

# Application for a Certificate of Site Compatibility

LINDAHL WIND FARM PROJECT



**PREPARED FOR:**  
Lindahl Wind Project, LLC

**SUBMITTED TO:**  
North Dakota Public Service Commission

**PREPARED BY:**  
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# 1. Introduction

Lindahl Wind Project, LLC (Lindahl Wind) is submitting this application (Application) for a Certificate of Site Compatibility (Certificate) to the North Dakota Public Service Commission (Commission) for the proposed Lindahl Wind Farm Project (Project).

The Project will encompass an approximately 13,000-acre project area (Project Area) and be located approximately 4 miles north of the City of Tioga, Williams County, North Dakota. A 39,000-acre study area (Study Area), which includes the Project Area, was analyzed for the environmental review to ensure the Project Area is best positioned to avoid or minimize impacts. The Project will generate up to 150 megawatts (MW) of electricity and will result in the construction of up to 75 wind turbines, depending on the turbine model selected. Additional Project facilities include access roads, electrical collection and communication systems and cabling, an operation and maintenance (O&M) building, permanent meteorological (MET) towers, and a substation. Please refer to **EXHIBIT A-1. PROJECT LOCATION MAP**, in Appendix A.

Lindahl Wind also plans to construct a 115 kilovolt (kV) generator lead line to facilitate the Project's interconnection, which will be less than 1 mile in length. In accordance with Section 49-22-03(12)(a) of the North Dakota Century Code (NDCC), the proposed line falls outside of the Commission's siting jurisdiction and will be permitted through Williams County and any applicable townships, as necessary. For this reason, the generator lead line is not discussed in detail in this Application.

Lindahl Wind has executed a power purchase agreement (PPA) with Basin Electric Power Cooperative (Basin Electric). The Project will interconnect to the grid via the Lindahl Switching Station currently in operation off of 75th Street Northwest in the SE ¼ of Section 16, Township 158 N, Range 95 W, Williams County, North Dakota. The switching station is owned and operated by Burke Divide Electric Cooperative. The current design of the switching station should allow for interconnection of the Project with no, or very limited, upgrades to the switching station. Given the Project's location in the heart of the Bakken Formation, the Project will help Basin Electric and its members meet the demand for electricity resulting from oil and gas activities in the Bakken oil production region.

Tradewind Energy, Inc. (Tradewind), is developing the Project. Tradewind is an independent wind and solar development company based out of Lenexa, Kansas and is recognized as a leader in the renewable energy industry. Tradewind has developed more than 1 gigawatt (GW) of wind power currently in operation and has an additional 4,500 MW of wind and solar power projects under construction or development.

Tradewind is financially partnered with Enel Green Power North America, Inc. (EGP). Lindahl Wind is a wholly-owned subsidiary of Enel Kansas, LLC, which is a wholly-owned subsidiary of EGP. EGP is a leading owner and operator of renewable energy plants in North America, with projects operating and under development in 21 U.S. states and two Canadian provinces. EGP owns and operates over 90 plants with an installed capacity of almost 2 GW powered by renewable hydropower, wind, geothermal and solar energy. EGP supports all aspects of Tradewind's projects during development.

## 1.1. Compliance with the Energy Conversion and Transmission Facility Siting Act, North Dakota Century Code Chapter 49-22

The North Dakota Energy Conversion and Transmission Facility Siting Act, NDCC Chapter 49-22 (Siting Act) requires the proponent of an energy conversion facility to obtain a Certificate from the Commission in

order to locate, construct, and operate the facility in the State of North Dakota. An application for a Certificate must meet certain criteria set forth in the Siting Act, as well as in North Dakota Administrative Code (NDAC) Article 69-06 (Siting Rules). 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).

In this Application, Lindahl Wind presents the information required by the Siting Act and the Commission's Siting Rules. Lindahl Wind has considered the exclusion and avoidance areas, the selection criteria, and the policy criteria in the design of the Project, in accordance with NDCC Chapter 49-22 and NDAC Chapter 69-06-08. Information regarding Project design, wind resources and technical information has been included in this Application to allow a thorough understanding of the Project and to aid in review by the Commission, regulatory agencies and the public. The table below provides a summary of information included in this Application and the section of the document in which each siting requirement is addressed. Please refer to **TABLE 1. CERTIFICATE COMPLETION CHECKLIST.**

**Table 1. Certificate Completion Checklist**

STATE AUTHORITY	DESCRIPTION	SECTION
Chapter 69-06-04	Certificate of Site Compatibility	
<i>Section 2</i>	<i>Contents</i>	
a. (1)	A description of the type of energy conversion facility proposed.	1.0, 4.1
a. (2)	A description of the gross design capacity.	1.2
a. (3)	A description of the net design capacity.	1.2.5
a. (4)	A description of the estimated thermal efficiency of the energy conversion process and the assumption upon which the estimate is based.	NA
a. (5)	A description of the number of acres that the proposed facility will occupy.	1.0, 1.2.1
a. (6) a	A description of the anticipated time schedule for obtaining the certificate of site compatibility.	1.3
a. (6) b	A description of the anticipated time schedule for completing land acquisition.	1.3
a. (6) c	A description of the anticipated time schedule for starting construction.	1.3
a. (6) d	A description of the anticipated time schedule for completing construction.	1.3
a. (6) e	A description of the anticipated time schedule for testing operations.	1.3
a. (6) f	A description of the anticipated time schedule for commencing commercial production.	1.3
a. (6) g	A description of the anticipated time schedule for 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.	Appendices C, D, E
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 North Dakota Century Code section 49-22-09.	1.0, 6.0
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 B
g.	A map identifying the criteria that provides the basis of the specific location of the proposed facility within the study area.	Exhibit 4, Appendix A
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.	3.0–3.6
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.	6.0–6.17
j.	The qualifications of each person involved in the facility site location study.	10.0
k.	A map of the study area showing the location of the proposed facility and the criteria evaluated.	Appendix A

STATE AUTHORITY	DESCRIPTION	SECTION
l.	An eight and one-half-inch by eleven-inch black and white map suitable for newspaper publication depicting the site area.	Appendix H
m.	A discussion of present and future natural resource development in the area.	6.11
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.	Appendix A
<b>NDCC Section 49-22-08</b>	<b>Description of Application Requirements</b>	
<i>Section 1</i>	<i>An application for a certificate shall be in such form as the commission may prescribe, containing the following information:</i>	
a.	A description of the size and type of facility.	1.0, 4.0
b.	A summary of any studies which have been made of the environmental impact of the facility.	1.2.3, 6.0–6.17
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.	1.2.1, Appendix A
e.	An identification of the location of the preferred corridor for any transmission facility.	NA
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.	1.1, 1.2, 2.0–3.6, 6.0–6.17
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.	6.0–6.17
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.	3.0–3.6, 6.0–6.17 8.0–8.10
i.	Such other information as the applicant may consider relevant or the commission may require.	Complete Application including Appendices and Exhibits
<b>NDCC 49-22-09</b>	<b>Factors to be considered in evaluating applications and the designation of sites, corridors, and routes.</b>	
1.	Available research and investigations relating to the effects of the location, construction, and operation of the proposed facility on public health and welfare, natural resources, and the environment.	8.1
2.	The effects of new energy conversion and transmission technologies and systems designed to minimize adverse environmental effects.	8.2
3.	The potential for beneficial uses of waste energy from a proposed energy conversion facility.	8.3
4.	Adverse direct and indirect environmental effects which cannot be avoided should the proposed site or route be designed.	8.4
5.	Alternatives to the proposed site, corridor, or route which are developed during the hearing process and which minimize adverse effects.	8.5
6.	Irreversible and irretrievable commitments of natural resources should the proposed site, corridor, or route be designed.	8.6
7.	The direct and indirect economic impacts of the proposed facility.	8.7
8.	Existing plans of the state, local government, and private entities for other developments at or in the vicinity of the proposed site, corridor, or route.	8.8
9.	The effect of the proposed site or route on existing scenic areas, historic sites and structures, and paleontological or archaeological sites.	8.9
10.	The effect of the proposed site or route on areas which are unique because of biological wealth or because they are habitats for rare and endangered species.	8.10
11.	Problems raised by federal agencies, other state agencies, and local entities.	9.0–9.17

## 1.2. Project Summary

The Project will be located in northeastern Williams County, North Dakota. See **EXHIBIT A-1. PROJECT LOCATION MAP**, in Appendix A. The planned nameplate (gross) capacity for the Project is up to 150 MW of wind energy capacity. Lindahl Wind continues to assess its turbine options, but anticipates that it will use a turbine model with an output of between 2.0 MW–3.3 MW. The Project’s facilities will include:

- ◆ Up to 75 wind turbines and related equipment;
- ◆ New gravel access roads and improvements to existing roads (as needed);
- ◆ Underground electrical collection and communication lines, with above-ground junction boxes;
- ◆ O&M building;
- ◆ Project substation; and
- ◆ Up to four permanent MET towers (up to 92 m tall).

### 1.2.1. Project Area

The Project Area is comprised of 27 sections (containing approximately 13,000 acres) of agricultural land in northeastern Williams County, North Dakota, situated north of the City of Tioga. Lindahl Wind currently holds wind energy leases with approximately 30 landowner partners. The leased area provides sufficient acreage to construct the anticipated 150 MW Project. Please refer to **TABLE 2. SITE LOCATION** for a list of the townships, sections, and ranges (all in Williams County) that are included in the Project Area as well as **EXHIBIT A-1. PROJECT LOCATION MAP**, in Appendix A.

**Table 2. Site Location**

TOWNSHIP NAME	TOWNSHIP	RANGE	SECTION(S)
Tioga (no Project facilities)	157N	95W	5
Lindahl	158N	95W	3–9, 16–20, 28, 29, 32 and 33
Sauk Valley	159N	95W	21, 26, 28, 29 and 31–36

### 1.2.2. Project Layout

In this Application, Lindahl Wind is providing a preliminary Project layout. See **EXHIBIT A-4. FACILITIES LAYOUT**, in Appendix A. The Project layout includes 75 primary turbine locations and 5 alternate turbine locations, should the primary turbine locations be determined unsuitable. Additionally, the Project layout includes primary and alternate access roads and collection lines. Primary access roads and collection lines are those connecting to primary turbine locations, and alternate access roads and collection lines are those that connect to alternate turbine locations. The preliminary Project layout is designed to accommodate any of the four turbine models under consideration. (See **SECTION 4.1.1. WIND TURBINES ON PAGE 17** for additional information regarding turbines under consideration.)

Based on the analyses completed to date, Lindahl Wind's turbine layout optimizes electrical generation and efficiency, while avoiding or minimizing environmental, cultural, and economic impacts. Lindahl Wind has and will continue to thoroughly evaluate its preliminary turbine locations and ancillary facilities. Further, Lindahl Wind will continue to coordinate with landowners and applicable agencies regarding the Project's design and layout. The Project's turbines and ancillary facilities will be sited so as to comply with the Commission's and Williams County's setback requirements. Prior to the public hearing regarding this Application, Lindahl Wind will submit a final Project layout to the Commission.

Once the Project is constructed, Lindahl Wind will file as-built surveys with the Commission, Williams County, and other interested agencies at their request.

### 1.2.3. Selection of Project Area

The Project Area possesses a unique and favorable combination of traits which makes it ideally suited for wind development. Specifically, the Project Area has an extraordinary wind resource, on-site electrical infrastructure for interconnection to the grid and landowner support. Further, the Project is compatible with the existing land use and environmental features within the Project Area. These attributes, coupled with the current high demand for electricity in northwest North Dakota, make this landowner-initiated Project well-suited for wind energy development.

In the late 2000's, a group of local landowners began exploring wind farm development in the general Project area. In 2010, those landowners, including approximately 20 Williams County residents, formed Lindahl Wind Farm, LLC, to develop the Project. Lindahl Wind Project, LLC, bought the assets of Lindahl Wind Farm, LLC, in 2014.

