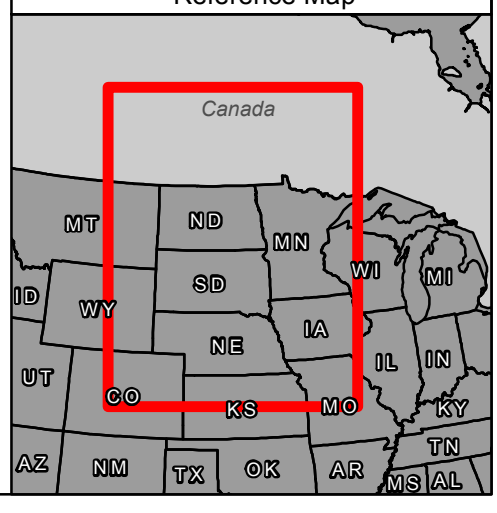
NEXTera ENERGY RESOURCES

Northern Long-Eared Bat Range and USFWS White-Nose Syndrome Zone

DICKEY COUNTY, ND

- Proposed Project Boundary (01-03-2017)
- County Boundary
- State/Province Boundary
- County with White-nose Syndrome Infected Hibernacula (Data as of 4/3/2017)
- USFWS White-nose Syndrome Buffer (Data as of 3/29/2017)
- Northern Long-eared Bat Range (Data as of 03/29/2017)

Reference Map



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1:100,000 NAD 1983 StatePlane North Dakota South FIPS 3302 Feet

0 0.5 1 2 3 4 Miles

Figure 3

Foxtail Wind Energy Center

NEXTera ENERGY RESOURCES

Geology Map

DICKEY COUNTY, ND

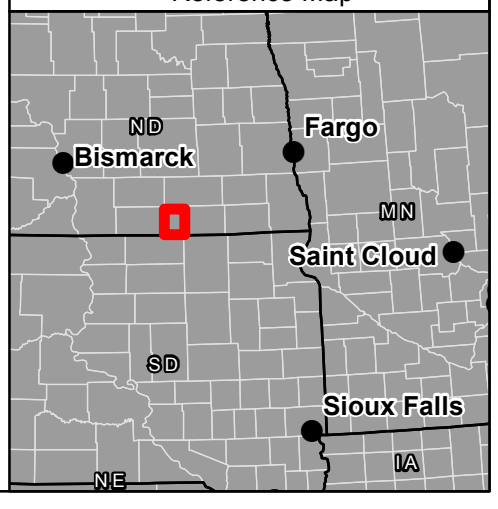
- Proposed Project Boundary (01-03-2017)
- 1.5 mile Buffer
- City/Town
- County Boundary
- Secondary Road

Bedrock Geology

- Shale

TETRA TECH

Reference Map



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Land Cover

- Open Water
- Developed, Open Space
- Developed, Low Intensity
- Developed, Medium Intensity
- Barren Land (Rock/Sand/Clay)
- Deciduous Forest
- Evergreen Forest
- Grassland/Herbaceous
- Hay/Pasture
- Shrub/Scrub
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands

1:65,000 NAD 1983 StatePlane North Dakota South FIPS 3302 Feet

0 0.5 1 2 3 4 Miles

Figure 4

Foxtail Wind Energy Center

NEXTera ENERGY RESOURCES

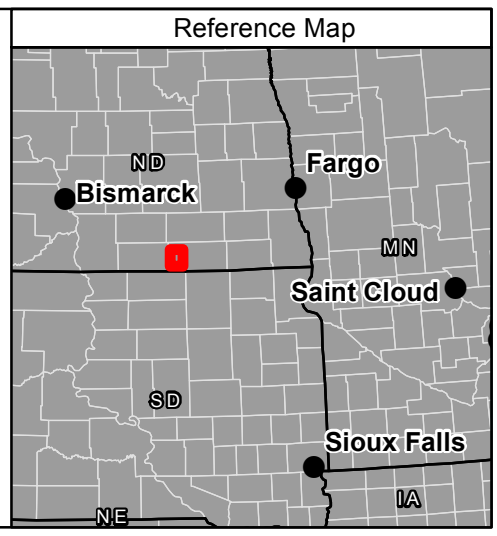
Land Cover Map

DICKEY COUNTY, ND

- Proposed Project Boundary (01-03-2017)
- 1.5 mile Buffer
- City/Town
- County Boundary
- Secondary Road

TETRA TECH

Reference Map



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APPENDIX A

KEY TO THE NORTHERN LONG-EARED BAT 4(D) RULE FOR NON-FEDERAL ACTIVITIES

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APPENDIX A

KEY TO THE NORTHERN LONG-EARED BAT 4(D) RULE FOR NON-FEDERAL ACTIVITIES

These questions have been extracted from the USFWS *Key to the Northern Long-Eared Bat 4(d) Rule for Non-Federal Activities* that can be found at:

http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/KeyFinal4dNLEB12Jan2016.pdf

1. Will the activity purposefully take northern long-eared bats?

   No.

2. Is the activity location outside the White-nose Syndrome Zone?

   No, the Project Area is within the White-nose Syndrome Zone.

3. Will the activity take place within a cave or mine where northern long-eared bats hibernate or could it alter the entrance or the environment of a hibernaculum?

   No, there are no known hibernacula in Dickey County.

4. Will the activity involve tree removal?

   Yes, limited numbers of trees may need to be removed.

5. Is the activity the removal of hazardous trees for protection of human life or property?

   No, the Project does not involve the removal of hazardous trees for protection of human life or property.

6. Will the tree removal activities include one or both of the following: a) removing a NLEB known occupied maternity roost tree or any trees within 150 feet of a known occupied maternity roost tree from June 1 through July 31; or b) removing any trees within 0.25 miles a NLEB hibernaculum at any time of year?

   No, there are no known maternity roost trees within the Project Area, or any known hibernacula in Dickey County.

   Based on the answers to the above questions, the Key indicates that construction and operation of the Project may proceed without contacting the USFWS with respect to the species.

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Whooping Crane Potentially Suitable Habitat Assessment

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Whooping Crane Potentially Suitable Habitat Assessment

Foxtail Wind Energy Center
Dickey County, North Dakota

Prepared For:

NEXTera® ENERGY RESOURCES

Foxtail Wind, LLC
700 Universe Blvd.
Juno Beach, Florida 33408

June 2017

TETRA TECH

EXECUTIVE SUMMARY

Foxtail Wind, LLC contracted Tetra Tech, Inc. (Tetra Tech) to conduct a desktop landscape-scale analysis to evaluate whooping crane stopover habitat within the vicinity of the Foxtail Wind Energy Center (Project), in accordance with recommendations in the voluntary US Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines (USFWS 2012). The methods used to determine potential whooping crane habitat suitability within and around the Project were designed by The Watershed Institute (TWI), and adapted by Tetra Tech to fit non-linear projects such as wind energy facilities.

The assessment identified 763 wetlands as potentially suitable stopover habitat within the Project Area and a surrounding 1.6-kilometer (1-mile) buffer, consisting of 2,170 acres of emergent wetlands, 135 acres of pond, and 214 acres of lacustrine wetlands (wetlands around a lake). Habitat quality scores ranged from 8 to 19, with a mean score of 12.3. This compares to the TWI-generated mean score of 12.1 for habitat suitability at the Quivira National Wildlife Refuge (NWR), a traditional migratory stopover location and designated critical habitat for migrating whooping cranes. Based on the Quivira NWR potentially suitable habitat scores generated by TWI, any habitat score of 12 or higher was considered potentially suitable stopover wetland habitat for migrating whooping cranes.

The two most likely impacts of wind development on whooping cranes are: 1) whooping crane avoidance of the area around the facility, and/or 2) direct mortality of whooping cranes due to collisions with transmission lines, wind turbines, or other infrastructure. Although potentially suitable habitat was identified within the Project Area and surrounding buffer, these habitat features are not unique on the landscape. As a result, whooping cranes are no more likely to use stopover habitat within this area than on the surrounding landscape. This conclusion is supported by the absence of whooping crane sightings recorded by USFWS in the vicinity of the Project. Whooping cranes may pass through the Project Area during spring and fall migration between known stopover sites, which may put them at risk of colliding with Project infrastructure. However, to date, no whooping crane fatalities have been recorded as a result of collisions with wind turbines.

This document or presentation includes Whooping Crane migration use data from the Central Flyway stretching from Canada to Texas, collected, managed and owned by the U.S. Fish and Wildlife Service. Data were provided to Tetra Tech as a courtesy for their use. The U.S. Fish and Wildlife Service has not directed, reviewed, or endorsed any aspect of the use of these data. Any and all data analyses, interpretations, and conclusions from these data are solely those of Tetra Tech.

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1.0 INTRODUCTION

Foxtail Wind, LLC (Foxtail Wind), a wholly-owned subsidiary of NextEra Energy Resources, LLC, proposes to develop the Foxtail Wind Energy Center (Project) in Dickey County, North Dakota (Figure 1). The Project will be constructed and operated by Northern States Power Company (NSP), a subsidiary of Xcel Energy (Xcel). NEER and NSP/Xcel are collaborating on development of the Project to reflect the engineering and design inputs necessary to transfer ownership of the Project to NSP/Xcel at the end of 2017 according to the executed Purchase & Sale Agreement (PSA). NSP/Xcel currently proposes to construct the Project in two phase between 2018 and 2019. Both the NEER and NSP/Xcel teams will be involved in the engineering design of the Project to be constructed, although NSP/Xcel will ultimately construct the Project.

The Project is situated within the 95 percent isopleth of the whooping crane (*Grus americana*) migration corridor, or the area in which 95 percent of whooping crane observations have occurred (Figure 1). Foxtail Wind contracted Tetra Tech, Inc. (Tetra Tech) to conduct a desktop landscape-scale analysis to evaluate whooping crane stopover habitat within the vicinity of the Project, in accordance with recommendations in the voluntary U.S. Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines (USFWS 2012). The objective of this potential habitat suitability analysis is to evaluate the biological and landscape features within and adjacent to the Project Area to determine the potential for whooping cranes to stopover during spring and fall migration.

The federally endangered whooping crane migrates through the western and central portions of North Dakota during spring and fall. Whooping crane fatalities have been attributed to collisions with power lines, and the international whooping crane recovery plan lists construction of power lines, fences, and other structures within their migration corridor as a potential threat to the species recovery (Canadian Wildlife Service [CWS] and USFWS 2007). Thus, the construction and operation of wind energy facilities may pose a potential risk to whooping cranes directly through mortality resulting from collisions with wind turbines, power lines, and other associated facilities, or indirectly through the avoidance of areas where wind turbines and other structures are located.

The methods used to determine potential habitat suitability within and around the Project for this assessment were based on those designed by The Watershed Institute (TWI 2013). TWI's goal was to develop a repeatable methodology that would provide electric utilities with information to help make utility line-marking decisions that provide ecological value and reduce risk to whooping cranes (TWI 2013). Tetra Tech adapted these methods to better fit a non-linear project, such as a wind energy facility. The inherent low probability of detecting whooping cranes in the field, minimizes the utility of conducting field surveys to document the presence or absence of the species; therefore, a desktop analysis such as the one presented here may provide more useful information on potential species presence by drawing on other data such as the availability of suitable habitats and historic records. While this assessment is not intended to replace field

surveys, it provides an additional line of evidence regarding the risk of potential Project-related impacts to whooping cranes.

2.0 LEGAL STATUS OF THE WHOOPING CRANE IN THE UNITED STATES

The whooping crane is protected by both federal and state laws in the United States, including under the Migratory Bird Treaty Act and as an endangered species under the Endangered Species Act (ESA) of 1973. The ESA prohibits "take" (CWS and USFWS 2007) of listed species. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (16 U.S.C. §1532(19)). "Incidental take" occurs when a fatality of an ESA-listed species occurs as an unintended consequence of an otherwise legal activity, as would be the case in the unlikely event of a whooping crane fatality occurring at a wind energy facility. North Dakota does not have state endangered or threatened species list, but instead defers to the USFWS federal listing of endangered and threatened species that occur within North Dakota (NDGF 2015).

The whooping crane population in North America includes an estimated 329 birds (with a 95% probability of actual flock size being between 293–371 birds) as of the 2015/2016 winter whooping crane survey conducted by USFWS (USFWS 2016a). At the time of this writing, results of the 2016/2017 USFWS winter survey are pending. To Tetra Tech's knowledge, no whooping crane fatality has occurred at a wind energy facility to date.

3.0 ENVIRONMENTAL SETTING AND PROJECT AREA DESCRIPTION

3.1 Environmental Setting

The Project Area is primarily located in the Missouri Coteau subregion of the Northwestern Glaciated Plains ecoregion. The Northwestern Glaciated Plains ecoregion marks the western most extent of continental glaciations and is characterized by gentle topography, fertile soils, significant surface irregularity, and high concentrations of semi-permanent wetlands. Much of the native prairie in the ecoregion has been largely replaced by wheat, alfalfa and other commercial crops. Tame grasslands, including pasturelands mainly used for cattle grazing, are also present and are primarily composed of non-native plant species (Bryce et al. 1996, Samson et al. 1998). The Missouri Coteau subregion consists of glacially carved, rolling hummocks which enclose numerous wetland depressions or potholes. Streams and rivers are nearly absent, as are upland deciduous forests. Land use on the flatter portions of the Missouri Coteau is a mixture of hay and spring wheat tilled agriculture, whereas on steeper slopes, cattle grazing occurs.

Some of the far eastern portions of the Project Area fall within the Drift Plains subregion of the Northern Glaciated Plains ecoregion (Bryce et al. 1996). The Northern Glaciated Plains ecoregion

is characterized by gentle topography and fertile soils used for agriculture. The Drift Plains subregion contains a high concentration of temporary and seasonal wetlands. Due to the relatively level topography, land use on the Drift Plains is extensively cultivated into agricultural fields with spring wheat, sunflowers, and alfalfa being the main crops produced.

3.2 Project Area Description

The Project Area is located in Dickey County, approximately 24 kilometers (15 miles) northwest of Ellendale, and consists of approximately 8,105 hectares (20,029 acres) of privately-owned lands (Figure 1; Project boundary dated January 23, 2017). The proposed Project would consists of up to 73 wind turbines and associated infrastructure, for a total nameplate generating capacity of approximately 150 megawatts. All lands within the Project Area plus an additional 1.6-kilometer (1-mile) buffer are hereafter referred to as the Study Area for the purposes of this assessment. The additional buffer was added as a conservative measure in the analysis to capture wetlands adjacent to but not within the Project Area (Figure 2).

The existing land use in the Study Area primarily consists of grazing for cattle production and agriculture, with some remnant native prairie. It contains numerous wetlands that vary from shallow vegetated depressions to large ponds and intermittent creeks. Residences and a few abandoned farmsteads are scattered throughout the Study Area. While most of the Project Area is flat to gently undulating, there is a rise that runs as a north-south oriented spine along the eastern third of the Project Area, which has the potential to provide thermals potentially useful to whooping cranes during migration. Whooping cranes have been documented at Hausauer Lake (approximately 64 kilometers [40 miles] southwest of the Project), Dakota Lake National Wildlife Refuge (NWR; approximately 51 kilometers [32 miles] to the southeast of the Project), and Long Lake NWR (approximately 105 kilometers [65 miles] to the northwest of the Project) during their annual migration periods (Figure 1; Austin and Richert 2001). As of fall 2016, no additional sightings have been documented in the vicinity of the Study Area (USFWS 2016).

4.0 THREATS TO WHOOPING CRANES

Several factors threaten the whooping crane because of its small population size and concentration of all members of the Aransas-Wood Buffalo National Park population at single breeding and wintering locations. Threat to the species associated with wind energy development identified in the Whooping Crane Recovery Plan include collision with power lines, fences, and other structures, and loss and degradation of stop-over and wintering habitat due to avoidance (CWS and USFWS 2007; USFWS 2009).

Power lines pose a major threat to whooping cranes when they are located in the vicinity of foraging or roosting habitat because individuals often fly at low altitudes (10 to 15 meters [33 to 49 feet] above the ground) when moving among sites (CWS and USFWS 2007; Stehn and Wassenich 2008). The majority of documented fatalities during migration are due to collisions with

power lines. Since 1956, 46 whooping cranes have been killed or seriously injured as a result of collisions with power lines (Stehn and Wassenich 2008). Collisions with power lines also have resulted in fatalities of whooping cranes in other experimental populations that are maintained by the introduction of captive-reared young (Stehn and Wassenich 2008). Fourteen individuals from the Florida non-migratory population and one individual in the migratory Wisconsin population have died from colliding with power lines (Stehn and Wassenich 2008).

Although whooping crane mortality has not been attributed to wind turbines, the Whooping Crane Recovery Plan considers wind energy development within the whooping crane migration corridor a potential threat because of the construction of power lines and associated structures (CWS and USFWS 2007). Both sandhill and whooping cranes have been seen in the vicinity of operational wind turbines, and Nagy et al. (2012) demonstrated that the cranes either flew above or around the turbines, flight behavior which appears to minimize the likelihood of turbine collision. Other studies have documented sandhill cranes gradually climbing as they approach marked power lines (Morkill and Anderson 1991, Murphy et al. 2009). The USFWS believes that whooping cranes will avoid stopping at areas with operational wind turbines. Thus, behavioral avoidance of wind energy facilities by whooping cranes may reduce the probability of collision but also may result in loss of stop-over habitat (USFWS 2009).

5.0 WHOOPING CRANE MIGRATION

Whooping cranes undertake an 8,047-kilometer (5,000-mile) round-trip migration from the breeding area in Canada to the wintering area in Texas every year. Individuals depart the breeding ground in Canada and travel south through Alberta, Canada, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas to the wintering ground at Aransas NWR on the Texas coast. The migration route is well-defined and 95 percent of all observations occur within a 322-kilometer- (200-mile-) wide-corridor during spring and fall migration (USFWS 2010; Figure 1). Whooping cranes may occasionally travel with sandhill cranes during migration, and stop-over sites used by sandhill cranes may indicate potential whooping crane stop-over areas (CWS and USFWS 2007).

During migration, whooping cranes can occur where suitable habitat is available. Four sites in the migration corridor are used consistently by whooping cranes and have high annual use: the Platte River in Nebraska, Cheyenne Bottoms Wildlife Management Area and Quivira NWR in Kansas, and the Salt Plains NWR in Oklahoma. These sites, including the wintering grounds at Aransas NWR, are designated as critical habitat under the Endangered Species Act (CWS and USFWS 2007). The Platte River is the closest of these four sites to the Project and is located over 563 kilometers (350 miles) to the south.

5.1 Migration Flight Behavior

Whooping cranes are diurnal migrants and primarily fly by using static soaring, but low-level flapping flight may be used when conditions dictate. Migration is initiated after the air has warmed and thermal updrafts are present. Individuals spiral upwards on thermals of warm air to heights of 305 to 1829 meters (1,000 to 6,000 feet; Kyut 1992), then enter into long, descending glides. This process is repeated throughout the day until suitable habitat is reached. Static soaring is energy efficient as birds seldom flap after they are airborne. Whooping cranes may travel up to 805 kilometers (500 miles) per day in ideal conditions; during average conditions they may travel 402 kilometers (250 miles) per day (Stehn and Wassenich 2008). During the end of the migration flight, individuals will enter long descending glides and use flapping flight at lower altitudes until they reach suitable roosting and feeding habitat. Whooping cranes do not regularly migrate during unfavorable weather conditions such as a strong headwind, rain or other precipitation, or overcast conditions. When visibility is poor, individuals use flapping flight at lower altitudes until they reach suitable roosting or feeding habitat.

5.2 Stop-over Habitat Characteristics

Whooping cranes require roosting habitat when they stop during migration. They often select sites with unobstructed visibility (Austin and Richert 2001). Palustrine emergent wetlands (freshwater wetlands characterized by emergent vegetation) are most often used as roosting sites, but individuals have been found roosting at lacustrine wetlands (wetlands around a lake), and riverine wetlands (wetlands along a river). The size of wetlands used during spring and fall migration ranges from about 0.4 hectare (1 acre) to over 486 hectares (1,200 acres; Austin and Richert 2001), but most wetlands are smaller than 4 hectares (10 acres).

Whooping cranes forage in wetlands and agricultural fields during migration and may commute between roosting and feeding areas. Palustrine emergent wetlands are used most often when whooping cranes forage in wetlands, but lacustrine and riverine wetlands have also been used as feeding sites (Austin and Richert 2001). Among agricultural crops used as feeding sites, the use of winter wheat was higher than other crop types in the fall and the use of row-crop stubble (comprised mostly of corn) was higher in the spring than other crop types (Austin and Richert 2001). Whooping cranes have also been observed feeding in sorghum, sunflower, and soybean stubble (Austin and Richert 2001). Feeding sites used during spring and fall migration are generally located within 1 kilometer (0.6 mile) or roosting sites (Johns et al. 1997; USFWS 2009).

6.0 METHODS

The objective of this desktop habitat analysis is to evaluate the biological and landscape features within the Study Area to determine the potential for use by migrating whooping cranes. To do so, Tetra Tech used habitat evaluation methods developed by TWI (2013), following protocols recommended by the USFWS Region 6 Guidelines for Minimizing Effects from Power Line Projects within the Whooping Crane Mitigation Corridor (USFWS 2010, TWI 2013). The methods

described here represent Tetra Tech's adaptation of the TWI methods to better fit the non-linear nature of a wind energy facility. The results of this analysis were supplemented with historic migration data and migration corridor information to provide an overall indication of the likelihood that whooping cranes will use the Study Area, and thus the potential for Project-related impacts.

6.1 Wetland Suitability Screening

To assess potential habitat suitability for whooping cranes, Tetra Tech first examined all National Wetland Inventory (NWI)-mapped wetlands within the Study Area. An underlying assumption of this assessment is that the distribution of NWI wetlands in the Geographic Information System (GIS) data (dated September 27, 2016; USFWS 2016b) is an accurate representation of the locations and classifications of wetlands within the Study Area. Based on this assessment, wetlands considered unsuitable for whooping cranes were eliminated from further consideration. Unsuitable wetlands were defined as follows:

- Wetlands less than or equal to 0.1 hectare (0.25 acre) in size. These wetland features were deemed too small to qualify as potentially suitable habitats (TWI 2013).
- Wetlands within the human disturbance zones d escribed below (TWI 2013).
- Palustrine forested wetlands, palustrine scrub/shrub wetlands, excavated wetlands, and intermittent streams, as classified by NWI (Cowardin et al. 1979, TWI 2013, USFWS 2016b). Palustrine forested wetlands and palustrine scrub/shrub wetlands were excluded because they likely have poor horizontal visibility as a result of vegetation that causes visual obstruction (Stahlecker 1992, TWI 2013). Excavated wetlands and intermittent streams were excluded as they are not likely to have suitable shallow water habitat (TWI 2013), or provide suitable roost habitat (Stahlecker 1992), respectively.

Tetra Tech generated human disturbance zones, using distances recommended by TWI, around highways, non-state roads, railroads, existing transmission lines, and residential and commercial properties within the Study Area (Table 1). Wetland features located within the human disturbance zones were considered unsuitable habitats. For wetlands that were partially within human disturbance zones, Tetra Tech removed the portions of the wetland found within the disturbance zone and recalculated the remaining wetland area. Remaining wetland features equal to or less than 0.1 hectare (0.25 acre) were considered too small to qualify as potentially suitable habitats (TWI 2013) and removed from further analysis. The remaining wetland areas outside of the human disturbance zone and larger than 0.1 hectare (0.25 acre) were considered potentially suitable for whooping cranes and were further assessed for habitat quality (Section 6.2).

Table 1. Types of disturbance and distance from affected area assumed to influence roosting sites (TWI 2013).

Type of Disturbance	Human Disturbance Zone (meters)*	Human Disturbance Zone (feet)*	Comments
Paved Road	400	1,312	state and federal highways
Gravel Road	200	656	--
Private Road	100	328	--
Urban Dwelling	800	2,625	towns and cities
Single Dwelling	200	656	residential houses and farm buildings
Railroad	400	1,312	railway lines and rail yards
Commercial Development	800	2,625	oil/gas production and existing wind turbines
Recreational Area	200	656	recreational parks and golf courses
Power Lines	100	328	anything greater than residential distribution lines
Bridges	400	1,312	any bridge over a wetland area

* Width of a band on one side of a linear feature or the radius around a point (Armbruster and Farmer 1981).

6.2 Habitat Quality Scoring

The remaining wetland features were scored in five separate categories to determine habitat quality using assigned values shown in Table 2 (TWI 2013):

- **Water Regime**. Because water is the primary attractant to whooping cranes, the score increases in proportion to the amount of permanent water present because it creates a more consistent and likely stopover habitat from year to year (TWI 2013). Tetra Tech used existing NWI classifications (Cowardin et al. 1979) to determine the score for each wetland feature.
- **Distance to Food Habitat.** Tetra Tech used Cultivated Crops (cropland) habitat information from the National Land Cover Database (USGS 2014) to define foraging habitat to score wetlands based on their distance from foraging opportunities. Wetlands within or adjacent to cropland scored higher than wetlands at a distance from cropland. Wetlands located further than 1.5 kilometers (0.9 miles) from cropland received a low score based on average forage distance (Armbruster 1990). Wetland distance categories are shown in Table 2.
- **Wetland Size**. Whooping cranes have been detected through visual observations and radio telemetry in a variety of wetland sizes but larger wetlands are generally preferred (TWI 2013). Tetra Tech used GIS to determine wetland size, and larger wetlands received a higher score (TWI 2013). Wetland size categories are shown in Table 2.
- **Natural Wetlands** are based on whether the wetland was naturally occurring or created by human activity such as water impoundments created by damming small creeks (TWI 2013). Natural wetlands received a higher score because they were assumed to have shallower water (TWI 2013).
- **Wetland Density**. Literature suggests whooping cranes select areas that have a wetland mosaic (TWI 2013). Tetra Tech used GIS to identify wetland mosaics as areas having five

or more potentially suitable wetlands within 1.5 kilometers (0.9 miles) of a potentially suitable wetland.

Table 2. TWI (2013) scoring used to assess habitat quality of each wetland feature.

Habitat Scoring Criteria	Score
Water Regime*	
Permanent	5
Intermittently Exposed	4
Semi-Permanent	3
Seasonally Flooded	2
Intermittent/Temporarily Flooded	1
Distance to Food Habitat	
Within or Adjacent to agriculture field	5
< 0.5 kilometer (< 0.3 miles)	4
0.6-1.0 kilometer (0.4-0.6 miles)	3
1.1-1.5 kilometer (0.7-0.9 miles)	2
> 1.5 kilometer (> 0.9 miles)	1
Wetland Size	
> 7 acres	5
5-6.9 acres	4
3-4.9 acres	3
1-2.9 acres	2
< 1.0 acre	1
Natural Wetland	
Natural	2
Created (dam, impoundments, excavations etc...)	0
Wetland Density	
Five or more wetlands in close proximity	3
Less than five wetlands in close proximity	0
Total Score Range (suitable habitat score)	**3-20 (12)****

* Non-tidal Water Regime from Cowardin et al. (1979)

**A score of 12 or greater was considered potentially suitable whooping crane habitat (TWI 2013)

The resulting scores were summed to develop an overall habitat quality score for each wetland, where 20 points is the maximum possible score (TWI 2013). To provide a frame of reference, TWI generated habitat quality scores for wetlands within the Quivira NWR (with an additional 1.6 kilometer [1-mile] buffer) using the same methods which, as noted above, is designated critical habitat for whooping cranes. Habitat scores at Quivira NWR ranged from 8 to 17 points with a mean score of 12.1 points (TWI 2013). Based on the Quivira NWR potentially suitable habitat scores, habitat scores of 12 points or higher at the Project was considered potentially suitable stopover wetland habitat for migrating whooping cranes (Table 2; TWI 2013).

6.3 Whooping Crane Sightings

The USFWS maintains an archived database on historical whooping crane sighting through the year 2010 (Tacha et al. 2010). Tetra Tech queried this database and overlaid all known whooping crane sightings within the Study Area. The USFWS Nebraska Ecological Services Field Office also maintains an active database of whooping crane sightings dating from 1942, current through

fall 2016 (confidential data provided by Matt Rabbe to Tetra Tech April 26, 2017). Tetra Tech overlaid these sightings with the Study Area and Project vicinity (Figure 1).