The initial area studied for inclusion in the Project encompassed approximately 39,000 acres in Williams County, North Dakota. Following Lindahl Wind Project, LLC's acquisition of the Project, Lindahl Wind assessed additional acreage in the general Project area, bringing the Project size to 46,806 acres. Based on data received through landowner and agency coordination, stakeholder feedback, community input, and site analysis, Lindahl Wind has refined the Project Area to approximately 13,000 acres and limited the Project Area to Lindahl Township, Tioga Township and Sauk Valley Township in Williams County. Only one parcel is currently located in Tioga Township but no Project turbines or other facilities will be located on the parcel. Additionally, the Project Area includes one parcel within Lindahl Township where the landowner has granted wind rights to Lindahl Wind, but Lindahl Wind agreed not to place Project facilities on that parcel.

### 1.2.4. Project Area Wind Characteristics

The U.S. Department of Energy (DOE) and the North Dakota Division of Community Services have conducted wind resource assessment studies in North Dakota. According to the DOE, annual average wind speeds of 6.5 meters per second (mps) and above are suitable for wind power projects. The 2012 AWS Truepower wind map for the United States indicates that the wind resources within the Project Area average 7.5 to 9.0 mps at a height of 80 meters above the ground.

Four temporary MET towers are currently located on-site to collect wind resource data. One of the MET towers has been collecting data since September 2010, and the other three MET towers were installed in May and June 2015. All of the temporary MET towers will be removed during construction of the Project, or within a year following commercial operation of the Project. Lindahl Wind has filed the location of the temporary MET towers with the North Dakota Aeronautics Commission.

The data collected to-date has been crucial in understanding the characteristics of the site's wind resource. For instance, the data shows that, at a turbine hub height of 80 meters, long-term annual wind speeds are at the top end of the average range for North Dakota, indicating that the Project Area is an excellent resource for electrical generation. Additionally, the data has helped to accurately determine the projected long-term annual energy output of the Project and has guided the siting of the wind turbines. Going forward, the data collected will continue to aid in verification of turbine model suitability.

To augment data collection from the temporary MET towers, the Project is currently employing the use of four temporary trailer-mounted Sound Detection and Ranging (SODAR) units. SODAR measures wind speed and direction by emitting faint acoustic chirps and measuring the frequency shift of the reflected sound wave. SODAR provides data up to and beyond hub height of the proposed turbines and helps to supplement wind data collected from more traditional measurement towers. These units will be in place temporarily and will likely be removed at the same time or before the temporary MET towers are removed.

In addition, Lindahl Wind will install up to four permanent MET towers, as required by the turbine manufacturer, as part of the Project. Refer to SECTION 4.1.2. ASSOCIATED FACILITIES ON PAGE 18.

### 1.2.5. Projected Output

The Project will have a nameplate capacity of up to 150 MW with projected average output ranging from 550 to 650 GW hours per year (GWh/y), depending on the wind turbine selected. Variations in the actual Project output will depend upon final wind turbine selection and any additional changes to the final design and layout of the facility.

## 1.3. Project Schedule

Project construction is anticipated to begin as early as Third Quarter 2015, provided all pre-construction permits and approvals have been obtained. The proposed Project schedule is as follows:

- ◆ **Land Acquisition.** All land that is proposed to house Project facilities is under long-term lease agreements allowing for construction of the Project.
- ◆ **Certificate of Site Compatibility.** Lindahl Wind anticipates the Certificate will be issued by the Commission in Third Quarter 2015.
- ◆ **Conditional Use Permit.** Lindahl Wind filed an application for a Conditional Use Permit (CUP) with Williams County in April 2015. Lindahl Wind anticipates that the County will issue a CUP in July 2015.
- ◆ **Other Permits.** Lindahl Wind will acquire all other permits necessary for construction of the Project prior to conducting the work for which the permit is required. Please refer to TABLE 17. POTENTIAL PERMITS/APPROVALS ON PAGE 55.
- ◆ **Construction.** Project construction is anticipated to begin as early as Third Quarter 2015 and be completed by December 2016.
- ◆ **Commercial Testing.** Turbine erection and commercial testing are anticipated to take place starting in August 2016 to ensure the Project is generating power by December 31, 2016.

- ◆ **Commercial Operations.** Lindahl Wind plans to have the Project fully commercially operational by the end of 2016 to comply with the terms of the PPA with Basin Electric.

#### 1.4. Expansion or Addition

Definitive plans and schedules for addition or expansion have not been determined at this time. However, should the opportunity arise for expansion or addition to the proposed Project, Lindahl Wind would take action to develop additional adjacent areas that have been deemed suitable for expansion. Lindahl Wind would obtain all necessary permits and approvals for any expansion project.

#### 1.5. Project Ownership

The Project will be developed, constructed, owned and operated by Lindahl Wind. Lindahl Wind is an independent power producer, and as discussed in SECTION 1 previously, is wholly owned by Enel Kansas, LLC.

#### 1.6. Project Cost

The estimated total cost to construct the Project is 248.5 million dollars.

## 2. Need for Facility

### 2.1. Need Analysis

The current need for additional electric generation sources in North Dakota is being driven by the energy intensive industrial boom taking place in the state. North Dakota's per capita energy consumption is currently among the highest in the country.

Lindahl Wind has executed a PPA with Basin Electric for the entire output of the Project. Energy will be delivered from the physical point of interconnection (the Lindahl Switching Station) to Basin Electric's members via infrastructure owned and operated by Burke Divide Electric Cooperative, Mountrail-Williams Electric Cooperative and the Western Area Power Administration (WAPA).

The Project is projected to serve local, state and regional load growth resulting from oil and gas operations. According to Basin Electric's 2013 Annual Report, Basin Electric's members have increased power obligations to member-consumers, with the increased need centering on "a steady strengthening of the economy and oil and gas development in the Williston Basin in western North Dakota and eastern Montana." Basin Electric's load forecast updates, completed in April 2013, predicted "the cooperative will see more than 1,600 MW of load growth from 2012 to 2025" (Basin Electric Power Cooperative 2013 Annual Report, Pg. 15). Additionally, the North American Electric Reliability Corporation's 2014 summer assessment forecast for Basin Electric included 147 MW of projected year-over-year demand growth compared to the 2013 actual summer peak (North American Electric Reliability Corporation (NERC), 2014). To meet Basin Electric's expected load growth, Basin Electric's 2013 financial forecast identified a need to invest "more than \$1.2 billion in generation and transmission assets with the greatest portion of that to be spent in the next five years" (Basin Electric Power Cooperative 2013 Annual Report, Pg. 18).

Furthermore, increased demand is predicted for the state of North Dakota due to load growth. In 2012, the North Dakota Transmission Authority commissioned a study to forecast future load growth demands due to the increased development in the Bakken oil production region. Based on the modeled load growth projections, North Dakota alone is expected to need an additional 1,830 MW by 2017, 2,400 MW by 2022, 2,769 MW by 2027 and 3,030 MW by 2032 (KLJ, 2012).

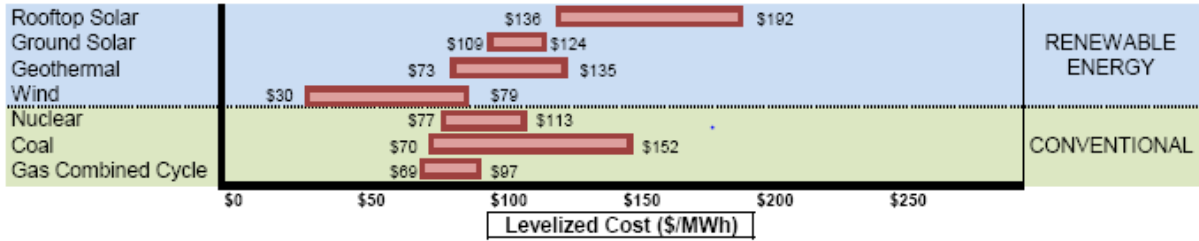
Thus, the renewable energy produced by Lindahl Wind's proposed Project can be used to meet future local, state and regional load growth projections and the accompanying need for new generation.

### 2.2. Alternatives

Potential alternatives to wind generation include electricity generation using coal, natural gas, solar energy, hydropower or biomass.

Wind energy is currently among the most cost-effective generation resources. As demonstrated in Lazard's September 2014 *Levelized Cost of Energy Analysis* (Version 8.0), wind energy is cost competitive with long-term estimates of both renewable and conventional generation technologies under certain scenarios. **FIGURE 1. COMPARING THE COST OF ENERGY** shows the results of Lazard's comparison of the unsubsidized 'levelized cost of energy' for various renewable and conventional technologies on a \$/MWh basis (Lazard 2014).

**Figure 1. Comparing the Cost of Energy**



Source: Lazard 2014

Additionally, based on the size, type and timing of the Project, it is unlikely that an alternative source of energy would meet the same need. As discussed in SECTION 1.2.4. PROJECT AREA WIND CHARACTERISTICS ON PAGE 5, the Project’s location is optimal for wind generation. Further, as discussed in SECTION 1.2.1. PROJECT AREA ON PAGE 4, Lindahl Wind has already leased sufficient acreage to construct the anticipated 150 MW Project and is in the process of obtaining permits required to commence construction. Finally, as noted in SECTION 2.1 ON PAGE 8, Lindahl Wind has executed a PPA with Basin Electric for the entire output of the Project. No alternative source of energy is in the same position to meet Basin Electric’s need to obtain a low-cost energy resource to meet the demand for electricity caused by regional load growth.

### 2.3. Ten-Year Plan

In accordance with NDCC § 49-22-04 and NDAC Chapter 69-06-02, Lindahl Wind submitted a Ten-Year Plan for years 2015–2025 on June 11, 2015. Lindahl Wind’s Ten-Year Plan is consistent with this Application for a Certificate.

### 3. Site Selection Criteria

Lindhahl Wind selected the Project Area based on landowner support, as well as an assessment of area technical and environmental characteristics, and energy demand in the region. Site selection for the Project was also based upon the criteria described in NDAC Chapter 69-06-08. These criteria are discussed further below.

#### 3.1. Exclusion Areas<sup>1</sup>

Per NDAC Section 69-06-08-01(1), certain geographical areas shall be excluded from energy conversion facility siting consideration. NDAC Section 69-06-08-01(2) also lists geographic areas that “must be excluded in the consideration of a site for a wind energy conversion facility.” Please refer to **EXHIBIT A-2. EXCLUSION AREAS** in Appendix A and **TABLE 3**.

**Table 3. Summary of Exclusion Areas**

GENERAL EXCLUSION AREA	PRESENT WITHIN 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	NA	6.2, 6.6, 6.7, 6.8, 6.12
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.	None	NA	6.2, 6.6, 6.7, 6.8, 6.12
County parks and recreation areas; municipal parks; parks owned or administered by other governmental subdivisions; hardwood draws; and enrolled woodlands.	None	NA	6.8, 6.9
Prime farmland and unique farmland, as defined by the land inventory and monitoring division of the soil conservation service, United States Department of Agriculture in 7 C.F.R. part 657; provided, however, that if the Commission finds that the prime farmland and unique farmland that will be removed from use for the life of the facility is of such small acreage as to be of negligible impact on agricultural productions, this exclusion does not apply.	Present	Within the Project Area, 61 percent of the total land is considered prime farmland or farmland of statewide importance. The Project is proposed to permanently impact less than 1 percent of the total land in the Project Area that could be considered prime farmland or farmland of statewide importance. Therefore, Lindahl Wind requests that the Commission determine that a prime farmland exclusion shall not apply to the Project.	6.9, 6.10
Irrigated land.	None	NA	—
Areas critical to the life stages of threatened or endangered animal or plant species.	None	NA	6.16
Areas where animal or plant species that are unique or rare to this state would be irreversibly damaged.	None	NA	6.16
Areas within 1,200 feet of the geographic center of an intercontinental ballistic missile (ICBM) launch or launch control facility.	None	NA	6.2

<sup>1</sup> As defined in NDAC 69-06-01-01, exclusion criteria are “criteria that remove areas from consideration for energy conversion facility sites and transmission facility routes.” Exclusion areas are composed of these limiting criteria.