7.0 RESULTS

Of 3,646 NWI-mapped wetlands within the Study Area (Figure 2), 2,532 wetlands were considered unsuitable due to their size, proximity to human disturbance, and/or wetland classification. The remaining 1,114 wetlands within the Study Area were assessed and scored to determine habitat quality. Habitat quality scores ranged from 8 to 19, with a mean score of 12.3. Within the Study Area, 763 wetlands received scores greater than or equal to 12, and thus were considered potentially suitable whooping crane roosting habitat. Wetlands identified as potentially suitable habitat in the Study Area ranged from 0.1 hectare (0.25 acres) to 50 hectares (124 acres) in size, and were scattered throughout the Study Area (Figure 3).

Wetlands considered potentially suitable habitat constituted 1,019 hectares (2,519 acres) within the Study Area, or 60 percent of NWI-mapped wetland acres in the Study Area and 6 percent of the entire Study Area (Table 3). Potentially suitable habitat was primarily emergent wetland (Table 3).

Table 3. Acres of NWI wetlands and wetlands identified as potentially suitable habitat (score ≥12) within the Study Area.

Wetland Type	Study Area (acres)[1]	
	All Wetlands	Potentially Suitable Habitat
Freshwater Emergent Wetland	3,531	2,170
Freshwater Forested/Shrub Wetland	1	0
Freshwater Pond	316	135
Lake	236	214
Riverine	94	0
Total	**4,179**	**2,519**

[1]1 acre = 0.4 hectare

The average acreage of wetlands that Tetra Tech scored for quality was 0.8 hectare (2 acres; Table 4). The average acreage of potentially suitable wetlands (i.e., that scored 12 or higher) was 1.2 hectares (3 acres; Table 4). For reference, the mean score and range of scores for the Study Area were slightly greater than those calculated for the Quivira NWR (Table 4).

Table 4. Comparison of potentially suitable habitat assessment scores between the Study Area and Quivira NWR (TWI 2013).

Analysis	Study Area	Quivira NWR[3]
Number of Wetlands Scored	1,114	499
Average Acreage of Scored Wetlands[1]	2	--
Range of Wetland Scores	8 - 19	8 – 17
Number of Potentially Suitable Wetland Features[1]	763	--
Average Acreage of Potentially Suitable Wetlands[1, 2]	3	--
Mean Wetland Score	**12.3**	**12.1**

[1]1 acre = 0.4 hectare

[2]Wetlands with a Potentially Suitable Habitat Assessment Score of 12 or greater (TWI 2013).

[3]Results from TWI (2013) as applied to known whooping crane critical habitat at Quivira NWR.

As of fall 2017, there have been no whooping crane sightings within the Study Area (Figure 1; USFWS Nebraska Ecological Services Field Office 2017). The closest known whooping crane sighting to the Study Area occurred approximately 16 kilometers (10 miles) to the northwest of the Project.

8.0 DISCUSSION

The location of the proposed Project within the 95th percent isopleth of the whooping crane migration corridor, and the presence of 763 potentially suitable stopover wetlands within the Study Area indicates that whooping cranes have the potential to occur within the Study Area. Additionally, with an overall mean score of 12.3, the potentially suitable habitat within the Study Area scored slightly higher on average than what was determined by TWI (2013) to represent potentially suitable habitat at Quivira NWR (a mean score of 12 or more; Table 5). However, potentially suitable wetland habitat within the Study Area appears to be primarily the seasonally and semi-permanently flooded wetlands that are present in high concentrations throughout the Northwestern Glaciated Plains ecoregion. As a result, potentially suitable habitat within the Study Area is not unique on the landscape, and whooping cranes are no more likely to use stopover habitat within the Project than on the surrounding landscape. This conclusion is supported by the lack of whooping crane sightings recorded by USFWS in or near the Study Area, especially compared to Long Lake NWR to the northwest where several whooping crane sightings have been recorded. This is also consistent with the previous desktop whooping crane habitat analysis conducted for the Project, which utilized different methods for assessing likelihood of occurrence by comparing habitat within the Project to habitat within a surrounding 56-kilometer (35-mile) buffer (Tetra Tech 2015), which also determined that there was a low likelihood of whooping crane occurrence.

Whooping cranes migrating between stopover sites may be at risk of colliding with Project infrastructure such as turbines or other project facilities; however, no new overhead transmission lines are proposed for the Project. Nearly 10,000 wind turbines have been constructed within the whooping crane migratory corridor. However, a large scale modelling study conducted by Pearse et al. (2015) found that 84 percent of areas they studied with wind turbines in the whooping crane migration corridor did not contain stopover sites used by whooping cranes during migration, and that this was not likely due to avoidance of turbines by cranes. The authors suggest that efforts could be made to place turbines in locations expected to have a low probability of crane use to maintain minimal spatial overlap of cranes and wind turbines (Pearse et al. 2015).

During migration, both sandhill and whooping cranes have been observed in the vicinity of operational wind turbines. Nagy et al. (2012) observed that the sandhill cranes flew either above or around the turbines, which may minimize the likelihood of turbine collision. Other studies have documented sandhill cranes gradually climbing as they approach marked power lines (Morkill and Anderson 1991, Murphy et al. 2009). Marking power lines has been identified as a way to further reduce the fatality risk during the operational phase of a wind energy facility. To date, no whooping

crane fatalities have been recorded as a result of collisions with wind turbines. The USFWS (2009) believes that whooping cranes will avoid stopping at areas with operational wind turbines. Thus, behavioral avoidance of wind energy facilities by whooping cranes may reduce the probability of collision but may result in loss of stopover habitat.

The Final Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program (WAPA and USFWS 2015) identifies siting turbines, transmission lines, access roads, and other project facilities greater than 1.6 kilometers (1 mile) from wetlands that provide suitable stopover habitat as an avoidance measure for Projects within the 95th percent isopleth of the whooping crane migration corridor. Where avoidance is not feasible, minimization measures include placing bird flight diverters on the top static wire on any new or upgraded overhead collector, distribution, and transmission lines within 1.6 kilometers (1 mile) of suitable stopover habitat, and providing mitigation for potentially suitable migratory stopover habitat located within a 0.8-kilometer (0.5-mile) radius of turbines based upon site-specific evaluations of these wetlands. However, as noted above, there are no new overhead transmission lines associated with the proposed Project, therefore, this avoidance and minimization measure is not recommended here.

9.0 CONCLUSIONS

Overall, the Study Area was found to contain 1,019 hectares (2,519 acres) of potentially suitable habitat (6 percent of the entire Study Area), within 763 potentially suitable wetlands. Results of this desktop habitat assessment found the mean wetland score for all wetlands within the Study Area was 12.3 (ranged from 8 to 19) which, for reference, is slightly above the mean score of 12.1 (range of 8 to 17) determined at the designated critical habitat stopover site at Quivira NWR. There are no historical or current observations of whooping cranes in the Study Area, which may indicate the Study Area is unlikely to be used during migration, especially compared to habitat available at Long Lake NWR to the northwest where numerous whooping cranes have been observed. Additionally, there is a higher proportion of wetlands in the 56 kilometers (35 miles) surrounding the Project compared to the Project Area itself, indicating that the Project Area is unlikely to attract whooping cranes (Tetra Tech 2015). Whooping cranes may still pass through the Project Area during spring and fall migration between known stopover sites which may put them at risk of colliding with Project infrastructure. Micrositing Project infrastructure away from potentially suitable habitat and placing bird flight diverters on select overhead lines may further reduce the risk of collision.

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FIGURES

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Florence Lake National Wildlife Refuge
Hutchinson Lake National Wildlife Refuge
Arrowwood National Wildlife Refuge
Tomahawk National Wildlife Refuge
Chase Lake National Wildlife Refuge
Slade National Wildlife Refuge
Half-Way Lake National Wildlife Refuge
Hobart Lake National Wildlife Refuge
Long Lake National Wildlife Refuge
Lake George National Wildlife Refuge
Stoney Slough National Wildlife Refuge
Bone Hill National Wildlife Refuge
Appert Lake National Wildlife Refuge
Springwater National Wildlife Refuge
Maple River National Wildlife Refuge
Dakota Lake National Wildlife Refuge
Hausauer Lake
Sand Lake National Wildlife Refuge

Sheridan County
Wells County
Foster County
Griggs County
Steele County
Burleigh County
Kidder County
Stutsman County
Barnes County
Logan County
LaMoure County
Ransom County
Emmons County
McIntosh County
Dickey County
Sargent County
North Dakota
South Dakota
McPherson County
Campbell County
Corson County
Marshall County
Brown County
Edmunds County
Walworth County
Dewey County
Faulk County
Spink County
Potter County
Day County

Wimbledon
Jamestown
Valley City
Edgeley
Ellendale
Hecla
Frederick
Aberdeen
Groton
Northville
Mellette
Conde

1:750,000 NAD 1983 StatePlane North Dakota South FIPS 3302 Feet

0 5 10 20 Miles

Foxtail Wind Energy Center

NEXTera ENERGY RESOURCES

Figure 1
Project Location

DICKEY COUNTY, ND

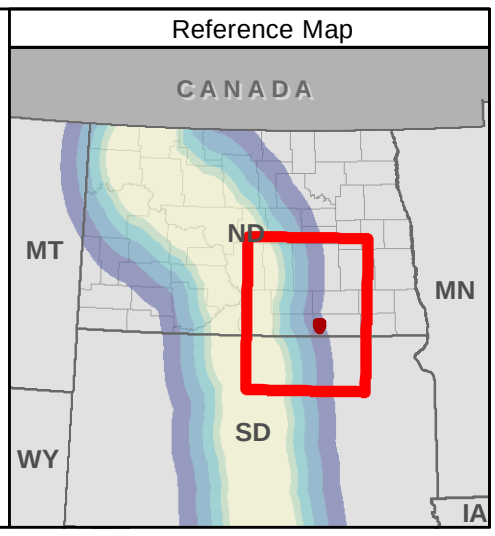
- Proposed Project Boundary (1/3/2017)
- County Boundary
- State Boundary
- USFWS Whooping Crane Sighting (through Fall 2016)
- USFWS National Wildlife Refuge
- USFWS National Wildlife Refuge with Whooping Crane Occurrence
- Hausauer Lake

Whooping Crane Corridor Sightings Percentage

- 75% (60 mi Corridor)
- 80% (80 mi Corridor)
- 85% (100 mi Corridor)
- 90% (130 mi Corridor)
- 95% (170 mi Corridor)

TETRA TECH

Reference Map



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Foxtail Wind Energy Center

NEXTera ENERGY RESOURCES

Figure 2
NWI Wetlands

DICKEY COUNTY, ND

Proposed Project Boundary (1/3/2017)

Study Area

NWI Wetland Type

Freshwater Emergent Wetland

Freshwater Forested/Shrub Wetland

Freshwater Pond

Lake

Riverine

TETRA TECH

Reference Map

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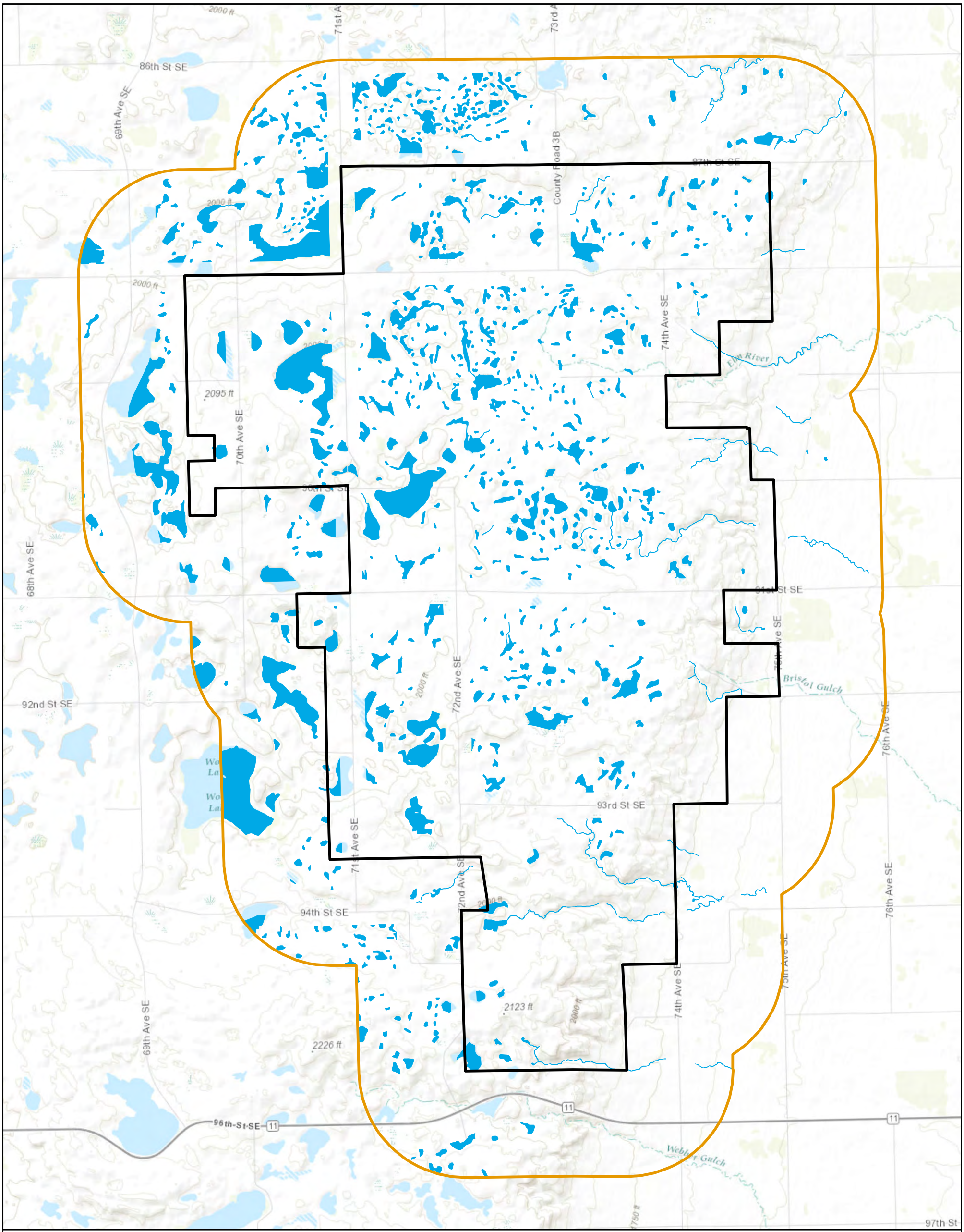


Foxtail Wind Energy Center

NEXTera ENERGY RESOURCES

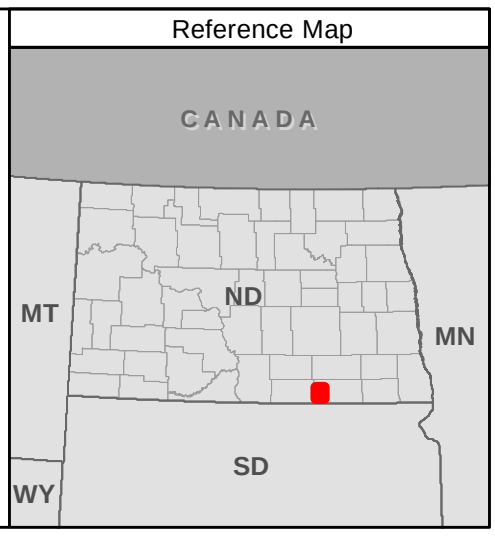
Figure 3
Potentially Suitable Wetlands

DICKEY COUNTY, ND

- Proposed Project Boundary (1/3/2017)
- Study Area
- Potentially Suitable Wetlands

TETRA TECH

Reference Map



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2017 Raptor Nest and Sharp-tailed Grouse Lek Surveys Memorandum

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TETRA TECH

TO:	Foxtail Wind, LLC
FROM:	Tetra Tech, Inc.
DATE:	July 5, 2017
CORRES. NO.:	TTCES-PTLD-2017-078
SUBJECT:	Foxtail Wind Energy Center 2017 Raptor Nest and Sharp-tailed Grouse Lek Surveys

Introduction

Foxtail Wind, LLC (Foxtail Wind), a wholly-owned subsidiary of NextEra Energy Resources, LLC, proposes to develop the Foxtail Wind Energy Center (Project) in Dickey County, North Dakota. Foxtail Wind is committed to environmental due diligence and contracted Tetra Tech, Inc. (Tetra Tech) to conduct spring raptor nest and sharp-tailed grouse lek surveys in the Project and surrounding area. The objective of the surveys was to document all raptor nests and sharp-tailed grouse leks within 1.6 kilometers (1 mile) of the Project and all eagle nests within 16 kilometers (10 miles) of the Project. The surveys were conducted in accordance with recommendations in the voluntary US Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines (USFWS 2012) and Stage 2 of the USFWS Eagle Conservation Plan Guidance (ECPG; USFWS 2013).

At Foxtail Wind's request, in March 2015, prior to a previous survey effort, Tetra Tech requested information on the locations of any known eagle nests and sharp-tailed grouse leks from the U.S. Fish and Wildlife Service (USFWS) and the North Dakota Game and Fish Department (NDGFD). The USFWS and NDGFD reported no known eagle nests or grouse leks within 16 kilometers (10 miles) of the Project. A subsequent request for updated eagle nest and grouse lek information was made to these agencies in March 2017; however, no new data were provided. Therefore, in preparation for the 2017 survey effort, Tetra Tech identified known raptor nest and grouse lek locations documented during surveys performed for the Project in 2015 (Tetra Tech 2015), which were revisited during the 2017 surveys.

This memo presents the results of the aerial and ground-based raptor nest and grouse lek surveys conducted at the Project in spring 2017. Raptor nest and grouse lek surveys were conducted in conjunction with each other (during the same survey weeks), but with timing and other protocol details, such as transect spacing, tailored to the agency-approved survey requirements for each species. The methods and results of each survey effort are described below.

Methods

Raptor Nest Surveys

The raptor nest survey consisted of two rounds to facilitate a complete inventory and accurate occupancy determination of raptor nests. An early season aerial survey was conducted in April 2017, before leaves had emerged on trees, to check on the status of 26 known nests found during previous survey efforts (Tetra Tech 2015) and search for new raptor nests. A ground-based follow-up survey was conducted later in the season in May 2017 to check on the nests located during the aerial nest survey and search for additional raptor nests.

Aerial Survey

The aerial raptor nest survey was conducted at the Project from April 11-13, 2017. It was conducted from a Robinson 44 helicopter (DWTA Helicopter, Wichita, Kansas) which flew approximately 61 meters (200 feet) above ground level (AGL) at an approximate speed of 97 kilometers per hour (kph; 60 miles per hour [mph]). The crew consisted of two Tetra Tech biologists and a pilot. The helicopter flew along north to south oriented transects spaced 1 mile apart within a 16-kilometer (10-mile) mile radius around the Project (Project boundary dated January 2017; Figure 1). The aerial surveys were not conducted over residences or livestock. Surveyors recorded all raptor nests within the Project Area and surrounding 1.6-kilometer (1-mile) buffer and all eagle nests within a 16-kilometer (10-mile) buffer surrounding the Project, as recommended in the USFWS ECPG.

Ground-based Survey

The ground-based follow-up raptor nest survey was conducted on May 10 and 11, 2017. A surveyor checked the status of eagle and other raptor nests located during the aerial survey and searched for new raptor nests within 1.6 kilometers (1 mile) of the Project. The ground-based survey was conducted from accessible public roadways by a biologist equipped with binoculars and a spotting scope to better identify and assess distant nests.

Data Collection

To aid in navigation and data recording, tablets with topographic maps, built-in global positioning system (GPS), and electronic data forms were used during both rounds of surveys. High-resolution photographs of nests were taken with an optically stabilized camera during the aerial survey.

For each raptor nest, the following data were collected:

- **Nest Identification Number:** Corresponding with GPS waypoint number.
- **Raptor Species:** Using four-letter American Ornithologists' Union codes (e.g., RTHA = red-tailed hawk, GHOW = great horned owl).
- **Adult Present:** Proximity of the adult to the nest (e.g., on nest, nearby, or unknown).

- **Eggs or Young:** Number of eggs or young observed.
- **Nest Substrate:** Structure in which nest was located (e.g., broadleaf tree, cut bank, transmission pole, etc.).
- **Nest Height:** Height relative to the structure on which it is located (e.g., on top of transmission pole, 3/4 of height of tree).
- **Nest Status:** To assess nest status, the following criteria were used (USFWS 2016):
    - In-use nest: A nest characterized by the presence of one or more eggs, dependent young, or adult on the nest.
    - Alternate nest: One of potentially several nests within an eagle nesting territory that is not an in-use nest at the current time. When there is no in-use nest, all nests in the territory are alternate nests.
    - Inactive: Defined by the absence of any adult, egg, or dependent young at the nest. This term is specific to non-eagle nests.
    - Unknown: A nest that could not be visited (e.g., road or access limitations) or that was visually obscured (e.g., vegetation around the nest site obscured the view of nest, wind speeds too high to determine status, etc.).
    - No Longer Present: A nest that was located during a previous survey, but has subsequently been destroyed and no longer exists. No evidence remains.
- **Nest Condition:** To assess nest condition, the following criteria were used (Postupalsky 1974):
    - Excellent: Defined cup or nest bowl with a well-maintained rim; adult or young present.
    - Good: Nest bowl intact and rim defined; minor repair needed for nest to be used; margins of nest in loose configuration, minor slumping occurring.
    - Fair: Nest bowl intact and nest not dilapidated; but needs significant repair in order to be used; material is slumping or sliding.
    - Poor: Loose structure of nest bowl still present; nest walls and side falling out; nest is in need of major repair to be used.
    - Remnant: Nest bowl not defined; scant material remaining and not usable unless fully rebuilt.

Sharp-tailed Grouse Surveys

The lek surveys were also performed in two phases to facilitate a complete inventory and accurate numbers of individuals in attendance. An early season aerial survey was conducted on April 11-15, 2017 and an additional ground-based survey was conducted on May 15-19, 2017. During the surveys Tetra Tech biologists checked on the status of 14 known leks (Leks 1-14; Figure 2, Table 2)

and searched for new leks within 1.6 kilometers (1 mile) of the Project. The surveys began 0.5 hour before sunrise and ended 2 hours past sunrise to coincide with peak lekking activity. The lek surveys were not conducted if winds exceeded 32 kph (20 mph) or if there was any type of precipitation event. Data recorded for each lek included GPS coordinates of the lek location and the total number of individuals in attendance at the lek. When possible, surveyors recorded the number of males and females at the lek.

Aerial Survey

During the aerial lek survey, the helicopter flew along north to south oriented transects spaced 400 meters (1,312 feet) apart within the Project plus a surrounding 1.6-kilometer (1-mile) buffer. The helicopter flew at a speed of approximately 60 kph (37 mph) and an altitude of 25 meters (82 feet) AGL. The same helicopter and crew used for the aerial raptor nest surveys was also used for the aerial lek surveys.

Ground-based Survey

Prior to the surveys, Tetra Tech performed a desktop habitat assessment to establish survey points (listening stations) within suitable lek habitat. Preliminary listening stations spaced 0.8 kilometer (0.5 mile) apart were mapped along public roads within the Project and a surrounding 1.6-kilometer (1-mile) buffer. Using the National Land Cover Database (Homer et al. 2015) and aerial imagery to delineate suitable lek habitat (open areas with grassland habitats), those listening stations adjacent to suitable habitat were mapped to be included in the surveys while those surrounded by agricultural habitats were removed from the assessment. A total of 121 listening stations were established during the desktop habitat assessment (Figure 2). Habitat suitability and access to the listening stations was verified by the surveyor during the raptor nest surveys, described above, and during the first day of the ground-based lek surveys.

During the ground-based lek survey, a surveyor drove along county roads and stopped at the established listening stations. At each listen station, the surveyor shut off the vehicle's engine, moved at least 10 meters (33 feet) from the vehicle, and systematically scanned and listened for displaying sharp-tailed grouse for a minimum of 3 minutes. The surveyor then traveled to the next listening station and repeated this procedure until reaching the end of the morning survey window, until an attempt was made to visit all the listening stations.

Results

Raptor Nest Surveys

A total of 29 raptor nests were located during the 2017 surveys (Figure 3), 27 nests during the initial aerial survey and two additional nests during the ground-based follow-up survey (Table 1). The nests included 1 bald eagle nest, 15 red-tailed hawk nests, 5 great horned owl nests, and 8 nests with unknown species determination. Nine red-tailed hawk nests, two great horned owl nests, and three nests of unknown species were located within the Project. The bald eagle nest

(Nest 102) was located approximately 4.7 kilometers (2.9 miles) to the east of the northern part of the Project, in a windbreak planted between two cropland fields. Surveyors were unable to determine the number of eggs or young in the bald eagle nest, but an adult was observed in incubating/brooding posture during both survey rounds. All of the nests with unknown species determinations were classified in the field as small nests, indicating that they are unlikely to be used by eagles (Table 1).

Nest status (see categories and criteria listed under Methods) was determined during at least one of the survey efforts for all nests except Nest 10 (Table 1; Figure 3). Thirteen of the nests located during the aerial survey were not visible from public roads during the follow-up survey. Nest 10 could not be approached with the helicopter due to the presence of nearby cattle, and was not visible from county roads during the ground-based follow-up survey. Raptor nests and surrounding 91-meter (300-foot) buffers are shown on Figure 3.

For context, of the 26 known, previously documented nests that were revisited in 2017, 18 nests (nine within the Project and nine outside the Project) were still present in the nest tree (Nests 1-6, 8, 10-11, 14, 17-23, and 26; Table 1). The remaining eight known nests were no longer present. Eleven new nests were found in 2017 during the aerial survey (Nests 100-108) and ground-based follow-up survey (Nests 200 and 201; Table 1).

Aside from the bald eagle associated with Nest 102, no bald eagles were observed during the aerial survey or ground-based follow-up survey. A small double-crested cormorant colony, consisting of about 20 nests, was observed within dead trees located along the northern shore of Wood Lake, approximately 1.8 kilometers (1.1 miles) to the west of the Project.

Sharp-tailed Grouse Surveys

There were 20 leks located within 1.6 kilometers (1 mile) of the Project, including thirteen active leks and seven inactive leks (Figure 2). Fourteen leks were located within the Project (nine active leks and five inactive leks). Six of the leks were first documented in 2017, during the aerial survey (Leks 100-104) and the ground-based survey (Lek 200). Both known and newly discovered leks and associated 152-meter (500-foot) buffers are shown on Figure 2.

Road access and road conditions precluded the ability of the surveyor to check the status of four leks during the ground-based follow-up survey. However, three of the leks (Leks 100, 101, and 102; Table 2) were documented as active during the aerial survey. The fourth lek (Lek 14) is an established lek that was first documented in 2015 and but no grouse were observed in attendance during the 2017 aerial survey. Established leks may be used for many years, and while the leks remain in the same general area, their locations may shift over time periodically based on vegetative conditions or other unknown factors. Lek 14 is approximately 800 meters (0.5 mile) to the west of Lek 102 (Figure 2). Given the proximity of Lek 14 to Lek 102, and the fact that grouse were seen at Lek 102 during the aerial survey, it is likely that the birds attending Lek 14 may have shifted their display site to Lek 102. Therefore, Lek 14 was considered inactive in 2017.