GENERAL EXCLUSION AREA	PRESENT WITHIN PROJECT AREA	DESCRIPTION	SECTION ADDRESSED
<i>Wind Energy Exclusion Area</i>			
Areas less than one and one-tenth times the height of the turbine from interstate or state roadway right of way.	Present	No turbines will be located within these exclusion areas.	4.2
Areas less than one and one-tenth times the height of the turbine plus seventy-five feet from the centerline of any county or maintained township roadway.	Present	No turbines will be located within these exclusion areas.	4.2
Areas less than one and one-tenth times the height of the turbine from any railroad right of way.	None	NA	—
Areas less than one and one-tenth times the height of the turbine from a one hundred fifteen kilovolt or higher transmission line.	Present	No turbines will be located within these exclusion areas.	4.2
Areas less than one and one-tenth times the height of the turbine from the property line of a nonparticipating landowner, unless a variance is granted. A variance may be granted if an authorized representative or agent of the permittee and affected parties with associated wind rights file a written agreement expressing all parties' support for a variance to reduce the setback requirement in this subsection. A nonparticipating landowner is a landowner that has not signed a wind option or an easement agreement with the permittee of the wind energy conversion facility as defined in North Dakota Century Code chapter 17-04.	Present	No turbines will be sited within these exclusion areas, unless a variance(s) is granted by the Commission.	4.2

### 3.2. Avoidance Areas<sup>2</sup>

Per NDAC § 69-06-08-01(3), certain geographical areas may not be approved as sites for energy conservation facilities 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 following: the proposed management of adverse impacts; the orderly siting of facilities; system reliability and integrity; the efficient use of resources; and alternative sites. Economic considerations alone will not justify approval of these areas. In addition, a buffer zone of a reasonable width to protect the integrity of the area must be included. An additional avoidance area for wind energy conversion facilities is set forth in NDAC § 69-06-08-01(4). Please refer to **EXHIBIT A-3. AVOIDANCE AREAS** in Appendix A and **TABLE 4. SUMMARY OF AVOIDANCE AREAS**.

<sup>2</sup> As defined in NDAC 69-06-01-01, avoidance criteria are “criteria that remove areas from consideration for energy conversion facility sites and transmission facility routes unless it is shown that under the circumstances there are no reasonable alternatives.” Avoidance areas are composed of these limiting criteria.

**Table 4. Summary of Avoidance Areas**

GENERAL AVOIDANCE AREA	PRESENT WITHIN PROJECT SITE	DESCRIPTION	SECTION ADDRESSED
Historical resources which are not designated as exclusion areas.	Present	Lindahl Wind has completed a Class I cultural resource inventory for the Project Area; as well as, a Class III cultural resource inventory of all turbine locations, access roads and collection line locations for the preliminary layout. Lindahl Wind also completed a Class II Architectural History reconnaissance survey.  Cultural resource sites will be avoided and 50-foot construction setbacks will be implemented. An Unanticipated Discoveries Plan has been developed for unidentified resources encountered during construction and was approved by SHSND.	6.7
Areas within the city limits of a city or the boundaries of a military installation.	None	NA	6.1, 6.4
Areas within known floodplains as defined by the geographical boundaries of the 100-year flood.	None	NA	6.12
Areas that are geologically unstable.	None	NA	6.11
Woodlands and wetlands.	Present	Wetlands are present within the Project Area. Small wooded areas and shelter belts are also present.  All permanent wetland impacts will be avoided to the extent practicable. Temporary impacts may occur due to installation of collection lines. A 50-foot construction setback from wetlands will be implemented during construction.  Trees are sparsely located throughout the Project Area and the Project has been designed to minimize tree removal to the extent possible. If impacts to trees occur, Lindahl Wind will follow the Commission's tree and shrub mitigation specifications.	6.9, 6.13, 6.14
Areas of recreational significance which are not designated as exclusion areas.	None	NA	—
<i>Wind Energy Avoidance Area</i>			
A geographic area where, due to operation of the facility, the sound levels within 100 feet of an inhabited residence or community building will exceed 50 decibels (dBA). The sound level avoidance area criteria may be waived in writing by the owner of the occupied residence or the community building.	Present	Lindahl Wind has completed a sound assessment, and using the turbine model with the highest sound emission level and modeling for ground attenuation, no sound levels exceeded 50 dBA within 100 feet of inhabited residences.  Lindahl Wind used a 1,400-foot setback between turbines and occupied residences to minimize the potential for sound impacts.	6.5

### 3.3. Selection Criteria<sup>3</sup>

Per NDAC § 69-06-08-01(5), a site may 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 specified selection criteria, will be at an acceptable minimum, or that those effects will be managed and maintained at an acceptable minimum. Please refer to TABLE 5.

**Table 5. Summary of Selection Criteria**

SELECTION CRITERIA	POTENTIAL ADVERSE EFFECTS FROM PROJECT	SECTION ADDRESSED
<i>The impact upon agriculture:</i>		
(1) Agricultural production.	Out of approximately 13,000 acres in the Project Area, approximately 0.5 acres of prime farmland and 37.0 acres of farmland of statewide importance will be permanently impacted. The Project is proposed to permanently impact less than 1 percent of the total land in the Project Area that could be considered prime farmland or farmland of statewide importance.	6.2, 6.10
(2) Family farms and ranches.	While some economic losses to producers will occur due to conversion of farmland, Lindahl Wind will provide additional income to these households, and has designed the Project to minimize impacts to family farms and ranches to the extent possible. Any economic losses are anticipated to be minor in comparison. Additionally, Lindahl Wind has designed the Project with a turbine setback distance of 1,400 feet from occupied homes to minimize impacts at each residence.	6.5, 6.9
(3) Land which the owner demonstrates has soil, topography, drainage, and an available water supply that cause the land to be economically suitable for irrigation.	Landowners have not expressed concerns related to irrigation on their property, and no known irrigation is present in the Project Area.	NA
(4) Surface drainage patterns and ground water flow patterns.	No adverse impacts are anticipated to surface drainage or groundwater flow patterns.	6.11, 6.12
(5) The agricultural quality of the cropland.	No adverse impacts to agricultural quality of cropland are anticipated. Landowners will be compensated for the placement of Project facilities on their property and will be reimbursed for revenues lost due to temporary crop damage from construction activities and/or field studies.	6.2, 6.10
<i>The impact upon the availability and adequacy of:</i>		
(1) Law enforcement.	No adverse impacts are anticipated.	6.3
(2) School systems and education programs.	No adverse impacts to school systems and education programs are anticipated.	6.3
(3) Governmental services and facilities.	No adverse impacts to government services and facilities are anticipated.	6.3
(4) General and mental health care facilities.	No adverse impacts to general and mental health care facilities are anticipated.	6.3
(5) Recreational programs and facilities.	No adverse impacts to recreational programs and facilities are anticipated.	6.8
(6) Transportation facilities and networks.	There will be a temporary increase in truck traffic during construction activities. During facility operations no adverse impacts are anticipated.	6.3
(7) Retail service facilities.	No adverse impacts are anticipated to retail service facilities.	6.3
(8) Utility services.	No adverse impacts are anticipated to utility services. Energy produced from the Project will aid in meeting growing power demands in the region.	6.3

<sup>3</sup> As defined in NDAC 69-06-01-01, selection criteria is defined as 'criteria' that guide and govern the selection of energy conversion facility sites and transmission facility corridors and routes in order to minimize adverse human and environmental impact after the exclusion and avoidance criteria have been applied.

SELECTION CRITERIA	POTENTIAL ADVERSE EFFECTS FROM PROJECT	SECTION ADDRESSED
<i>The impact upon:</i>		
(1) Local institutions.	No adverse impacts to local institutions are anticipated.	6.3
(2) Noise-sensitive land uses.	Sound sensitive land uses within the Project Area include residences near turbine sites. Lindahl Wind has maintained a minimum 1,400-foot setback distance between turbines and occupied residences. A sound analysis was conducted to analyze potential sound impacts to residences and Lindahl Wind will ensure that the final Project layout complies with the Commission's sound avoidance criterion.	6.5
(3) Rural residences and businesses.	No turbines have been placed within 1,400 feet of occupied residences and businesses, and no adverse impacts are anticipated.	6.5, 6.6
(4) Aquifers.	No aquifers are present within the Project Area; therefore, no adverse impacts to aquifers are anticipated.	6.11
(5) Human health and safety.	No impacts to human health and safety are anticipated.	6.4
(6) Animal health and safety.	Generally, no adverse impacts to domestic animal health or safety concerns are anticipated. Measures to keep livestock away from construction activities will be used as necessary. Coordination is ongoing with U.S. Fish and Wildlife Service (USFWS) regarding any potential risks to avian and bat species.	6.15, 6.16
(7) Plant life.	Temporary and permanent vegetation impacts will occur during construction. Following construction, temporarily disturbed non-cultivated areas will be re-vegetated with a seed mixture free of noxious weeds, in accordance with Commission requirements.	6.14
(8) Temporary and permanent housing.	Temporary housing may be utilized in the form of motels, rental housing, and/or trailers during construction. Local housing facilities could experience short-term economic benefits; however, given currently low vacancy rates, non-local workers may be required to travel to the larger cities such as Minot, Williston or Dickinson to find temporary housing. No long-term adverse impacts are anticipated.	6.1
(9) Temporary and permanent skilled and unskilled labor.	Skilled and unskilled labor would receive short-term economic benefits during construction. No long-term adverse impacts are anticipated. Local contractors will be utilized if possible. The Project is expected to boost the local economy.	3.6
<i>The cumulative effects of the location of the facility in relation to existing and planned facilities and other industrial development.</i>		
Cumulative effects	Oil and gas development occurs in the Project Area. Efforts to minimize cumulative effects from the Project include use of existing public and oil roadways to the extent possible. Prior to and during construction, Lindahl Wind will continue to coordinate with oil and gas parties in or near the Project Area to ensure the continued development of both the mineral and surface estates.	5.1, 6.11

### 3.4. Policy Criteria<sup>4</sup>

Per NDAC § 69-06-08-01(6), the Commission may give preference to an applicant that will maximize benefits that result from the adoption of 13 specified criteria related to the applicant's policies and practices (the Commission may also require the adoption of such policies and practices). The table below identifies those 13 criteria and describes how Lindahl Wind's policies and practices are consistent with these policy criteria. Please refer to TABLE 6. In addition, the Commission may give preference to an applicant that will maximize interstate benefits.

<sup>4</sup> As defined in NDAC 69-06-01-01 policy criteria are 'criteria' that guide and govern the selection of energy conversion facility sits and transmission facility corridors and routes in order to maximize benefits during the construction and operation of a facility.