References

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Table 1. Raptor Nests Detected at the Foxtail Wind Energy Center in Spring 2017

Nest ID Number	Raptor Species	Nest Status Round 1 (Aerial)	Nest Status Round 2 (Ground-based)	Nest Substrate	Nest Size
1[1]	Unknown	Inactive	Inactive	Snag	Small
2[1]	Red-tailed hawk	In-use	In-use	Broadleaf tree	Small
3[1]	Unknown	Inactive	Unknown[3]	Broadleaf tree	Small
4[1]	Red-tailed hawk	Inactive	In-use	Broadleaf tree	Small
5[1]	Great horned owl	In-use	In-use	Broadleaf tree	Small
6[1]	Red-tailed hawk	In-use	In-use	Broadleaf tree	Small
8[1]	Red-tailed hawk	In-use	In-use	Broadleaf tree	Small
10[1]	Unknown	Unknown[2]	Unknown[3]	Broadleaf tree	Small
11[1]	Red-tailed hawk	In-use	Unknown[3]	Broadleaf tree	Small
14[1]	Great horned owl	Inactive	In-use	Broadleaf tree	Small
17[1]	Red-tailed hawk	In-use	Unknown[3]	Broadleaf tree	Small
18[1]	Unknown	Inactive	Unknown[3]	Broadleaf tree	Small
19[1]	Red-tailed hawk	In-use	Inactive	Broadleaf tree	Small
20[1]	Unknown	Inactive	Unknown[3]	Broadleaf tree	Small
21[1]	Great horned owl	In-use	Inactive	Broadleaf tree	Small
22[1]	Red-tailed hawk	In-use	Inactive	Broadleaf tree	Small
23[1]	Red-tailed hawk	In-use	Unknown[3]	Broadleaf tree	Small
26[1]	Red-tailed hawk	Inactive	In-use	Broadleaf tree	Small
100	Red-tailed hawk	In-use	Unknown[3]	Broadleaf tree	Small
101	Great horned owl	In-use	Unknown[3]	Broadleaf tree	Small
102	Bald eagle	In-use	In-use	Broadleaf tree	Large
103	Red-tailed hawk	In-use	Inactive	Broadleaf tree	Small
104	Unknown	Inactive	Inactive	Broadleaf tree	Small
105	Great horned owl	In-use	Unknown[3]	Broadleaf tree	Small
106	Red-tailed hawk	In-use	Unknown[3]	Broadleaf tree	Small

Table 1. Raptor Nests Detected at the Foxtail Wind Energy Center in Spring 2017

Nest ID Number	Raptor Species	Nest Status Round 1 (Aerial)	Nest Status Round 2 (Ground-based)	Nest Substrate	Nest Size
107	Unknown	Inactive	Unknown[3]	Broadleaf tree	Small
108	Unknown	Inactive	Unknown[3]	Broadleaf tree	Small
200	Red-tailed hawk	Not Applicable[4]	In-use	Broadleaf tree	Small
201	Red-tailed hawk	Not Applicable[4]	In-use	Broadleaf tree	Small

[1] Known nest first documented during surveys conducted in 2015.
[2] Nest structure present, but unable to approach nest with helicopter because of nearby cattle.
[3] Nest not visible from accessible road during follow-up ground-bases survey.
[4] Location of nest not known at the time of survey.

Table 2. Status of Sharp-tailed Grouse Leks at the Foxtail Wind Energy Center in Spring 2017						
Lek ID	Survey Date	Survey Round	Number of Males	Number of Females	Number of Unknown Grouse	Total Grouse
1[1]	4/15/2017	1	0	0	0	0
	5/19/2017	2	0	0	0	0
2[1]	4/11/2017	1	0	0	22	22
	5/18/2017	2	0	0	0	0
3[1]	4/12/2017	1	0	0	0	0
	5/19/2017	2	0	0	0	0
4[1]	4/11/2017	1	0	0	0	0
	5/20/2017	2	0	0	0	0
5[1]	4/12/2017	1	0	0	10	10
	5/19/2017	2	0	0	0	0
6[1]	4/12/2017	1	0	0	2	2
	5/20/2017	2	0	0	0	0
7[1]	4/12/2017	1	0	0	0	0
	5/16/2017	2	0	0	0	0
8[1]	4/15/2017	1	0	0	0	0
	5/16/2017	2	0	0	0	0
9[1]	4/15/2017	1	0	0	10	10
	5/17/2017	2	0	0	0	0
10[1]	4/12/2017	1	0	0	4	4
	5/15/2017	2	0	0	0	0
11[1]	4/12/2017	1	0	0	0	0
	5/15/2017	2	0	0	0	0
12[1]	4/15/2017	1	0	0	12	12
	5/15/2017	2	0	0	0	0

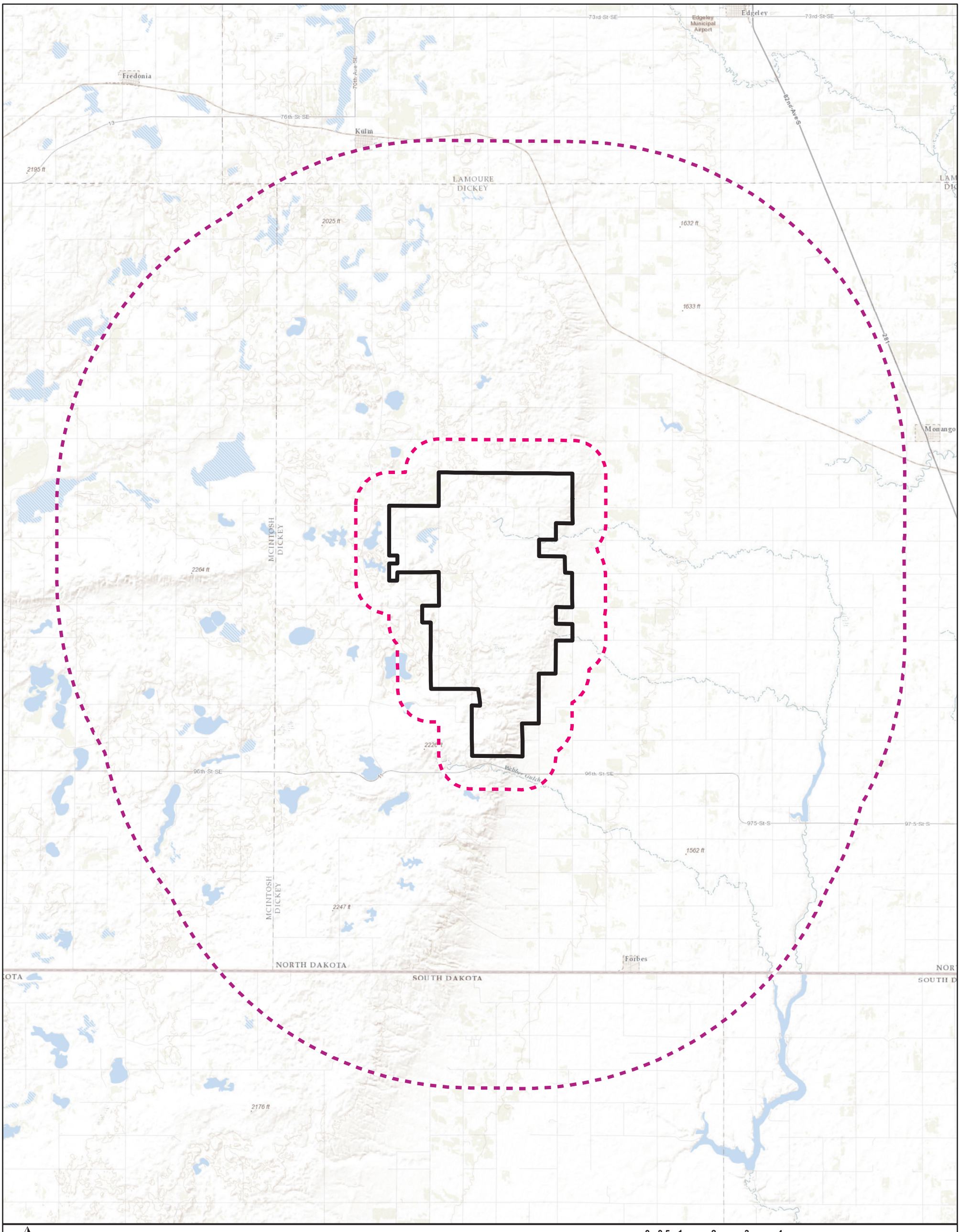
Table 2. Status of Sharp-tailed Grouse Leks at the Foxtail Wind Energy Center in Spring 2017

Lek ID	Survey Date	Survey Round	Number of Males	Number of Females	Number of Unknown Grouse	Total Grouse
13[1]	4/15/2017	1	0	0	0	0
	5/17/2017	2	0	0	10	10
14[1]	4/12/2017	1	0	0	0	0
	5/20/2017	2	Not Applicable[2]	Not Applicable[2]	Not Applicable[2]	Not Applicable[2]
100	4/11/2017	1	0	0	15	15
	5/18/2017	2	Not Applicable[2]	Not Applicable[2]	Not Applicable[2]	Not Applicable[2]
101	4/11/2017	1	0	0	10	10
	5/20/2017	2	Not Applicable[1]	Not Applicable[1]	Not Applicable[1]	Not Applicable[1]
102	4/11/2017	1	0	0	25	25
	5/20/2017	2	Not Applicable[2]	Not Applicable[2]	Not Applicable[2]	Not Applicable[2]
103	4/12/2017	1	0	0	4	4
	5/17/2017	2	0	0	0	0
104	4/12/2017	1	0	0	7	7
	5/19/2017	2	0	0	0	0
200	4/11/2017	1	Unknown[3]	Unknown[3]	Unknown[3]	Unknown[3]
	5/15/2017	2	3	0	3	6

[1] Known nest first documented during surveys conducted in 2015.

[2] Lek too far away from accessible road to determine status during ground-based follow-up survey. Lek 14 determined inactive due to proximity to Lek 102 and presence of grouse at Lek 102 during aerial survey.

[3] Lek not detected during the aerial survey.



Foxtail Wind Energy Center

NEXTera ENERGY RESOURCES

Figure 1
Study Area

DICKEY COUNTY, ND

Proposed Project Boundary (01-03-2017)

1-Mile Buffer

10-mile Buffer

Reference Map

TETRA TECH

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1
5
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14
102
101
9
12
103
11
13
10
200

1:55,000 WGS 1984 UTM Zone 14N

0 0.5 1 2 3 4 Miles

Foxtail Wind Energy Center

NEXTera ENERGY RESOURCES

Figure 2
Grouse Leks and Buffers

DICKEY COUNTY, ND

Proposed Project Boundary (01-03-2017)

1-Mile Buffer

Listening Station

Known Leks (Status)

Active

Inactive

Leks Found in 2017 (Status)

Active

500-foot Buffer

TETRA TECH

Reference Map

Canada

ND

MN

WI

SD

NE

IA

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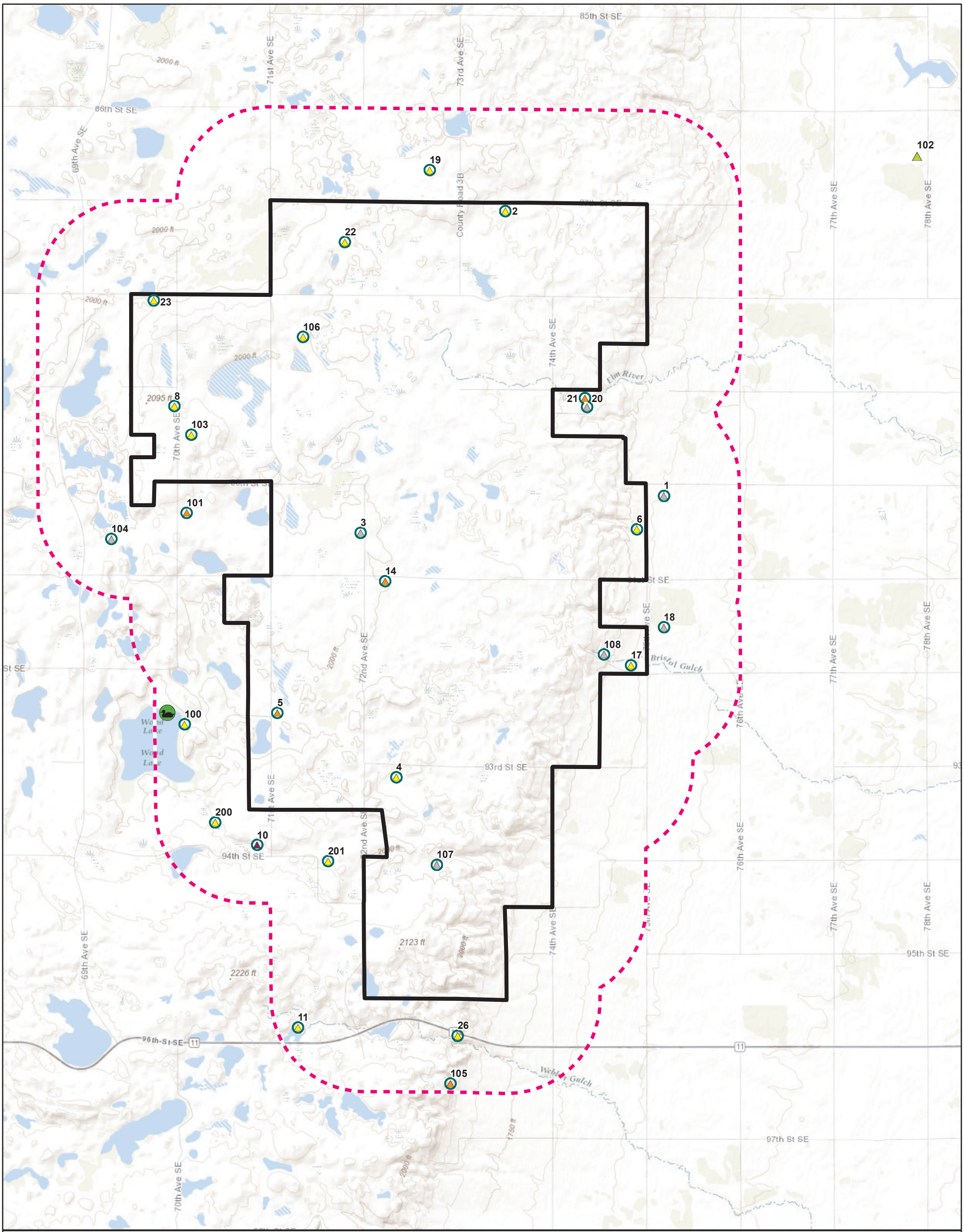


Foxtail Wind Energy Center

Figure 3
Raptor Nests and Buffers

DICKEY COUNTY, ND

Proposed Project Boundary (01-03-2017)

1-Mile Buffer

300-foot Nest Buffer

Double-crested Cormorant Colony

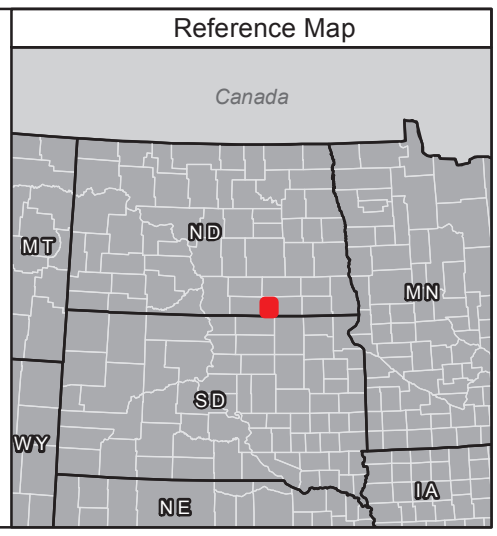
Nest Species, Status

- Bald eagle, In-use
- Great Horned Owl, In-use
- Red-tailed Hawk, In-use
- Unknown Species, Unknown Status*
- Unknown Species, Inactive

*Nest 10 structure present, but unable to approach nest with helicopter because of nearby cattle, and nest not visible from county road during the follow-up survey.

TETRA TECH

Reference Map



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Appendix C

Agency Correspondence

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"VARIETY IN HUNTING AND FISHING"

NORTH DAKOTA GAME AND FISH DEPARTMENT

100 NORTH BISMARCK EXPRESSWAY BISMARCK, NORTH DAKOTA 58501-5095 PHONE 701-328-6300 FAX 701-328-6352

April 26, 2017

Brita Woeck
Project Manager
Tetra Tech, Inc.
19803 North Creek Parkway
Bothell, WA 98011

Dear Ms. Woeck:

RE: Foxtail Wind Energy Center
Dickey County, North Dakota

A primary concern with wind power development in North Dakota is the disturbance of native habitats (i.e. prairie, wetlands and woodlands) associated with the construction of turbines, access roads, and other associated facilities. Limiting construction within native habitats reduces impacts to a number of species of conservation priority. In the past we have asked that work within these areas be minimized to the extent possible. As this approach has not shown to be successful, the department is pursuing a different approach to protect native habitats.

NextEra is proposing to conduct a grassland/native prairie assessment to supplement studies done in previous seasons. We believe that on the ground work must be performed to determine where suitable native habitat still exists. We highly recommend that desktop analysis be followed up by field visits to all sites found to be potential native habitat.

We also recommend that an action plan be incorporated into the assessment. Collecting information on areas of high quality habitat is ineffective without a plan to address how these findings will be taken into consideration during the planning and implementation of the project.

Sincerely,

Greg Link
Chief
Conservation & Communication Division

js

NORTH DAKOTA
DEPARTMENT of HEALTH

ENVIRONMENTAL HEALTH SECTION
Gold Seal Center, 918 E. Divide Ave.
Bismarck, ND 58501-1947
701.328.5200 (fax)
www.ndhealth.gov

March 7, 2017

Lindsey Meyers, PhD, PWS
AECOM
1000 East Calgary Avenue, Suite 1
Bismarck, ND 58503

Re: Foxtail Wind Energy Center Project
Dickey County

Dear Dr. Meyers:

This department has reviewed the information concerning the above-referenced project submitted under date of March 1, 2017, with respect to possible environmental impacts.

This department believes that environmental impacts from the proposed construction will be minor and can be controlled by proper construction methods. With respect to construction, we have the following comments:

1. Care is to be taken during construction activity near any water of the state to minimize adverse effects on a water body. This includes minimal disturbance of stream beds and banks to prevent excess siltation, and the replacement and revegetation of any disturbed area as soon as possible after work has been completed. Caution must also be taken to prevent spills of oil and grease that may reach the receiving water from equipment maintenance, and/or the handling of fuels on the site. Guidelines for minimizing degradation to waterways during construction are attached.

2. Projects disturbing one or more acres are required to have a permit to discharge storm water runoff until the site is stabilized by the reestablishment of vegetation or other permanent cover. Further information on the storm water permit may be obtained from the Department's website or by calling the Division of Water Quality (701-328-5210). Check with the local officials to be sure any local storm water management considerations are addressed. Storm water runoff from the project area discharges to a 303(d) listed water body (Elm River, including all tributaries; Bristol Gulch, including all tributaries). Extra care should be taken to ensure construction activity does not affect the water body.

3. The proposed construction project lies east approximately ½ mile of an unnamed aquifer. In addition, several domestic and stock water supply wells encompass the project, with some wells falling within the extent of the project boundaries. Based upon this information, the site(s) appear suitable for further development. Care should be taken to avoid spills of any materials that may have an adverse effect on groundwater quality. All spills must be immediately reported to this Department and appropriate remedial actions performed.

The department owns no land in or adjacent to the proposed improvements, nor does it have any projects scheduled in the area. In addition, we believe the proposed activities are consistent with the State Implementation Plan for the Control of Air Pollution for the State of North Dakota.

If you have any questions regarding our comments, please feel free to contact this office.

Sincerely,

L. David Glatt, P.E., Chief
Environmental Health Section

LDG:cc
Attach.

NORTH DAKOTA
DEPARTMENT of HEALTH

ENVIRONMENTAL HEALTH SECTION
Gold Seal Center, 918 E. Divide Ave.
Bismarck, ND 58501-1947
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www.ndhealth.gov

Construction and Environmental Disturbance Requirements

These represent the minimum requirements of the North Dakota Department of Health. They ensure that minimal environmental degradation occurs as a result of construction or related work which has the potential to affect the waters of the State of North Dakota. All projects will be designed and implemented to restrict the losses or disturbances of soil, vegetative cover, and pollutants (chemical or biological) from a site.

Soils

Prevent the erosion of exposed soil surfaces and trapping sediments being transported. Examples include, but are not restricted to, sediment dams or berms, diversion dikes, hay bales as erosion checks, riprap, mesh or burlap blankets to hold soil during construction, and immediately establishing vegetative cover on disturbed areas after construction is completed. Fragile and sensitive areas such as wetlands, riparian zones, delicate flora, or land resources will be protected against compaction, vegetation loss, and unnecessary damage.

Surface Waters

All construction which directly or indirectly impacts aquatic systems will be managed to minimize impacts. All attempts will be made to prevent the contamination of water at construction sites from fuel spillage, lubricants, and chemicals, by following safe storage and handling procedures. Stream bank and stream bed disturbances will be controlled to minimize and/or prevent silt movement, nutrient upsurges, plant dislocation, and any physical, chemical, or biological disruption. The use of pesticides or herbicides in or near these systems is forbidden without approval from this Department.

Fill Material

Any fill material placed below the high water mark must be free of top soils, decomposable materials, and persistent synthetic organic compounds (in toxic concentrations). This includes, but is not limited to, asphalt, tires, treated lumber, and construction debris. The Department may require testing of fill materials. All temporary fills must be removed. Debris and solid wastes will be removed from the site and the impacted areas restored as nearly as possible to the original condition.

North Dakota Department of Transportation

Grant Levi, P.E.
Director

Doug Burgum
Governor

March 16, 2017

Lindsey Meyers, PhD, PWS
Environmental Project Manager
AECOM
1000 East Calgary Avenue, Suite 1
Bismarck ND 58503

FOXTAIL WIND ENERGY CENTER PROJECT OF UP TO 75 TURBINE GENERATORS AND ASSOCIATED FACILITIES, DICKEY COUNTY, NORTH DAKOTA

We have reviewed your February 10, 2017, letter.

This project should have no adverse effect on the North Dakota Department of Transportation (NDDOT) highways.

However, if because of this project any work needs to be done on highway right of way, appropriate permits and risk management documents will need to be obtained from the Department of Transportation District Engineer, Les Noehre, Grand Forks at 701-787-6500.

Robert Fode

ROBERT A. FODE, P.E - DIRECTOR, OFFICE OF PROJECT DEVELOPMENT

57/raf/js
c: Les Noehre, Grand Forks District Engineer

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
NORTH DAKOTA REGULATORY OFFICE
1513 SOUTH 12TH STREET
BISMARCK ND 58504-6640

REPLY TO
ATTENTION OF

March 16, 2017

Regulatory Branch (NWO-2017-00398-BIS)

AECOM
Attn: Ms. Lindsey Meyers
1000 East Calgary Avenue, Suite 1
Bismarck, North Dakota 58503

Dear Ms. Meyers:

This is in response to your letter dated March 1, 2017 requesting comments on the proposed Foxtail Wind Energy Center Project located in Sections 29, 30, 31, and 32 of Township 131 North, Range 65 West; Sections 25, 26, 27, 34, 35, and 36 of Township 131 North, Range 66 West; Sections 4, 5, 6, 7, 8, 9, 16, 17, 19, 20, 29, 30, and 31 of Township 130 North, Range 65 West; and, Sections 1, 3, 11, 12, 13, 14, and 24 of Township 130 North, Range 66 West, Dickey County, North Dakota.

U. S. Army Corps of Engineers Regulatory Offices administer Section 10 of the Rivers and Harbors Act (Section 10) and Section 404 of the Clean Water Act (Section 404). A Section 10 permit would be required for work impacting navigable waters, this includes work over, through, or under Section 10 waters. Section 10 waters in North Dakota are the Missouri River (including Lake Sakakawea and Lake Oahe), Yellowstone River, James River (south of the railroad tracks in Jamestown, North Dakota), Bois de Sioux River, Red River of the North, and Upper Des Lacs Lake. A Section 404 permit would be required for the discharge of dredge or fill material (temporarily or permanently) in waters of the United States. Waters of the United States may include, but are not limited to, rivers, streams, ditches, coulees, lakes, ponds, and their adjacent wetlands. Fill material includes, but is not limited to, rock, sand, soil, clay, plastics, construction debris, wood chips, overburden from mines or other excavation activities and materials used to create any structure or infrastructure in waters of the United States.

Based on the information contained in your letter, the Corps has determined that your proposed project may need a Clean Water Act Section 404 permit. The permit application and instructions for completing the application may be found at: http://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/Obtain-a-Permit. Be sure to accurately describe all proposed work and construction methodology. Once the application is complete, mail it to the letterhead address or to the email address below.

The North Dakota Regulatory office can accept (and prefers) electronic submissions to the following email: CENWO-OD-RND@usace.army.mil.

Regulatory Branch (NWO-2017-00398-BIS)

If we can be of further assistance or should you have any questions regarding our program, please do not hesitate to contact this office by letter or phone at (701) 255-0015.

Sincerely,

Patricia L. McQueary
Regulatory Program Manager
North Dakota

North Dakota Department of Transportation

Grant Levi, P.E.
Director

Doug Burgum
Governor

March 21, 2017

Lindsey Meyers, PhD, PWS
Environmental Project Manager
AECOM
1000 East Calgary Avenue, Suite 1
Bismarck ND 58503

FOXTAIL WIND ENERGY CENTER PROJECT OF UP TO 75 TURBINE GENERATORS AND ASSOCIATED FACILITIES, DICKEY COUNTY, NORTH DAKOTA

We have reviewed your March 1, 2017, letter.

The North Dakota Department of Transportation (NDDOT), concerns are with the heavy loads on ND Highway 11 and ND Highway 56. Please note that during spring load restrictions ND Highway 11 has an eight ton restriction and ND Highway 56 has a seven ton restriction.

All proposed temporary or permanent access points will need to be requested by the submittal of SFN 5918 Driveway Application and Permit.

Additionally, if because of this project any work needs to be done on highway right of way, appropriate permits and risk management documents will need to be obtained from the Department of Transportation District Engineer, Jay Praska at 701-845-8800.

Robert Fode

ROBERT A. FODE, P.E., DIRECTOR – OFFICE OF PROJECT DEVELOPMENT

57/raf/js
c: Jay Praska, Valley City District Engineer

North Dakota State Water Commission

900 EAST BOULEVARD AVENUE, DEPT 770 • BISMARCK, NORTH DAKOTA 58505-0850
(701) 328-2750 • TTY 1-800-366-6888 or 711 • FAX (701) 328-3696 • http://swc.nd.gov

March 28, 2017

Lindsey Meyers
AECOM
1000 E Calgary Avenue, STE 1
Bismarck, ND 58503

Dear Ms. Meyers:

This is in response to your request for a review of the environmental impacts associated with the Foxtail Wind Energy Center Project located in Dickey County, ND.

The proposed project has been reviewed by State Water Commission staff, and the following comments are provided:

- No permits relative to the NFIP are required based on the current effective FIRM and State minimum standards.

- Initial review indicates the project does not require a conditional or temporary permit for water appropriation. However, if surface water or groundwater will be diverted for construction of the project, a water permit will be required per North Dakota Century Code § 61-04-02. Please consult with the Water Appropriations Division of the Office of the State Engineer at the (701) 328-2754 or waterpermits@nd.gov if you have questions.

- A permit to drain is required for the drainage of a pond, slough, lake, or sheetwater, or any series thereof, which has a watershed area of 80 acres or more.

- A construction permit is required for the diversion, obstruction, or retention of surface water in excess of 50 acre-feet. For purposes of the construction permit threshold, the diverting volume is calculated based on the volume of runoff from the 25-year, 24-hour rainfall event.

Please direct any drain or construction permitting questions to the Regulatory Division at (701) 328-4813 or by email at acarranza@nd.gov.

- Our records indicate that there is a small dam located within the project boundary in 13006531BC at the outlet to Moores Lake. The information we have on this structure is attached.

Thank you for the opportunity to provide review comments. If you have any questions, please call me at 701-328-4967.