**Table 6. Summary of Policy Criteria**

POLICY CRITERIA	APPLICANT'S POLICIES AND PRACTICES	SECTION ADDRESSED
Recycling of the conversion byproducts and effluents	NA	NA
Energy conservation through location, process, and design	The proposed Project has been designed to maximize energy conversion where available.	1.2, 3.5
Training and utilization of available labor in this state for the general and specialized skills required	Lindahl Wind will use skilled and trained labor from North Dakota if possible.	6.1
Use of a primary energy source or raw material located within the state	The energy generated will come from the available wind resources of the state. In addition, gravel or scoria will likely be obtained from a local source for road and pad construction, as well as for aggregate for concrete.	1.2.4
Not relocating residents	No relocation of residences will occur.	6.1
The dedication of an area adjacent to the facility to land uses such as recreation, agriculture, or wildlife management	The Project will not interfere with adjacent land uses. As such, Lindahl Wind does not currently anticipate dedicating any adjacent areas for land uses such as recreation, agriculture, or wildlife management.	6.8
Economies of construction and operation	As a 150 MW wind energy project, Lindahl Wind will benefit from economies of scale related to the Project's construction and operation. Wind energy projects have one-time costs that remain relatively stable despite the scale of the project. Therefore, a larger project will have cost advantages in comparison to a smaller project because the fixed costs are spread out over more units of output. Some examples of wind energy project costs that remain similar despite the size of the project include: an on-site office space, crane mobilization, and substation procurement and construction.	3.6, 6.1
Secondary uses of appropriate associated facilities for recreation and the enhancement of wildlife	None. The Project has been sited on private property, which is not generally open to the public.	NA
Use of citizen coordinating committees	Lindahl Wind was started as an effort driven by a locally led group of landowners. In addition, Lindahl Wind has coordinated and will continue to coordinate with landowners and local businesses and groups located within and near the Project Area.	1.2.3, 9.0
A commitment of a portion of the energy produced for use in this state	Energy produced by the proposed facility will interconnect to the transmission grid at the Lindahl Switching Station owned by Burke Divide Electric Cooperative. The power produced by the Project will help Basin Electric and its members meet the demand for electricity resulting from local oil and gas operations.	2.1
Labor relations	No impacts to labor relations are anticipated.	NA
The coordination of facilities	Existing facilities and facility corridors were considered in the location of the Project and its associated facilities.	3.5, 6.3, 6.4
Monitoring of impacts	Lindahl Wind will monitor construction activities and use Best Management Practices (BMPs) throughout Project construction. During Project operation and restoration, Lindahl Wind will monitor the Project and assess impacts as well as comply with all requirements set forth in the Certificate.	5.1, 5.2, 6.17

### 3.5. Design and Construction Limitations

When determining the location for the proposed Project, Lindahl Wind considered the following design and construction limitations: wind resources, interconnection to the electrical transmission system, environmental constraints, and landowners and local support. As discussed in SECTION 1.2.4 ON PAGE 5,

Lindhahl Wind has assessed the meteorological conditions of the Project Area to ensure that the site has an economically viable wind resource.

Further, capacity for interconnection to the existing electrical transmission system was also a significant factor in Project design. The Project has executed a System Impact Study Agreement (SISA) with the WAPA for interconnection to the transmission grid. The SISA states that the Project will be studied as an 'out of queue' request, thereby placing the study process on a fast track, and results are anticipated in the near future.

Site control was also critical to the Project. Lindahl Wind secured voluntary lease agreements with landowners in the Project Area.

Several site-specific limitations also affected the Project's design and construction, including:

- ◆ Avoidance and minimization of permanent impacts on wetlands, including wetland basins subject to U.S. Fish and Wildlife Service (USFWS) wetland easements;
- ◆ Avoidance or mitigation of impacts to cultural resources; and
- ◆ Setback requirements from features, including occupied residences, non-participating landowner property lines and existing roads.

See SECTION 6. ENVIRONMENTAL ANALYSIS ON PAGE 26 for more detailed discussion of the site-specific resources and mitigation measures utilized.

### 3.6. Economic Considerations

The economics of a wind farm are driven, first and foremost, by the value of the wind resource. Information on the wind resource at the site is discussed in SECTION 1.2.4 ON PAGE 5. Since 2010, Lindahl Wind has compiled and assessed wind resource data in the Project Area. The data has indicated that the Project Area will provide an excellent resource for wind generation with high economic output.

Lindhahl Wind would distribute this renewable energy resource for the benefit of local and regional area residents. Further, according to national averages provided by the American Wind Energy Association (AWEA), a 100 MW wind energy project would create approximately 200 temporary construction jobs and 8 to 12 long-term operation and maintenance jobs. These high-skilled, high-paying positions would contribute payroll dollars to the rural portions of North Dakota. Full-time personnel are likely to live in the immediate or surrounding communities near the Project. In addition, lease payments would be made to landowners for placement of wind turbines and associated facilities.

## 4. Description of the Proposed Facility

### 4.1. Project Components

#### 4.1.1. Wind Turbines

##### *Wind Turbine Technology*

Wind turbines convert the kinetic energy of the wind into the rotational energy of a rotor and drivetrain. This energy is in turn converted into electrical power by industrial generators integrated within the wind turbine housing. An automated ‘pitch’ system will control the speed of the rotor by turning the face of each rotor blade into or out of the wind. Modern wind turbines typically produce energy in a wind speed range of 3.1 to 25 mps or 7 to 56 miles per hour (mph). Power quality will be further accomplished through the use of power electronics, which convert generator output to achieve required output voltage and frequency control. An integrated wind speed and direction monitoring system works with a ‘yaw’ motion control system to keep the face of the turbine presented into the wind.

##### *Wind Turbine Characteristics*

A specific turbine model has not been selected at this time, but Lindahl Wind plans to select the most appropriate technology for the Project to ensure cost efficiency and optimization of wind and land resources. Lindahl Wind is considering numerous turbine types for the Project. **TABLE 7. REPRESENTATIVE TURBINE TYPE CHARACTERISTICS FOR THE PROJECT**, describes the characteristics of modern turbine types that are typical of those under consideration. The turbine output possibilities range from 2.0 MW–3.3 MW. The planned Project layout is designed to accommodate any of the turbine models under consideration. The turbine list included in **TABLE 7** is representative of the turbine options under consideration; however, the Project may opt to use a turbine not included in the list that has equal or lesser dimensions and impacts as those listed here.

**Table 7. Representative Turbine Type Characteristics for the Project**

TURBINE TYPE	ROTOR DIAMETER (meters – feet)	ROTOR SWEEP AREA (meters <sup>2</sup> – feet <sup>2</sup> )	CUT-IN WIND SPEED (m/s)	RATED POWER (MW)	CUT-OUT WIND SPEED (m/s)	BLADE LENGTH (meters – feet)	HUB HEIGHT (meters–feet)	BLADE HEIGHT (HIGHEST) (meters–feet)	BLADE HEIGHT (LOWEST) (meters–feet)	MAX # OF PROJECT TURBINES
Vestas V110-2.0	110–360	9,503 – 101,787	3.0	2.0	20.0	55–180	80–262.5	135–443	25–82	75
Vestas V110-2.2	110–360	9,503 – 101,787	3.0	2.2	20.0	55–180	80–262.5	135–443	25–82	68
Vestas V117-3.3	117–384	10,751 – 115,811	3.0	3.3	25.0	58.5–192	91.5 – 300.2	150–492	33–108	45
Vestas V117-3.3	117–384	10,751 – 115,811	3.0	3.3	25.0	58.5–192	84–275.6	142.5–467	25.5–84	45

##### *Rotor Diameter*

The maximum nominal rotor diameter under consideration is 117 meters. The rotor consists of three blades mounted to a rotor hub. The hub is attached to the nacelle, which houses the generator, step-up transformer, brake, cooling system, and other electrical and mechanical systems.

### *Towers*

The towers, on which the nacelle is mounted, will be constructed of conical tubular steel, with a hub height range from 80 to 91.5 meters. All tower welds will be performed according to specifications established by the American National Standards Institute (ANSI). Surfaces of the tower components will be sandblasted and coated by the manufacturer to protect against corrosion. A secured door at the base of the tower will provide internal access to the turbine.

### *Lightning and Ground Protection*

Lightning and ground protection for all wind farm equipment is designed and constructed to be compliant with all applicable National Electrical Code (NEC) and National Electric Safety Code (NESC) requirements. Grounding and shielding components are integrated into the foundation and structural elements of all equipment and conductor lines. In particular, each wind turbine will include conductive elements in the blades and a complete grounding and shielding network within the turbine, tower, and foundation.

### *Lighting*

Turbines will be lit so as to satisfy minimum Federal Aviation Administration (FAA) requirements. Steady burning lights will not be used and not all turbines will be continuously illuminated. Instead, turbines will be illuminated as needed.

### *Foundation*

Each turbine will sit atop a concrete foundation. Foundation size and design will be finalized once geotechnical analyses have been completed and the turbine model selected, though it is estimated that the foundation could be approximately 60 feet in diameter and 7 to 10 feet in depth.

### *Monitoring and Control*

Monitoring and control of each wind turbine will be accomplished through the use of software typically provided by the wind turbine supplier. Information will be carried on communication lines connected to each turbine. This will allow remote monitoring and control by turbine suppliers, O&M providers and Lindahl Wind.

## **4.1.2. Associated Facilities**

### *Access Roads*

Construction and service access to each turbine location will be facilitated by a compacted gravel road within the Project Area. Roads will be located in consultation with the landowner to avoid or minimize impacts to land use and the environment. The roads will be approximately 12 to 16 feet wide and constructed with locally-sourced gravel, if available. The Project roads will support the size and weight of maintenance vehicles. Construction impacts from access roads were calculated using a 100-foot width for temporary impacts and a 16-foot width for permanent impacts. The 100-foot width is an average as it could become more or less during actual construction, depending on the topography. Following construction, the temporarily affected areas will be restored to pre-construction conditions, to the extent practicable.

### *Collection System*

An electrical collection system consisting of buried cables will interconnect all turbines to the wind farm substation. Design of the electrical system and interconnection details will be finalized based on final turbine selection. Voltage from the turbine generator will be increased through the use of industrial step-up transformers for injection into the collection system. This system will operate at 34.5 kV, and will be sited to minimize cost and land impacts. A small number of cabling junction boxes may be located above ground and marked with bollards. Construction activities from collection lines were calculated using a 50-foot width for temporary impacts. The permanent impact resulting from above ground collection system components will be less than 1 acre. Once construction is complete, the land will be returned to pre-construction conditions, to the extent practicable, following installation of the collection system.

### *Meteorological Towers*

The Project will include up to four permanent MET towers that will remain in place for the life of the Project. These permanent MET towers will be as tall as the hub height of the selected wind turbine, and will provide data critical to assessing the performance of the Project and aid in short-term forecasting for the Project.

### *Operations & Maintenance Building*

An O&M building will be constructed on up to 5 acres within the Project Area to provide a year-round workspace and equipment storage, and to facilitate basic maintenance activities. The O&M building will be constructed near a year-round maintained public road and in close proximity to the Project's substation. The O&M building will be data-connected to the wind project via a buried fiber-optic line interconnected with the Project's overall communication system.

### *Substation*

The Project's underground collection system will extend from the turbines to a Project substation. Lindahl Wind will acquire up to 5 acres for the substation which will likely be constructed near the existing Lindahl Switching Station.

The substation will be designed to provide voltage step-up from the 34.5 kV collection system to the 115 kV transmission system voltage. This facility will house the production metering and various collection system and facility isolation and protective functions. The facility will be fenced to provide site security and safety.

## **4.1.3. Temporary Facilities**

Other temporary facilities will be required for the construction phase of the Project, including a concrete batch plant, a laydown area for equipment, intersection improvements to facilitate over-length turning, crane paths and working pads and a staging area for turbine delivery.

## **4.2. Project Layout**

Lindahl Wind has designed a Project that optimizes the wind resource, minimizes the impact on land resources and potentially sensitive areas, and follows the energy conversion facility siting criteria outlined in NDAC § 69-06-08-01 and the Williams County Zoning Ordinance.