Sincerely,

Jared Huibregtse
Water Resource Planner IV

JH:dm/1570

DAM INFORMATION SHEET

Name: **MOORES DAM**
NID ID: **ND00271** Hazard Class: **Low**

Status: **Intact**
Design Class: **2L**

OWNERSHIP AND REGULATION INFORMATION

Other Name: **MOORES LAKE**
Former Name:
Owner: **DICKEY CO WRD**
Owner Type: **Local**
Other Owner/mgr: **DICKEY CO WRD**
Regulating Agency: **NDSWC**
Designer:

SWC Project: **1533**
Const. Permit:
Water Permit:
Creation ID: **James**

Priv/ on Fed Land:**False**

LOCATION INFORMATION

County: **Dickey**
Location (T,R,S): **13006531BC**
Latitude: **46.03499**
Longitude: **-98.8783**
Contributing: **400** acres

DRAINAGE BASIN INFORMATION

Basin: **00/00/00**
Subbasin: **00/00/00**
River: **ELM RIVER (JAMES)-TR**
Total Drainage: **0.63** sq mi
sq mi

EMERGENCY INFORMATION

Emergency Action Plan: **Not Required**
Nearest Town: **N**
Distance to Town: **0 miles**

INSPECTION INFORMATION

Inspection Frequency: **0 years**
Last Inspection Date: **00/00/00**
Phase I Report: **False** Info Date: **03/01/74**

STRUCTURAL INFORMATION

Year Built: **1949**
Year Modified: **1971S**
Purpose: **Recreation**
Purpose (2):
Dam Type: **Rolled Earth**
Embank. Volume: **0 cu yds**
Core: **HEZ**
Foundation: **SZ**

Low Head Dam: **False**
Upstream Slope: **3.0:1**
Downstream Slope: **2.5:1**
Dam Length: **1065 ft**
Top Width: **10 ft**
Max Height: **20.8 ft**
Structure Height: **0 ft**
Normal Depth: **14.8 ft**

CAPACITY INFORMATION

	HEIGHT (ft)	ELEV (ft)	AREA (acres)	VOLUME (ac-ft)
MAXIMUM POOL	**20.8**	**2056**	**37.343**	**495.8**
EMERGENCY POOL		**2050**	**29.2**	**295.5**
NORMAL POOL	**14.8**	**2050**	**29.2**	**295.5**
DRAWDOWN PIPE		**0**	**0**	**0**
STREAMBED	**0**	**2035.2**	**0**	**0**

DAM INFORMATION SHEET - PAGE 2

HYDRAULIC INFORMATION

Max Discharge w/Water at Top of Dam: **0 cfs**
Emergency Spillway Width: **100 ft**
Emergency Spillway Construction: **Combined**
Emergency Spillway Type: **Uncontrolled**

Principal Spillway Inlet: **100' GS**
Conduit Size and Type:
Conduit Length: **0 ft**
Outlet Gates: **X**

Low Level Type: **N**
Valve Type: **N**
Valve Location:
Low Level Reservoir Extension: **N**
Low Level Reservoir Extension Installation:

COST SHARING INFORMATION

Year	Work Perfomed	Parties and Contribution	Total

COMMENTS AND REMARKS

A natural Lake with Emb + Spillway

From:	Meyers, Lindsey
To:	"Haupt, Michael L."
Subject:	RE: ND School Trust Land - Foxtail Wind Farm - Dickey County
Date:	Thursday, March 23, 2017 11:40:00 AM

Thank you Michael for your response!

Lindsey (Meyers) Churchill, PhD, PWS
Ecologist | Project Manager, Environment, Midwest Region
D +1-701-221-4148
M +1-701-516-6103
lindsey.meyers@aecom.com

From: Haupt, Michael L. [mailto:mhaupt@nd.gov]
Sent: Wednesday, March 22, 2017 4:13 PM
To: Meyers, Lindsey
Subject: ND School Trust Land - Foxtail Wind Farm - Dickey County

Linsey,

Good afternoon! The ND School Trust has five tracts of land within or adjacent to the proposed Foxtail wind farm including the W2-16-130-66, section 36-130-66 less the E2NE4, NE4-33-131-66, N2-36-131-66, and SW4-18-131-65 Dickey County. If NextEra is interested in including the Trust land in the proposed wind farm please submit an on line application on our web site at https://land.nd.gov/surface/Right-of-Way.aspx for review. Let me know if you have questions. Thanks.

Michael L. Haupt
Land Management Professional, CPRM
North Dakota Department of Trust lands
1707 Nth 9th Street
Bismarck ND 58506-5523
701-328-1916
mhaupt@nd.gov

Subject: Foxtail: PSC app agency correspondence - ND State Trust Lands

From: Nasby, Ashley [mailto:Ashley.Nasby@nexteraenergy.com]
Sent: Wednesday, May 31, 2017 2:12 PM
To: Haupt, Michael L. <mhaupt@nd.gov>; Vonbische, Thomas <THOMAS.VONBISCHE@nexteraenergy.com>
Cc: Humann, Michael T. <mhumann@nd.gov>
Subject: RE: ROW#8057 - NextEra Energy - proposed wind farm - N2 36-131-66 Dickey County

Michael,

There is no local zoning approval required for the wind farm. Dickey County defers to the townships (German, Whitestone and Grand Valley) which also do not require zoning approval. We will require state PSC approval and plan on submitting our application in early July of this year.

Ashley Nasby
Wind Development

NextEra Energy Resources
700 Universe Blvd.
Juno Beach, FL 33408
O: 561-691-2830
C: 561-635-9290

From: Haupt, Michael L. [mailto:mhaupt@nd.gov]
Sent: Wednesday, 31 May, 2017 3:08 PM
To: Vonbische, Thomas
Cc: Nasby, Ashley; Humann, Michael T.
Subject: RE: ROW#8057 - NextEra Energy - proposed wind farm - N2 36-131-66 Dickey County

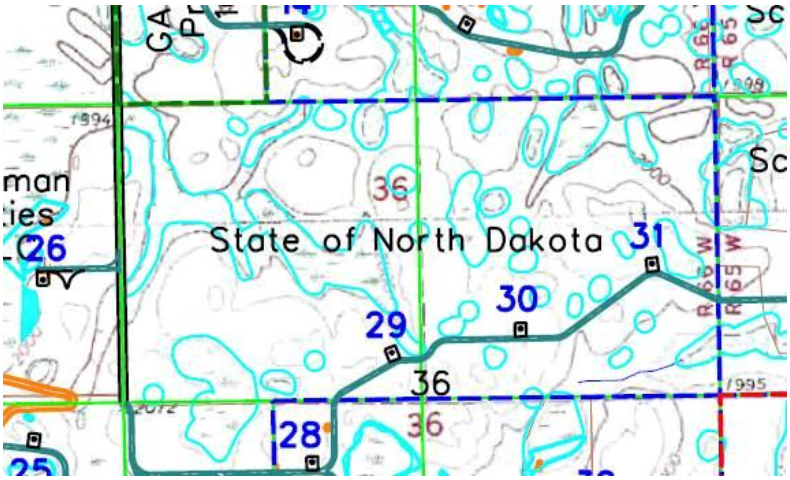
Tom,

Good afternoon! Has the windfarm received local zoning approval from the township and/or county? Where is the windfarm in regards to approval by township, count or state? Thanks.

Michael L. Haupt
Land Management Professional, CPRM
North Dakota Department of Trust lands
1707 Nth 9th Street
Bismarck ND 58506-5523
701-328-1916
mhaupt@nd.gov

From: Vonbische, Thomas [mailto:THOMAS.VONBISCHE@nexteraenergy.com]
Sent: Wednesday, May 31, 2017 1:19 PM
To: Haupt, Michael L. <mhaupt@nd.gov>
Cc: Nasby, Ashley <Ashley.Nasby@nexteraenergy.com>
Subject: RE: ROW#8057 - NextEra Energy - proposed wind farm - N2 36-131-66 Dickey County

Michael:
Thank you so very much for taking the time to join our team on the site visit for ROW# 8057.
We have revised our proposed use for your property to below. What our next steps on this application?
Revise the application? Fees? Exhibits? Hearing?



Thanks,

Tom VonBische

Land Services Supervisor

Phone: (612) 670-8469
thomas.vonbische@nexteraenergy.com

From: Haupt, Michael L. [mailto:mhaupt@nd.gov]
Sent: Monday, May 22, 2017 7:56 AM
To: Vonbische, Thomas
Cc: Westrick, Chris; Nasby, Ashley; Humann, Michael T.
Subject: RE: ROW#8057 - NextEra Energy - proposed wind farm - N2 36-131-66 Dickey County

The visit went well! We asked your team to reconsider the tower arraignment in order to add a fourth tower on the Trust land, without impacting the number of towers on the neighbors. It is the Trust's intent to maximize the wind power potential of the land in order to provide income for the schools. Thanks.

Michael L. Haupt
Land Management Professional, CPRM
North Dakota Department of Trust lands
1707 Nth 9th Street
Bismarck ND 58506-5523
701-328-1916
mhaupt@nd.gov

From: Vonbische, Thomas [mailto:THOMAS.VONBISCHE@nexteraenergy.com]
Sent: Monday, May 22, 2017 7:52 AM
To: Haupt, Michael L. <mhaupt@nd.gov>
Cc: Westrick, Chris <Chris.Westrick@nexteraenergy.com>; Nasby, Ashley <Ashley.Nasby@nexteraenergy.com>; Humann, Michael T. <mhumann@nd.gov>
Subject: RE: ROW#8057 - NextEra Energy - proposed wind farm - N2 36-131-66 Dickey County

Michael:
Good morning! Checking with our developer and our environmental permitting team.
Hope the visit went well and our folks were helpful.

Regards,

Tom VonBische

Land Services Supervisor

Phone: (612) 670-8469
thomas.vonbische@nexteraenergy.com

From: Haupt, Michael L. [mailto:mhaupt@nd.gov]
Sent: Monday, May 22, 2017 8:46 AM
To: Vonbische, Thomas
Cc: Westrick, Chris; Nasby, Ashley; Humann, Michael T.
Subject: RE: ROW#8057 - NextEra Energy - proposed wind farm - N2 36-131-66 Dickey County

Tom,

Good morning! We met with your environmental team last week and have some questions. Has NextEra received local approval, township and county, of the project? What is the timeline for local or state approval for this project? Thanks.

Michael L. Haupt
Land Management Professional, CPRM
North Dakota Department of Trust lands
1707 Nth 9th Street
Bismarck ND 58506-5523
701-328-1916
mhaupt@nd.gov

Note: You can track the real time status of your right-of-way application 24/7 at http://www.land.nd.gov/surface/right-of-way.aspx using either the ROW number or by entering at least the first three letters of the company name. By checking this site you can find the name, telephone number and email address of the person working on the application as well as its current status in real time.

From: Vonbische, Thomas [mailto:THOMAS.VONBISCHE@nexteraenergy.com]
Sent: Monday, May 08, 2017 7:53 PM
To: Haupt, Michael L. <mhaupt@nd.gov>
Cc: Westrick, Chris <Chris.Westrick@nexteraenergy.com>; Nasby, Ashley <Ashley.Nasby@nexteraenergy.com>

Subject: RE: ROW#8057 - NextEra Energy - proposed wind farm - N2 36-131-66 Dickey County

CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe.

Michael:

Thanks for the location of addition ND Trust lands. We have our environmental, tribal and surveying team heading to the project for May 18th & 19th. Is it too soon to schedule a site visit with you for then?

Regards,

Tom VonBische

Land Services Supervisor

NEXTera ENERGY RESOURCES

Phone: (612) 670-8469
thomas.vonbische@nexteraenergy.com

From: Haupt, Michael L. [mailto:mhaupt@nd.gov]
Sent: Tuesday, April 18, 2017 10:04 AM
To: Vonbische, Thomas
Subject: RE: ROW#8057 - NextEra Energy - proposed wind farm - N2 36-131-66 Dickey County

Thomas,

Good morning! Swenson and Hagen's preconstruction survey permit is good until 12/31/2019. Please contact me to set up the onsite inspection. Let me know if you have further questions. Thanks.

Michael L. Haupt
Land Management Professional, CPRM
North Dakota Department of Trust lands
1707 Nth 9th Street
Bismarck ND 58506-5523
701-328-1916
mhaupt@nd.gov

From: Vonbische, Thomas [mailto:THOMAS.VONBISCHE@nexteraenergy.com]
Sent: Monday, April 17, 2017 6:18 PM
To: Haupt, Michael L. <mhaupt@nd.gov>
Cc: Nasby, Ashley <Ashley.Nasby@nexteraenergy.com>; Dan Raymond (dan@danello.net) <dan@danello.net>
Subject: RE: ROW#8057 - NextEra Energy - proposed wind farm - N2 36-131-66 Dickey County

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Dear Michael:

Re: ND Department of Trust Lands (State Fed Tax ID #: 45-6002470).

I have UPSed the application fee of $100 by check enclosed for ND Department of Trust Lands (State Fed Tax ID #: 45-6002470). I will contact our development team to set up an onsite inspection of the Trust land with NextEra and our surveyor. I look forward to your preliminary review of the proposed project. I also understand that if modified or accepted an application fee (here submitted) survey plat and consideration payment will be requested for final review.

It has also been brought to my attention that only pre-approved contractors may enter ND Department of Trust Lands. Can you advise me on those? In the North Dakota, we use the surveying firm of Swenson, Hagen & Co.

Additionally, NextEra Energy (Rough Rider Wind I, LLC,) had an easement ROW #5284 for collection lines and access road on these parcels of land in 2009 and was terminated 2012. Enclosed is a copy of the survey description of that easement. We are currently seeking a turbine placement with the associated access roads and collection lines for the same parcels of land. Exhibit enclosed without designed roads and collection lines.

Regards,

Tom VonBische

Land Services Supervisor

NEXTera ENERGY RESOURCES

Phone: (612) 670-8469
thomas.vonbische@nexteraenergy.com

From: Haupt, Michael L. [mailto:mhaupt@nd.gov]
Sent: Thursday, April 13, 2017 1:13 PM
To: Vonbische, Thomas
Subject: ROW#8057 - NextEra Energy - proposed wind farm - N2 36-131-66 Dickey County

Thomas,

Good afternoon! For tracking purposes this project has been assigned ROW#8057. Please refer to this number in future correspondence and on payments. The application fee is $100 and your check can be made payable to the ND Department of Trust Lands (State Fed Tax ID #: 45-6002470). Please call me to set up an onsite inspection of the Trust land with NextEra and their surveyor.

Once we have completed preliminary review of the proposed project you will be notified if the project is rejected, modified or accepted. If modified or accepted an application fee (if not already submitted) survey plat and consideration payment will be requested for final review. Construction cannot begin until preliminary and final review have been completed, a survey plat has been requested, submitted and approved, application fee and consideration payment received and the Land Commissioner has approved the project and signed the easement. Please provide an electronic copy of the survey description or written narrative in a Word document format for easy transfer into the easement document. Let me know if you have questions. Thanks.