The following tables identify Project setbacks, as designated by the Commission and Williams County that were incorporated into the Project layout. All setbacks have been applied measuring from the center of the base of the turbine tower to the applicable feature, and using the tallest and largest rotor diameter turbine model under consideration. Please refer to **TABLE 8. SETBACK DISTANCES AS DESIGNATED BY THE COMMISSION** and **TABLE 9. SETBACK DISTANCES AS DESIGNATED BY WILLIAMS COUNTY.**

**Table 8. Setback Distances as Designated by the Commission**

SETBACK TYPE	DISTANCE
Interstate or state roadway right of way	1.1 times the height of the turbine
The geographic center of an ICBM launch or launch control facility	NA
County or maintained township roadway	1.1 times the height of the turbine plus 75 feet from the centerline of the roadway
Railroad right-of-way	1.1 times the height of the turbine
115 kV or higher transmission line	1.1 times the height of the turbine
Property line of a non-participating landowner	1.1 times the height of the turbine*
Inhabited residence or a community building	A wind energy conversion site must not include a geographic area where, due to the operation of the facility, the sound levels within 100 feet of an inhabited residence or a community building will exceed 50 dBA**

\* A variance may be granted if an authorized representative or agent of the permittee and affected parties with associated wind rights file a written agreement expressing all parties' support for a variance to reduce the setback requirement in this subsection. A non-participating landowner is a landowner that has not signed a wind option agreement or a wind easement, as defined in NDCC Chapter 17-04, with the permittee of the wind energy conversion facility.

\*\* The sound level avoidance area criteria may be waived in writing by the owner of the occupied residence or the community building.

**Table 9. Setback Distances as Designated by Williams County**

SETBACK TYPE	DISTANCE
Turbines from the perimeter of the facility	2.5 times the rotor diameter
Turbines from existing structures*	1,400 feet**
Turbines from the nearest public road or above ground communication and electrical lines (center of right-of-way)	200 feet or greater

\* Williams County has indicated that for purposes of applying this setback, 'structures' do not include fences, above ground communication and electrical lines, or road-related items (such as road signs), as those features are addressed by a Williams County's 200-foot setback.

\*\* The Williams County Zoning Ordinance provides that a variance may be granted if a waiver agreement is signed by the permittee and affected landowner. Williams County Zoning Ordinance § IX.4.b. Lindahl and affected landowners have executed the requisite waiver agreements, and Lindahl has submitted a variance application to Williams County requesting a variance allowing Lindahl to place turbines less than 1,400 feet from existing structures, except for currently inhabited structures, on the property of participating landowners.

Where setback distance requirements vary, Lindahl Wind will use the largest setback for siting the Project's turbines.

### 4.3. Estimated Project Facility Impacts

As discussed in **SECTION 1.2.2. PROJECT LAYOUT ON PAGE 4**, Lindahl Wind has not yet selected a turbine type; therefore, the Application presents a Project layout that will accommodate multiple turbine types, and includes primary and alternate turbine locations and primary and alternate access road and collection line location options. For approximate acreage of temporary and permanent impacts, please refer to **TABLE 10. ESTIMATED IMPACTS FROM PROJECT FACILITIES.**

**Table 10. Estimated Impacts from Project Facilities**

PROJECT FACILITIES	DESCRIPTION OF AND APPROXIMATE ACREAGE OF TEMPORARY IMPACTS	DESCRIPTION OF AND APPROXIMATE ACREAGE OF PERMANENT IMPACTS
Turbines	Circular turbine site with 2 acre disturbance	Each turbine base is set atop a concrete pedestal having a diameter of 19 feet and a gravel ring of 10 feet placed circumferentially around it. The total above-ground permanent impact is approximately 1,200 square feet.
	143.0 acres	2.0 acres
Access Roads	100 foot wide impacts associated with construction of access roads with crane paths	The roads would be approximately 16 feet wide gravel surface
Primary	181.0 acres	42.0 acres
Alternate	11.0 acres	3.0 acres
Collection lines	A 50-foot construction impact corridor has been estimated for the equipment used to install the collection lines	Impacts associated with collection line installation are all temporary in nature, with the exception of above ground junction boxes
Primary	112.0 acres	<1 acre
Alternate	<1 acre	<1 acre
SCADA System cables	1.0 acres	0 acres
Meteorological Towers	3-point guy radius plus working area totaling 250 feet	Assumes fenced in area of 50 feet by 50 feet
	4.0 acres	<1 acre
Substation	5 acres	The substation will be constructed on a gravel pad up to 5.0 acres.
O&M Building	10.0 acres	The O&M building will be constructed on a gravel pad up to 5.0 acres.
Laydown Yard and Concrete Batch Plant	The combination of these two facilities would be approximately 17.0 acres.	These facilities are temporary and the associated land will be converted back to its pre-existing condition following completion of construction.
Intersection Modifications	Intersection modifications total approximately 13.0 acres.	These facilities are temporary and the associated land will be converted back to its pre-existing condition following completion of construction.
Cross Country Crane Paths	130.0 acres	0 acres

## 5. Project Construction, Operation and Decommissioning

### 5.1. Project Construction

#### 5.1.1. Construction Activities

A variety of activities must be completed to carry the Project through construction. Below is a preliminary list of activities necessary to develop the Project. Pre-construction, construction, and post-construction activities for the Project include:

- ◆ Pre-construction
  - › Geotechnical analysis;
  - › Design substation and medium voltage power collection system;
  - › Design turbine foundations, access roads, and O&M building;
  - › Underground utility and oil and gas facility discovery; and
  - › Procure all necessary turbine and associated facility components (towers, nacelles, blades, foundations and transformers).
  
- ◆ Construction
  - › Construct temporary laydown yard, batch plant, staging area and construction operations compound;
  - › Construct temporary intersection modifications to facilitate turbine component delivery;
  - › Construct access roads and install collection and communication lines;
  - › Construct the Project substation;
  - › Construct an O&M building;
  - › Construct tower foundations;
  - › Place towers and set turbines.

- ◆ Post-Construction
  - › Restore disturbed areas not intended for permanent above ground facilities;
  - › Test facility; and
  - › Begin commercial production.

Haul road permits will be acquired from the townships, Williams County and the North Dakota Department of Transportation (NDDOT), as necessary. Furthermore, Lindahl Wind will acquire all necessary permits to cross/bore state, county and township roads required for the installation of its collection lines. Lindahl Wind will negotiate a road use and maintenance agreement with Williams County and applicable townships, if needed.

During construction, equipment and worker vehicles would travel to and from the site. Peak construction is anticipated to be early summer when the majority of the foundation construction, access road, electrical and substation work is taking place. Upon completion of construction, heavy equipment will be removed from the site.

In addition, culverts or other drainage methods would be installed as needed.

### 5.1.2. Construction Management

Lindahl Wind will be responsible for scheduling and coordinating the Project construction activities, including:

- ◆ Obtaining building, electrical, grading, road and utility permits;
- ◆ Performing civil, structural and electrical engineering;
- ◆ Conducting surveying and geotechnical analysis;
- ◆ Forecasting Project labor needs;
- ◆ Facilitating subcontractor involvement;
- ◆ Securing construction materials;
- ◆ Overseeing construction tasks, including: site and access road development; foundation excavation and pouring; electrical and communications installation; turbine and meteorological tower erection; substation installation; and system testing; and
- ◆ Managing the Project budget.

During construction, coordination will be ongoing between Lindahl Wind and construction teams. The construction manager will engage in ongoing correspondence with local officials, citizens groups, and landowners.

### 5.1.3. Commissioning

Upon completion of the construction phase, the Project will undergo detailed inspection and testing procedures before being commissioned. Inspection and testing will occur for each individual component of the wind turbines, as well as the associated communication, meteorological, collection and Supervisory Control and Data Acquisition (SCADA) systems.

## 5.2. Project Operation and Maintenance

Before the Project becomes fully operational, O&M staff will be integrated into Project construction. The O&M staff will work cooperatively with the construction manager to ensure a smooth transition from construction through commissioning and operating the facility.

### 5.2.1. Supervisory Control and Data Acquisition System

Each wind turbine will communicate directly with the SCADA system for remote performance monitoring, energy reporting and troubleshooting. The SCADA system provides data on turbine generation and production, availability, meteorology and communications. The SCADA system allows 24/7 monitoring of, and communications with, the Project and relays alarms and communication errors. Lindahl Wind will oversee on-site service and maintenance for the Project. Permanent, full-time staff will remain on-site to perform these duties.

### 5.2.2. Maintenance Schedule

The following schedule is anticipated to be used for service activities:

- ◆ **First Service Inspection**– The first service inspection will take place one to three months after the turbines have been commissioned. Focus will be placed on bolt tightening, greasing and oil filtering.
- ◆ **Semi-Annual Service Inspection**– Semi-annual service inspections will commence six months after the first inspection. The semi-annual inspections will consist of lubrication and safety testing.
- ◆ **Annual Service Inspection**– The annual service inspection will include the same items as the semi-annual service inspection plus bolt tightening and a full component check.
- ◆ **Two-Year Service Inspection**– The two-year service inspection will include items checked during the annual inspection, as well as terminal connector tightening.
- ◆ **Five-Year Service Inspection**– The five-year service inspection will include items checked during the annual inspection, as well as braking system inspection, oil and grease testing, balance check and terminal connector tightening.

## 5.3. Decommissioning and Restoration

At the end of the Project's useful life, Lindahl Wind will remove the wind facilities in accordance with North Dakota Wind Turbine Decommissioning Guidelines (NDAC § 69-09-09). This includes:

- ◆ Dismantling and removal of all towers, turbine generators, transformers, and overhead cables;
- ◆ Removal of underground electrical cables to a depth of 24 inches (60.96 centimeters);
- ◆ Removal of foundations, buildings, and ancillary equipment to a depth of 3 feet below existing ground surface;
- ◆ Removal of surface road material and restoration of the roads and turbine sites to substantially the same physical condition that existed immediately before construction; and
- ◆ Grading, adding topsoil, and reseeded according to Natural Resources Conservation Service (NRCS) technical guide recommendations and other agency recommendations, unless the landowner requests in writing that the access roads or other land surface areas be retained.

In accordance with NDAC § 69-09-09-06, Lindahl Wind will file a decommissioning plan with the Commission prior to the commencement of operation of the Project. Pursuant to NDAC Section 69-09-09-08, after the tenth year of operation, if required by the Commission, Lindahl Wind will secure a bond, letter of credit, corporate guarantee, or other form of financial assurance with the Commission to cover the anticipated costs of decommissioning the Project.

Lindahl Wind also reserves the right to explore alternatives regarding Project decommissioning. Retrofitting the turbines and power system with upgrades based on new technology may allow the Project to produce electricity efficiently and successfully for many more years. Based on estimated costs of decommissioning and the salvage value of decommissioned equipment, it is anticipated that the salvage value of the Project will exceed the cost of decommissioning.

## 6. Environmental Analysis

This section describes the existing conditions within the 39,000-acre Study Area. The Study Area, which includes the Project Area, was analyzed to best position the Project to avoid or minimize impacts. The existing conditions, or affected environment, are the baseline conditions that may be affected by the proposed Project. This section discusses the potential direct environmental impacts of the proposed Project. Potential indirect impacts are identified in the resource discussions where applicable. Mitigation measures, such as BMPs, which would avoid, minimize, or mitigate impacts, are discussed where appropriate.

Impacts discussed in the following sections are related to the placement of 75 turbines and associated access roads, collection lines, MET towers, O&M building and substation. The discussion will assume the greatest possible impacts associated with the proposed Project.

### 6.1. Demographics

The Project is located in a rural area in northwestern North Dakota. There are no indications of any new residential construction within the Study Area. The Project Area is located within portions of Lindahl, Tioga, and Sauk Valley Townships in Williams County, North Dakota; however, no Project facilities will be located within Tioga Township. While there are no cities or towns within the Study Area, cities and small unincorporated towns nearby include Tioga and McGregor. Major employment industries within this county include transportation and warehousing, retail trade, agriculture, manufacturing, health and social services, accommodation and food services, oil and gas extraction and construction. Please refer to **TABLE 11**.

**Table 11. Demographic Trends**

COUNTY/TOWNSHIP	POPULATION IN 2013	PER CAPITA INCOME	% OF INDIVIDUALS BELOW POVERTY LEVEL
Williams County	29,595	\$38,738	8.6%
Statewide	723,857	\$29,732	11.9%

Source: US Bureau of the Census, Census 2014

In May 2015 Williams County had an unemployment rate of two percent.

#### 6.1.1. Demographic Impacts/Mitigation

The Project is designed to be socioeconomically beneficial to landowners, local governments, and communities. The proposed Project will result in increased income to landowners receiving lease payments and to landowner-investors receiving profits from the sale of electricity, which could raise the per capita income in Williams County. There is a potential for residents within 60 or more miles to take advantage of employment opportunities during Project construction.

Non-local construction workers would need temporary housing. The average rental vacancy rate within Williams County from 2009–2013 was 2.5 percent. This indicates that non-local workers may have some difficulty finding temporary housing in the immediate area and be required to travel to the larger cities, such as Minot or Dickinson, to find temporary housing.

Specialty Project construction workers would make up about 20 percent of the Project work force (40 jobs) and would likely come from out-of-state. Substation construction would require approximately 20 workers for 150 days.

Following construction, approximately 35 people are estimated to be required for 150 days to complete site reclamation. O&M activities would require eight to twelve full-time personnel; two to four of these individuals would be on-site at any given time.

Construction of the Project could potentially provide temporary increases to the revenue of the area through increased demand for lodging, food services, fuel, and general supplies. Personal income could also be generated by circulation and recirculation of dollars paid out by the Project as business expenditures and state and local taxes.

The proposed Project could increase demand on the Williams County labor force and for local housing during construction; however, the construction period is only temporary. Overall, Lindahl Wind anticipates that the Project will be socioeconomically beneficial to the local population and will not impact long-term population trends. Further, no relocation of residences will occur. Therefore, no mitigation measures are anticipated to be required.

## 6.2. Land Use

The Study Area is located in a rural setting of North Dakota predominantly comprised of grasslands and cultivated land. The Project Area is comprised primarily of cultivated lands (65 percent) and grasslands (30 percent).

Please refer to **EXHIBIT A-5. LAND USE**, in Appendix A and **TABLE 12. LAND USE**. The table provides acreage contained within each land classification; as well as the representative acreage anticipated to be temporarily and permanently impacted within each land classification based on the construction limits and corridor requirements of the primary preliminary layout, which includes 75 turbine sites, access roads, roadway intersection improvements, MET towers, collection lines and the substation and O&M facility.

**Table 12. Land Use**

LAND CLASSIFICATION	STUDY AREA (ACRES)	PROJECT AREA (ACRES)	TEMPORARY IMPACTS (ACRES)	PERMANENT IMPACTS (ACRES)
Barren	3	1	0	0
Cultivated	24,728	8,477	394.0	32.0
Developed	1,468	432	25.0	2.0
Grasslands	12,375	3,933	178.0	19.0
Water	168	15	0	0
Wetlands	330	59	0	0
Woodlands	43	6	<1	0
<b>TOTAL</b>	<b>39,158</b>	<b>12,940</b>	<b>&lt;598</b>	<b>53.0</b>

Numbers obtained using USDA National Agricultural Statistics Service (NASS) data.

Agricultural production and oil and gas production are activities that occur within the Study Area. The Study Area is zoned as agricultural land within Williams County, and county zoning regulations require a CUP for a wind energy facility.

Through coordination with the USFWS, several USFWS wetland easements have been identified within the Study Area. Three USFWS grassland easements were also found within the Study Area but none are located in the Project Area. Lindahl Wind will avoid all wetland basins under USFWS easements. **EXHIBIT A-3. AVOIDANCE AREAS** in Appendix A identifies the locations of USFWS wetland and grassland easements within the Study Area.

The USFWS also administers the National Wildlife Refuge System, which includes National Wildlife Refuges (NWR), Waterfowl Production Areas (WPA). NWRs serve the purpose of preserving and protecting lands for fish and wildlife and their habitat. WPAs are lands protected and/or restricted for the purpose of waterfowl production. There are no NWRs within the Study Area, as the nearest NWR, Lostwood, is approximately 16 miles to the east-northeast. The nearest WPA, Fuller WPA, is approximately 0.8 miles west of the Project Area.

In addition, Private Land Opened to Sportsman (PLOTS), which are administered through an agreement between the North Dakota Game & Fish Department (NDGFD) and individual landowners, occur near the Project Area and provide hunting and bird watching opportunities to outdoor enthusiasts. The nearest PLOTS parcel is directly adjacent to the Study Area in the west half of Section 12, Township 158 N, Range 96 W, or approximately 0.5-mile from the Project Area.

No NDGFD Wildlife Management Areas (WMA) occur within the Project Area; however, McGregor Dam WMA is directly adjacent to the Project Area in Section 22, Township 159 N, Range 95 W. As requested by the NDGFD, Lindahl Wind will set back wind turbines and MET towers at least 0.5-mile from WMA boundaries.

The NRCS administers the Conservation Reserve Program (CRP). Agricultural landowners may enroll their land into the CRP, essentially taking the land out of production for a given timeframe to provide habitat for wildlife, minimize soil erosion and improve water resources, while receiving annual payments. A mailer was sent to all landowners within the Study Area on March 6, 2015 to determine the location of CRP-enrolled parcels. At this time, based on landowner response, there are no known CRP acres in the Project Area.

The Minot Air Force Base was consulted to determine if any turbine sites lie within 1,200 feet of the geographic center of an ICBM launch or launch control facility. In a letter dated January 7, 2015, the Minot Air Force Base found no issues of encroachment to Air Force assets from construction of the proposed Project. Please refer to **APPENDIX F. SCOPING PACKAGE AND RESPONSES** for a copy of the correspondence.

### 6.2.1. Land Use Impacts/Mitigation

Construction of the Project will result in the permanent conversion of land within the Project Area from existing land uses into a renewable energy resource. Temporary impacts from the proposed Project will also result. Temporary land use impacts associated with construction staging and laydown areas and underground collection and communication lines will cease following construction and will be returned to pre-construction land uses, which primarily consist of grasslands and cultivated lands.

It is not anticipated that the conversion of existing land use will result in a trend toward modification of existing land use patterns. Conflicts with the existing development plans of state, local, or private entities within the Project Area are not anticipated as the Project generally avoids developed areas. The Project will

permanently impact approximately 53.0 acres or less of land based on calculations from primary turbine locations, access roads, MET towers, the O&M facility and substation. The Project will temporarily impact approximately 598.0 acres or less of land based on calculations from the above mentioned facilities plus collection lines and an equipment laydown area.

All permanent impacts to wetland basins under USFWS easements will be avoided. The Project may need to bore some collection lines underneath basins to avoid permanent impacts, but neither the act of boring nor the installation of collection lines will permanently impact the hydrology of the wetland. The Project Area does not contain USFWS grassland easements so avoidance measures will not be necessary.

Lindhahl Wind will coordinate with local and state NRCS offices and Farm Service Agency (FSA) office and the local landowners with respect to any unavoidable areas of CRP land that cannot be avoided to determine seeding specifications for the reclamation of temporarily disturbed land and payment requirements for permanently disturbed land. Permanent impacts to CRP are not anticipated.

No PLOTS parcels or WMAs will be directly affect by the Project as none are located within the Study or Project Areas and indirect impacts are not anticipated.

### 6.3. Public Services

#### *Local Services*

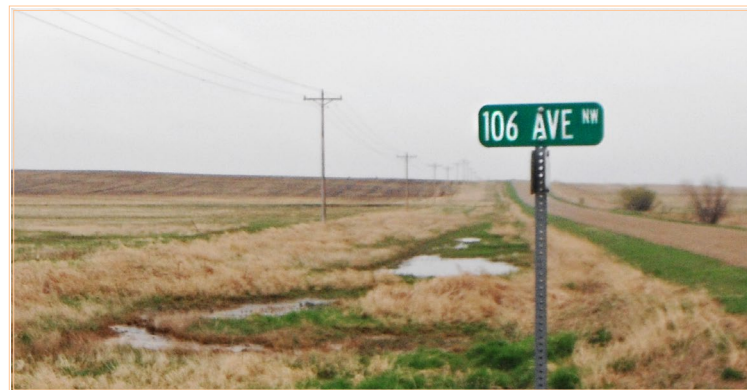
The majority of public services and infrastructure are located in the town of Tioga, which is approximately 2 miles south of the Study Area or 4 miles south of the Project Area. Tioga contains a medical clinic, a municipal airport, police, fire and ambulance services, a public school for grades kindergarten through 12<sup>th</sup> grade, businesses and churches. The Study Area is located in a rural part of North Dakota mainly used for agricultural and pastoral purposes. Please refer to **EXHIBIT A-6. INFRASTRUCTURE**, in Appendix A.

#### *Electrical Service*

Electrical service in the Study Area is provided by Mountrail-Williams Electric Cooperative and Burke Divide Electric Cooperative. Transmission infrastructure includes overhead electrical lines. A transmission line, totaling approximately 12 miles, proceeds in a north/south alignment within the Study Area. Additionally, there are multiple small underground and overhead distribution lines going to farmsteads and oil production facilities.

#### *Roads*

Major roadways intersecting the Study Area include ND Highway 40 and ND Highway 50 adjacent to the north. Other roadways in the Study Area include well maintained gravel roadways and two-track trails used for agricultural and oil field purposes. The proposed Project will require the construction of several miles of 12- to 16-foot access roads on private lands under easement by Lindahl Wind.



### *Traffic*

NDDOT traffic counts have been conducted for the two major highways located to the north and center of the Study Area. The 2013 average annual daily traffic (AADT) volumes included 2,785 vehicles on ND Highway 40, and 700 vehicles on ND Highway 50. No additional traffic counts were conducted for roadways within the Study Area. Traffic on some of the remaining roadways can be significant due to oil and gas exploration and production. Additional traffic loads on the roadways in the Study Area can be contributed to agricultural traffic or rural residences. There will be a temporary increase in truck traffic during construction activities.

### *Water Supply*

Rural water is supplied to the Study Area by Williams Rural Water District. It is common for rural residences in the area to utilize private wells for alternative uses, such as agriculture. According to North Dakota State Water Commission (NDSWC) data, there are 63 domestic/stock/industrial wells located within the Study Area, of which only 13 are located within the Project Area. No sole source aquifers occur within the Study Area. The nearest aquifer, the Wildrose Aquifer, is approximately four miles northwest of the Study Area, or approximately five miles northwest of the Project Area at the closest point.

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

Telephone, fiber optic, and microwave communications exist within the Study Area. Coordination with utility companies is ongoing to determine locations and potential impacts. A microwave and radio frequency study was completed in February 2015. Please refer to **APPENDIX C. MICROWAVE AND RADIO FREQUENCY FACILITIES ANALYSIS**.

## **6.3.1. Public Service Impacts/Mitigation**

### *Local Services*

Impacts to local services in and around the Study Area are not anticipated; therefore, no mitigation is required.

### *Electrical Service*

The proposed Project would have a positive impact on the electrical services in the region as it would help meet the demand for electricity brought on by the Bakken oil activity. From the proposed location of interconnection, at the Lindahl Switching Station, Basin Electric has the potential to move power in multiple directions in order to meet the demand.



### *Roads and Traffic*

Existing roadways within the Study Area will be utilized to the extent feasible; however, construction of new access roads will be required to provide access to the proposed tower locations. In order to reduce the overall Project footprint, constructed access roads may connect several tower locations in a string. Newly constructed permanent access roads will be approximately 12 to 16 feet wide. Access roads will be constructed in locations which minimize impacts to the environment and/or existing land uses.

Traffic volumes will increase during Project construction. Additional traffic can be expected from workers and large trucks delivering equipment or tower parts. Haul road permits will be acquired from townships, Williams County and NDDOT, as necessary. Lindahl Wind will negotiate a road use and maintenance agreement with Williams County and the townships, if needed. Lindahl Wind will work with Williams County and applicable townships to develop construction traffic plans and follow recommended mitigation. Additional traffic for maintenance of the Project will be minor. The increase in traffic during construction is not expected to be at a volume that will disrupt residents or travel in the Study Area.