Michael L. Haupt
Land Management Professional, CPRM
North Dakota Department of Trust lands
1707 Nth 9th Street
Bismarck ND 58506-5523
701-328-1916
mhaupt@nd.gov

Note: You can track the real time status of your right-of-way application 24/7 at http://www.land.nd.gov/surface/right-of-way.aspx using either the ROW number or by entering at least the first three letters of the company name. By checking this site you can find the name, telephone number and email address of the person working on the application as well as its current status in real time.

From:	McCarthy, Melinda
To:	Meyers, Lindsey
Subject:	Fw: Foxtail Wind Energy Center ND SHPO Ref: 17-0099
Date:	Monday, March 20, 2017 9:36:34 AM
Attachments:	20170320090433.pdf

Melinda McCarthy, MA, RPA
Cultural Resource Lead
Principal Investigator
D +1-701-255-5500
M +1-573-225-6751
melinda.mccarthy@aecom.com

AECOM
1000 E. Calgary Ave
Suite 1
Bismarck, ND 58503, United States
T +1-701-221-4140
aecom.com

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From: Wells, Kimberly <Kimberly.Wells@nexteraenergy.com>
Sent: Monday, March 20, 2017 9:27 AM
To: Quinnell, Susan L.
Cc: Estabrook, Richard; Wells, Kimberly; McCarthy, Melinda
Subject: FW: Foxtail Wind Energy Center ND SHPO Ref: 17-0099

Hi Susan,

Thanks for this info. Rich and I will review and do some research on the group and the Education Day you shared with us. We will also work with Melinda and her team at AECOM to evaluate options for either updated photography for the visual sims or an alternate tool if one exists to display the proposed turbines under weather conditions that may better approximate peak visitor times during the spring and summer.

Kim

Kimberly Wells, Ph.D.
Manager, Environmental Services
Mid Continent Region
NEXTera Energy Resources, LLC

601 Travis Street, Suite 1900
Houston, TX 77002
713.951.5372 (office)
832.538.7935 (mobile)
Kimberly.Wells@NEE.com

From: Quinnell, Susan L. [mailto:squinnell@nd.gov]
Sent: Monday, March 20, 2017 9:19 AM
To: Wells, Kimberly
Subject: RE: Foxtail Wind Energy Center ND SHPO Ref: 17-0099

Hi Kim,

It was a pleasure to discuss Foxtail Wind with your group Friday. Here is a list of Whitestone Hill Friends group members. Have a great week.

Susan Quinnell
Review and Compliance Coordinator
ND State Historic Preservation Office
State Historical Society of North Dakota
North Dakota Heritage Center
612 East Boulevard Avenue
Bismarck ND 58505-0830

701-328-3576
701-328-3710 FAX

From: Wells, Kimberly [mailto:Kimberly.Wells@nexteraenergy.com]
Sent: Thursday, March 09, 2017 3:05 PM
To: Quinnell, Susan L.
Subject: Re: Foxtail Wind Energy Center ND SHPO Ref: 17-0099

Great, I'll send out an invite tonight from my hotel.

Kim Wells
Manager, Mid Continent Region
Environmental Services

NextEra Energy Resources
832.538.7935 (cell)

On Mar 9, 2017, at 9:52 AM, Quinnell, Susan L. <squinnell@nd.gov> wrote:

> Hi Kim,
>
> No, not at all.
>
> Susan Quinnell
> Review and Compliance Coordinator
> ND State Historic Preservation Office
> State Historical Society of North Dakota
> North Dakota Heritage Center
> 612 East Boulevard Avenue
> Bismarck ND 58505-0830
>
> 701-328-3576
> 701-328-3710 FAX
>
> ---
>
> **From:** Wells, Kimberly [mailto:Kimberly.Wells@nexteraenergy.com]
> **Sent:** Thursday, March 09, 2017 9:46 AM
> **To:** Quinnell, Susan L.; Swenson, Fern E.; Picha, Paul R.
> **Cc:** Meyers, Lindsey; Nasby, Ashley; Estabrook, Richard; Stewart, Carolyn
> **Subject:** RE: Foxtail Wind Energy Center ND SHPO Ref: 17-0099
>
>
>
> Hi Susan,
>
> Is 4 Central next Friday too late for the SHPO team?
>
> Kim
>
> Kimberly Wells, Ph.D.
> Manager, Environmental Services
> Mid Continent Region
> NEXTera Energy Resources, LLC
> 601 Travis Street, Suite 1900
> Houston, TX 77002
> 713.951.5372 (office)

832.538.7935 (mobile)
Kimberly.Wells@NEE.com

<image001.jpg>

From: Quinnell, Susan L. [mailto:squinnell@nd.gov]
Sent: Thursday, March 09, 2017 9:18 AM
To: Wells, Kimberly; Swenson, Fern E.; Picha, Paul R.
Cc: Meyers, Lindsey; Nasby, Ashley; Estabrook, Richard; Stewart, Carolyn
Subject: RE: Foxtail Wind Energy Center ND SHPO Ref: 17-0099

CAUTION - EXTERNAL EMAIL

Hi Kim,

Yes, Paul Picha, Fern Swenson and I are available Thursday-Friday March 16 & 17. What times would work for you?

Susan Quinnell
Review and Compliance Coordinator
ND State Historic Preservation Office
State Historical Society of North Dakota
North Dakota Heritage Center
612 East Boulevard Avenue
Bismarck ND 58505-0830

701-328-3576
701-328-3710 FAX

From: Wells, Kimberly [mailto:Kimberly.Wells@nexteraenergy.com]
Sent: Thursday, March 09, 2017 8:48 AM
To: Quinnell, Susan L.
Cc: Meyers, Lindsey; Nasby, Ashley; Estabrook, Richard; Stewart, Carolyn
Subject: FW: Foxtail Wind Energy Center ND SHPO Ref: 17-0099

CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe.

Hi Susan,

Melinda shared your email below with us on our Foxtail project. Would you be available for a call next Thursday or Friday to discuss? We would like to walk through what you are thinking and discuss. In addition, we can provide an update on the voluntary tribal outreach efforts underway with several tribes, including the SWO.

Kim

Kimberly Wells, Ph.D.
Manager, Environmental Services
Mid Continent Region
NEXTera Energy Resources, LLC
601 Travis Street, Suite 1900
Houston, TX 77002
713.951.5372 (office)
832.538.7935 (mobile)
Kimberly.Wells@NEE.com

From: Quinnell, Susan L. <squinnell@nd.gov>
Sent: Tuesday, March 7, 2017 12:41 PM
To: McCarthy, Melinda
Subject: Foxtail Wind Energy Center ND SHPO Ref: 17-0099

Hi Melinda,

We've reviewed the viewshed analysis photos and have a question. Would it be possible to move back or eliminate turbines 13, 14, 15, 22, 23, 24, 25, and 26? This is so that visitors can enjoy a less impacted experience at this state level important and emotion-provoking historic site.

Thanks.

Susan Quinnell
Review and Compliance Coordinator
ND State Historic Preservation Office
State Historical Society of North Dakota
North Dakota Heritage Center
612 East Boulevard Avenue
Bismarck ND 58505-0830

701-328-3576
701-328-3710 FAX

From: McCarthy, Melinda
To: Meyers, Lindsey
Subject: Fw: Foxtail - Photo Point Locations
Date: Friday, May 19, 2017 2:21:52 PM

Melinda McCarthy, MA, RPA
Cultural Resource Lead
Principal Investigator
D +1-701-255-5500
M +1-573-225-6751
melinda.mccarthy@aecom.com

AECOM
1000 E. Calgary Ave
Suite 1
Bismarck, ND 58503, United States
T +1-701-221-4140
aecom.com

From: Quinnell, Susan L. <squinnell@nd.gov>
Sent: Friday, May 19, 2017 11:51:42 AM
To: McCarthy, Melinda
Subject: RE: Foxtail - Photo Point Locations

Hi Melinda, Thanks for your patience. We've had a chance to discuss these and they look good.

Susan Quinnell
Review and Compliance Coordinator
ND State Historic Preservation Office
State Historical Society of North Dakota
North Dakota Heritage Center
612 East Boulevard Avenue
Bismarck ND 58505-0830

701-328-3576
701-328-3710 FAX

From: McCarthy, Melinda [mailto:melinda.mccarthy@aecom.com]
Sent: Tuesday, May 16, 2017 2:10 PM
To: Quinnell, Susan L.
Subject: Re: Foxtail - Photo Point Locations

Have you ever had a chance to look these points over?

Best,

Melinda McCarthy, MA, RPA
Cultural Resource Lead
Principal Investigator
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From: Quinnell, Susan L. <squinnell@nd.gov>
Sent: Monday, May 8, 2017 8:11:35 PM
To: McCarthy, Melinda
Subject: RE: Foxtail - Photo Point Locations

Hi Melinda, I'll look at these when I get back this Thursday or Friday, I just have my cell with me.
Thanks.

From: McCarthy, Melinda [melinda.mccarthy@aecom.com]
Sent: Monday, May 8, 2017 11:19 AM
To: Quinnell, Susan L.
Cc: Picha, Paul R.; Swenson, Fern E.
Subject: Foxtail - Photo Point Locations

Susan,

As well as re-taking the Foxtail viewshed analysis photos, the client has requested that a series of photos be taken from several points at varying distances from the project area to get a better understanding of the changes to viewshed impacts at specific distances from the battlefield site. They have also requested that SHPO review and approve the photo point locations prior to our completion of fieldwork.

I have attached a map showing our proposed photo points and a table below explaining our rationale for each location. (Please be aware that the turbine points displayed on this map are the original points and are only for reference to the general project area. They do not represent the most up-to-date array.)

Please, let me know if you have any questions or comments.

Point Name Direction Location Rational
1 SSW Intersection of 85th St. SE and 73rd Ave. SE Will show the viewshed of the Project from within the Whitestone Hill Study Area (where the battle likely took place) surrounding the Historic Site. When combined with all the other points, it will also help show a progression of how the impacts deminish as you get further from the Project Area.
2 SSW Top of Whitestone Hill This is just a retake of the previous photos from the same photo point; the highest point for several miles and a point within the Whitestone Battlefield Historic Site.
3 SSW Entrance to Whitestone Hill Battlefield Historic Site Shows the project from an area at the site not impacted by the Project viewshed. Helps establish that the hilly landscape can help minimize viewshed impacts to the site.
4 SSW Intersection of 87th St. SE and 73rd Ave. SE When combined with the other photos will help show changes in distance and landscape from measurable distances (Slightly over 1 mile).
5 SSW Intersection of 88th St. SE and 73rd Ave. SE When combined with the other photos will help show changes in distance and landscape from measurable distances (Less then 0.5 miles).

Best,

Melinda McCarthy, MA, RPA
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Record of Conversation

To	Steve Ginsbach, North Dakota Township Officers Association		
Phone Number	701-899-2096		
Subject	Agency letter sent 3/1/2017		
From	Lindsey (Meyers) Churchill, AECOM		
Date	3/10/2017	Time	1050

Steve Ginsbach called Lindsey Churchill to respond to the agency letter sent on 3/1/17; he left a voicemail. Lindsey called Steve back within 5 minutes after Steve left the voicemail. Steve stated that the North Dakota Township Officers Association did not have an issue with the project as long as local township rules and regulations are followed, and the townships where the project is located approve of the project.

Foxtail Wind Project Teleconference Summary
Date: April 10, 2017
Attendees: Brita Woeck (Tetra Tech), Michael Erickson (U.S. Fish and Wildlife Service [USFWS] Kulm Wetland Management District)
Subject: USFWS Easement Building Regulations

Brita and Michael discussed USFWS easement types and the review/permitting processes for development within easements. The following summarizes the key points from the conversation.

- Wetland easements
    - USFWS owns the perpetual rights to wetland basins only; no authority over the upland areas. Cannot burn, drain, fill, or level the wetland basin without a Special Use Permit (SUP)
    - If wetland basins can be avoided (no filling/leveling), and hydrology remains intact, development is considered to result in no impact.
    - Developer typically provides shapefiles to USFWS for evaluation. USFWS will provide maps showing wetland basins to avoid.
- Grassland easements
    - USFWS owns perpetual rights to entire easement. Plowing, grading, and development are not allowed within easement without an SUP.
    - If avoidance of the easement is not possible, USFWS recommends minimizing impacts by having roads and other linear features follow section line roads (easements are already subject to existing transportation rights-of-way). Strive to minimize fragmentation effects.
- Farmer Home Administration (FmHA) easements
    - Perpetual rights vary by easement. USFWS may own rights to wetland basins, shelterbelts, and/or other features. Contact of the individual easement indicates what conservation practices have been placed on the land. USFWS would review to determine features that should be avoided.
- Both temporary (underground collection lines) and permanent (roads, turbine pads, O&M, etc.) impacts that affect USFWS easement rights require an SUP from USFWS.
    - Issuance of an SUP is a federal action triggering NEPA review, including consultation under ESA Section 7 and NHPA Section 106. Michael thinks that the NEPA document would be very brief, and tier to the Western Programmatic Wind EIS.
    - Time frame is driven by NEPA process typically; however, NEER may be asked to provide funding assurances for restoration of easement land (bond, letter of credit, or similar) that could take time to put in place.
- Compensation is required for permanent impacts at an acreage ratio of 1:1.
    - Developer would purchase a comparable easement and transfer the rights to USFWS (USFWS would retain easement in perpetuity).
    - USFWS has an extensive backlog of landowners interested in easements.
    - Under Partial Relinquishment Clause, USFWS would partially relinquishing their rights to the impacted easement to the developer for the life of the wind project. At the end of project life, developer would restore the disturbed area, and rights would go back to USFWS.

Foxtail Wind Project Teleconference Summary
Date: May 22, 2017
Attendees: Brita Woeck (Tetra Tech), Michael Erickson (U.S. Fish and Wildlife Service [USFWS] Kulm Wetland Management District)
Subject: USFWS Easement – Wetland Basin Avoidance

Brita and Michael discussed USFWS wetland easements and interpretation of wetland basin avoidance. The following summarizes the key points from the conversation.

- Boring/horizontal directional drilling (HDD) under a protected wetland basin is considered avoidance of impacts by USFWS, as long as the boreholes are outside of the field-delineated wetland boundary.
- Because boring/HDD avoids impacts there is no need for a special use permit from USFWS (and therefore no NEPA trigger).
- USFWS will want to review the project layout when finalized and compare to the wetland basins to confirm that all impacts will be avoided, and will provide a letter to the project files.