### *Water Supply*

The water supply for residents within the Study Area is not anticipated to be permanently affected by the proposed Project. Lindahl Wind will coordinate with individuals and/or Williams Rural Water District with respect to use of water supply, as necessary.

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

The telecommunications infrastructure and services that could potentially be impacted by the Project's construction or operations include underground telephone and fiber optic cables, amplitude modulation (AM) and frequency modulation (FM) radio broadcasts, off-air television, non-federal government microwave beam paths, and land mobile radio.

The conclusions of potential effects from the Microwave and Radio Frequency Facilities Analysis include;

- ◆ No microwave beam paths are present within the Study Area;
- ◆ No land mobile transmitting stations are expected to be adversely affected, assuming that their transmitting stations are located exactly as per their licenses;
- ◆ Cellular telephone transmission and reception is not expected to be adversely affected; and
- ◆ Over-the-air TV interference, if it occurs, can be mitigated through the:
  - › Relocation of the household antenna to receive a better signal;
  - › Installation of a better outside antenna, or one with a higher gain; or
  - › Installation of satellite or cable TV; however, it is likely that most homes already have a satellite TV.

No further constraints were identified for siting the turbines with respect to avoidance of potential impacts to microwave communication in the area. Please refer to **EXHIBIT A-7. MICROWAVE BEAM PATHS** in Appendix A.

Lindhahl Wind will be engaged in ongoing coordination with Northwest Communications Cooperative to determine locations and potential impacts to existing telephone and fiber optic equipment. Though not anticipated, if the Project's facilities cross or otherwise affect existing telephone or fiber optic equipment, Lindahl Wind will coordinate with Northwest Communications Cooperative and any other service providers to avoid interference with their facilities. When the Project is constructed, Lindahl Wind will provide information about the Project's facility locations to North Dakota One Call. If the Project negatively impacts telecommunication services, Lindahl Wind will provide a specific mitigation plan and take the necessary steps to restore all impacted services.

## 6.4. Human Health and Safety

### *Air Traffic*

The FAA regulates federal airspace. Due to their height, wind turbines may have an effect on airports and navigable airspace. The FAA evaluates the proposed Project on aeronautical compatibility.

The Tioga Municipal Airport (D60) is the nearest public-use airport to the Study Area and is located approximately 3 miles south of the Study Area or approximately 6 miles southeast of the Project Area. One additional public-use airport, the Stanley Municipal Airport (08D), is located approximately 25 miles to the southeast of the Study Area or 28 miles southeast of the Project Area.

Private registered airports and/or runways were not identified in the Study Area.

### *Electromagnetic Fields*

The electromagnetic fields (EMFs) refer to two separate fields: electric fields and magnetic fields. Electric fields arise from the voltage or electrical charges, and magnetic fields arise from the flow of electricity or current that travels along transmission lines, power collection (feeder) lines, substation transformers, house wiring, and electrical appliances. The intensity of the electric field is related to the voltage of the line and the intensity of the magnetic field is related to the current flow through the conductors (wire). EMF can occur indoors and outdoors.

### *Hazardous Materials/Hazardous Waste*

Correspondence received from the North Dakota Department of Health (NDDH) on December 12, 2014 and review of the United States Environmental Protection Agency (EPA) hazardous materials databases on March 27, 2015 revealed 84 Tier 2 hazardous materials sites. All identified hazardous materials sites were identified within the city limits of the city of Tioga, approximately 2 miles south of the Study Area or approximately 4 miles south of Project Area. Through a search of the NDDH website, up to 16 underground storage tanks (USTs) may be present within the Study Area. This number cannot be confirmed because the NDDH did not provide a precise physical address for the USTs. No landfill locations were listed by NDDH within the Study Area boundaries.

KLJ performed an environmental incident search on the NDDH website on January 9, 2015 and determined that 244 incidents occurred within 1 mile of the Study Area boundary since 1975. The NDDH did not indicate if these incidents were considered open or closed.

#### *Security*

The Study Area is located directly north of Tioga and directly south of the unincorporated town of McGregor. Multiple residences are located in or around the Study Area; however, no towns are located within the boundaries of the Study Area.

### **6.4.1. Human Health and Safety Impacts/Mitigation**

#### *Air Traffic*

Construction of wind turbines may impact aircraft operations in the Study Area. The FAA requires the submittal of a Notice of Proposed Construction (Form 7460-1) for any object that will extend more than 200 feet above ground level (AGL). Wind turbines will be lit to satisfy FAA requirements; however, depending on comments received on Form 7460-1, the wind turbines may need to be marked and lighted above the minimum FAA requirements to enhance safety for the aircraft. The FAA published Advisory Circulars (AC) defines the standards for marking and lighting structures to promote aviation safety. Chapter 13, *Marking and Lighting Wind Turbine Farms*, in the regulations and policies document AC 70/7460-1K, Obstruction Marking and Lighting, provides guidelines to mark and light wind farms. This marking/lighting is intended to assist pilots in identifying and avoiding these obstacles.

The Tioga Municipal Airport indicated they would not be opposed to the Project assuming all current and future FAA guidelines are met and a “Determination of No Hazard” is issued by the FAA. For a copy of the correspondence, please refer to **APPENDIX F. SCOPING PACKAGE AND RESPONSES**.

#### *Electromagnetic Fields*

The Project facilities are not significant sources of EMF exposure. The connection lines, for example, generate levels of EMF comparable to those generated by household appliances. Turbine generators, with their height, result in little or no EMF at ground level (Fortin, Patricia, et al). As outlined in **SECTION 4.1. PROJECT COMPONENTS ON PAGE 17**, the wind turbines have been set back 1,400 feet from occupied residences. Further, collection lines will be buried to a depth of at least 4 feet.

#### *Hazardous Materials/Hazardous Waste*

It is not anticipated that hazardous waste sites will be encountered within the Project Area during construction. If hazardous waste sites are encountered, construction will be suspended and the NDDH will be contacted immediately to determine the best method for removal or clean up.

Any hazardous materials used for the construction of the Project will be contained according to the North Dakota Pollutant Discharge Elimination System (NDPDES) Permit. In addition, a storm water pollution prevention plan (SWPPP) will be developed as part of the NDPDES permit. Hazardous materials used for maintenance will be stored inside a building or surrounded by a containment area to prevent contamination from spills. There will be no underground storage tanks installed at the Project site. On-site storage of turbine petroleum products in the maintenance facility is anticipated to be minimal and stored above ground.

A Spill Prevention, Control and Countermeasure (SPCC) Plan will be prepared for the Project if oil storage will exceed 1,320 gallons.

### *Security*

It is anticipated that construction of the Project will not impact the security of surrounding residents or communities as it is largely a rural area and the turbines will not abut residences. All facilities, including turbine access doors, the Project substation and the O&M facility, will be locked and have appropriate warning signage. Additionally, the Project substation and the outdoor storage yard at the O&M facility will be enclosed in a chain-link fence.

## 6.5. Sound

The Project is located in a rural setting in northern North Dakota. Sound is generated by wind turbines due to turbulence at the blade tips, from mechanical systems in the hub or nacelle (which radiates throughout the structure), and from transformers at the base of the turbine mast. Sound increases with wind speed until maximum blade rotational speed is reached, which usually occurs when wind speeds reach 8–10 mps at the turbine hub.

Sound contributors in the Project Area include farm machinery, roadway traffic and oil facilities and activity. Sound levels in rural settings typically range from 35 to 45 dBA. The Project will implement a minimum 1,400-foot setback between turbines and residences to reduce any potential turbine-related sound at residences to levels consistent with those of a rural setting.

### 6.5.1. Sound Impacts/Mitigation

EAPC Wind Energy (EAPC) conducted a sound analysis for the proposed Project. The Sound Analysis is located in **APPENDIX D. SOUND AND SHADOW FLICKER ANALYSIS**. The sound analysis studied the turbine model with the highest sound emission level. Therefore, the results would be representative of any turbine model with sound levels at or below that evaluated. EAPC's sound analysis found that sound emission levels within 100 feet of all occupied residences were below 50 dBA when assessing the turbine model with the highest sound emission levels and modeling for ground attenuation.

## 6.6. Visual

The visual landscape of the Study Area consists of a rural setting including agricultural fields, grasslands and wetlands. Oil and gas development is very prevalent within the Study Area and Project Area. Temporarily erected oil and gas drilling rigs reach approximately 100 feet above ground level. The pump jacks that are placed over the drilled hole are significantly shorter, 25 to 30 feet at max height. The oil and/or saltwater



storage tanks on oil production pads are 25 feet at max height. The Study Area contains two communication towers and one overhead transmission line that transects the Study Area from north to south. No visually sensitive areas, such as National Parks, exist in or directly adjacent to the Study Area.

Land within the Study Area is utilized mainly for agricultural purposes. Crops in the Study Area consist mainly of wheat, canola, barley, soybeans and sunflowers, with limited amounts of alternative crops grown. The native vegetation in the Study Area is mainly composed of western wheatgrass, green needlegrass, blue-stem, and needle and thread along with prairie cordgrass and reedgrass occurring near wetlands. Wetlands of various hydrology, soils, and vegetation exist within the Study Area. In addition, small drainages exist within the Study Area.

### *Shadow Flicker*

Shadow flicker may result during certain conditions when the combination of lighting, location, and rotation of turbine blades can cast flickering shadows, which can be a nuisance if cast upon inhabited homes or visually sensitive areas. EAPC conducted a shadow flicker analysis of the preliminary layout, which can be found in **APPENDIX D. SOUND AND SHADOW FLICKER ANALYSIS**.

## **6.6.1. Visual Impacts/Mitigation**

Visual and aesthetic impacts would result from construction of the proposed Project. Measuring the aesthetic value of a specific landscape is difficult and may vary based on an individual's personal values, experiences, or preferences. The degree of visual contrast will vary based on the viewpoint distance and location in relation to the Project. Given the Project's location within the Bakken oil production region, there are several oil facilities visible throughout the Study Area.

No local, state, or federal guidelines exist that determine the threshold for shadow flicker. However, 30 hours of shadow flicker per year is a commonly cited target for wind projects, and Lindahl will target shadow flicker of 30 hours per year or less when siting Project turbines. EAPC's shadow flicker analysis concluded that only one residence would potentially have over 30 hours of shadow flicker per year for the turbine with the maximum shadow flicker potential. If the turbine with the maximum shadow flicker potential is ultimately used, mitigation measures will be employed to reduce shadow flicker to 30 hours per year or less at the affected residence, as necessary. All of the residences would be below 30 hours for a turbine with less shadow flicker potential than the maximum studied.

Additional impacts to adjacent land users may occur from tower lighting or marking. The FAA requires specific lighting depending on Project location. Mitigation options for such impacts are limited because the lighting and markings are designed to be visible to pilots. In order to minimize visual impacts to adjacent land users, wind turbine lighting will not exceed FAA lighting requirements unless warranted by the FAA (see the air traffic impacts discussion in **SECTION 6.4.1. HUMAN HEALTH AND SAFETY IMPACTS/MITIGATION**). Furthermore, the use of setback distances from occupied residences is anticipated to alleviate some of the direct visual impacts to adjacent residents by reducing the intensity of the lights through distance buffers.

## **6.7. Cultural and Archaeological Resources**

Lindahl Wind has coordinated with the State Historical Society of North Dakota (SHSND). In a November 24, 2014 letter, SHSND requested that Lindahl Wind conduct a Class I Literature Review, a Class III Pedestrian Survey and a Class II Architectural History Reconnaissance Survey within the physical area of potential

effect (APE). The APE subject to the Class III Pedestrian Survey is defined as any ground surface areas directly disturbed or that have the potential to be disturbed by any construction or installation activities associated with the wind farm.

KLJ conducted a Class I Literature Review of the Study Area at the SHSND on October 30, 2014. The literature review revealed 96 previously recorded cultural resources identified during 18 previous inventories. Of these resources, 25 are located within the Project Area APE. These resources include<sup>5</sup>:

- ◆ 2 archaeological sites;
- ◆ 1 archaeological isolated find;
- ◆ 20 archaeological site leads; and
- ◆ 2 historical sites.

Wind turbines, access roads and associated facilities have been sited to avoid archaeological sites identified from the Class I Literature Review.

A meeting with the SHSND was held on December 10, 2014 to determine the visual APE for the architectural history survey. SHSND determined an APE for visual impacts and identified 53 locations that required architectural surveys to be conducted.

The Class II Architectural History reconnaissance survey, in compliance with NDCC Chapter 55-02-07, was conducted on January 20–22, 2015 for the 53 sites identified by SHSND in the Study Area. During the inventory, field-crew could only access and document 52 sites; therefore, a total of 51 architectural history sites and one potential historic district (McGregor) were documented. Of these 52 accessed sites, only 12 sites occur within the Project Area. Of the 12 sites, 7 were recommended for no further study and 5 were recommended potentially eligible for nomination to the National Register of Historic Places. SHSND has requested that cultural resource site forms be completed for all 12 sites. Lindahl Wind will continue to coordinate with SHSND to ensure that construction of access roads and Project facilities will not impact cultural resources that SHSND recommends for avoidance.



A Class III Pedestrian Inventory was conducted on April 13–22, 2015. Eighteen newly recorded cultural resources were documented within the Project Area.

At the recommendation of SHSND, a scoping package was sent to the Three Affiliated Tribes and the Turtle Mountain Band of Chippewa on February 2, 2015 requesting any comments or information regarding potential sensitive resources within or near the Study Area. As of the date of this Application, no response from either party has been received.

<sup>5</sup> As outlined in Chapter 55 of the North Dakota Century Code, distribution of cultural resource data is prohibited.

### 6.7.1. Cultural and Archaeological Resources Impacts/Mitigation

Any ground disturbing activity within the Project Area can potentially impact known or unknown cultural resources. There may also be possible concerns regarding visual impacts to historic properties within and adjacent to the Project Area.

The Class II report is complete, site forms will be completed for the 12 sites within the Project Area and coordination with SHSND will be on-going. The Class III survey work has been completed and the report will be completed for SHSND evaluation.

Wind turbines, access roads, and associated facilities have been sited to avoid archaeological sites identified from the Class I Literature Review and Class III Pedestrian Survey.

Lindahl Wind has also prepared an Unanticipated Discoveries Plan. The plan details a process for prompt communication and action regarding the discovery of previously unknown archaeological resources or human remains, should they be encountered during construction. The plan was submitted and found to be acceptable by SHSND on March 26, 2015. Please refer to **APPENDIX E. UNANTICIPATED DISCOVERIES PLAN.**

## 6.8. Recreational Resources

There are no designated recreation areas, public or private parks or designated trails in the Study Area. Recreational opportunities in the vicinity of the Project include fishing, wildlife watching, and hunting. The nearest recreational opportunity is the Tioga Country Club located 1 mile northwest of the City of Tioga or 2.6 miles southeast of the Project Area at the nearest point.

As noted in **SECTION 6.2. LAND USE ON PAGE 27**, several USFWS and NDGFD managed parcels are located just beyond the Study Area boundaries. None of the aforementioned parcels will be directly affected by the Project.

### 6.8.1. Recreational Resources Impacts/Mitigation

Impacts on recreational resources from construction of the proposed Project would be mainly visual in nature. Sportsmen, landowners and birdwatchers that make use of the lands within the Project Area will likely be impacted by the sight and possibly the sound of wind turbines. Wind turbines and MET towers are set-back 1/2-mile from McGregor Dam WMA boundaries to minimize disturbances to wildlife.

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

## 6.9. Effects on Land-Based Economics

### *Agriculture*

According to the U.S. Department of Agriculture (USDA) 2012 Census of Agriculture, Williams County contains 758 farms, which primarily produce wheat, durum and cattle, ranking 25<sup>th</sup> out of 53 ND counties. The market value of agricultural products sold in Williams County was \$178.7 million in 2012, with a per farm average of \$235,756.

### Woodlands

Wooded areas within the Study Area consist of shelter belts and wooded ravines. There are no economically significant forestry resources located within the Study Area.

## 6.9.1. Land Based Economics Impacts/Mitigation

### Agriculture

Construction of the proposed Project would result in the permanent conversion and the temporary conversion of agricultural land into a renewable, alternative energy source. The Project will permanently impact approximately 116.0 acres of land based on calculations from primary turbine locations, access roads, MET towers, the O&M facility and substation. The Project will temporarily impact approximately 361.0 acres of land based on calculations from the above mentioned facilities plus collection lines and equipment laydown area. A majority of impacts will be on grassland or cultivated lands. Long-term benefits would be seen in the form of profits associated with lease payments from the Project. This additional income would also be reflected as an increase to the county tax base. Additional money brought into the community would most likely be seen in increased spending at local businesses and improvements to the communities and counties.

### Woodlands

Impacts to woodlands from the placement of wind turbines and associated facilities are anticipated to be minor in nature. Tree removal and replacement would be coordinated with landowners and conducted in accordance with the Commission's tree and shrub mitigation specifications.

## 6.10. Soils

There are 45 soil types found within the Study Area. The majority of these soil types are loamy soils. Loamy soils are a broad textural class of soils that contain a mixture of sand, silt, and clay particles. While most soils contain some mixture of these three particles, an ideal loam exhibits the properties of sand, silt, and clay in approximately equal proportions (not equal amounts). The presence of clay in a soil has a greater influence on a soil than the presence of silt or sand; therefore, a soil name can include the modifier 'clay' with as little as 20 percent clay, while a soil must contain at least 40 percent sand or 45 percent silt in order to contain those respective modifiers in its name. Soils identified as sandy loams have moderately coarse textures, silt loams have medium textures, and clay loams have moderately fine textures. Soil types located within the Project Area include loams, silt loams, sandy loams, and clay loams.



Prime farmland is the land that has the best combination of physical and soil characteristics for producing food, feed, forage, fiber, and oilseed crops. The USDA NRCS has two classifications for prime farmland: (i) where all areas of the soil series are classified prime farmland; and (ii) where only the drained areas of the soil series are prime farmland. The NRCS also identifies farmland of statewide and local importance, which is land that is important for the production of food, feed, fiber, forage, and oilseed crops. Generally, additional farmlands of statewide or local importance include those that are nearly prime and that produce high yields of crops in an economic manner when treated and managed according to acceptable farming methods. Some may produce as high of a yield as prime farmland soils if conditions are favorable.

Of the 45 soil types within the Study Area, 4 soil types are classified by the NRCS as prime farmland, 12 are classified as farmland of statewide importance and 29 are not classified as prime farmland or farmland of statewide importance. Please refer to TABLE 13. SOILS SUMMARY.

Approximately three percent of the Project Area is comprised of soils that are classified as prime farmland; with approximately 58 percent of the Project Area comprised of soils that are of statewide importance. Please refer to TABLE 14. FARMLAND CLASSIFICATION ON PAGE 40 and EXHIBIT A-8. PRIME AND UNIQUE FARMLAND, in Appendix A.

**Table 13. Soils Summary**

MAP UNIT SYMBOL	SOIL TYPE	PRIME FARMLAND	FARMLAND OF STATEWIDE IMPORTANCE	NOT PRIME OR FARMLAND OF STATEWIDE IMPORTANCE
C400A	Bearden silt loam, 0 to 2 percent slopes	X		
C419A	Wildrose silty clay, 0 to 2 percent slopes	X		
C451A	Arnegard loam, 0 to 2 percent slopes	X		
C451B	Arnegard loam, 2 to 6 percent slopes	X		
C132B	Williams-Zahl loams, 3 to 6 percent slopes		X	
C210A	Williams-Bowbells loams, 0 to 3 percent slopes		X	
C210B	Williams-Bowbells loams, 3 to 6 percent slopes		X	
C415A	Tansem loam, 0 to 2 percent slopes		X	
C418B	Tansem-Sakakawea loams, 2 to 6 percent slopes		X	
C242A	Nutley west, silty clay, 0 to 2 percent slopes		X	
C480A	Shambo loam, 0 to 2 percent slopes		X	
C501A	Korchea loam, 0 to 2 percent slopes, occasionally flooded		X	
C663A	Niobell-Williams loams, 0 to 3 percent slopes		X	
C767B	Parshall-Tally fine sandy loams, 0 to 6 percent slopes		X	
C810A	Bowdle loam, 0 to 2 percent slopes		X	
C905C	Amor-Williams-Zahl loams, 3 to 9 percent slopes		X	
C132C	Williams-Zahl-Zahill complex, 6 to 9 percent slopes			X
C135C	Zahl-Williams-Zahill complex, 6 to 9 percent slopes			X
C135D	Zahl-Williams loams, 9 to 15 percent slopes			X
C148C	Williams-Zahl-Parnell complex, 0 to 9 percent slopes			X
C153E	Zahl-Max loams, 15 to 25 percent slopes			X
C154C	Zahl-Williams-Bowbells loams, 3 to 9 percent slopes			X
C155F	Zahl-Max-Arnegard loams, 15 to 60 percent slopes			X
C156F	Zahl-Max-Bowbells loams, 6 to 35 percent slopes			X
C165F	Zahl-Max-Parnell complex, 0 to 35 percent slopes			X
C272A	Hamerly-Tonka complex, 0 to 3 percent slopes			X
C2A	Tonka silt loam, 0 to 1 percent slopes			X
C328C	Lihen-Sakakawea complex, 2 to 9 percent slopes			X
C3A	Parnell silty clay loam, 0 to 1 percent slopes			X
C491A	Straw-Fluvaquents channeled, complex, 0 to 2 percent slopes, frequently flooded			X
C526B	Daglum-Rhoades silt loams, 2 to 6 percent slopes			X
C580A	Harriet-Regan-Stirum complex, 0 to 2 percent slopes, occasionally flooded			X
C5A	Southam silty clay loam, 0 to 1 percent slopes			X
C75A	Vallers loam, saline, 0 to 1 percent slopes			X
C800B	Appam sandy loam, 2 to 6 percent slopes			X
C816B	Lehr loam, 2 to 6 percent slopes			X
C818B	Lehr-Williams loams, 0 to 6 percent slopes			X



MAP UNIT SYMBOL	SOIL TYPE	PRIME FARMLAND	FARMLAND OF STATEWIDE IMPORTANCE	NOT PRIME OR FARMLAND OF STATEWIDE IMPORTANCE
C818C	Lehr-Williams loams, 6 to 9 percent slopes			X
C825A	Divide loam, 0 to 2 percent slopes			X
C870E	Wabek-Lehr-Appam complex, 9 to 25 percent slopes			X
C874B	Wabek-Appam complex, 2 to 6 percent slopes			X
C874C	Wabek-Appam complex, 6 to 9 percent slopes			X
C877B	Wabek-Lehr complex, 2 to 6 percent slopes			X
C877C	Wabek-Lehr complex, 6 to 9 percent slopes			X
C906E	Amor-Zahl-Werner loams, 9 to 25 percent slopes			X

**Table 14. Farmland Classification**

FARMLAND CLASSIFICATION	ACRES WITHIN STUDY AREA	ACRES WITHIN PROJECT AREA	TEMPORARY IMPACTS (ACRES)	PERMANENT IMPACTS (ACRES)
Prime	1,143	433	9.0	0.5
Statewide Importance	19,892	7,529	387.0	37.0
Not Prime or Farmland of Statewide Importance	18,107	4,980	204.0	16.0

### 6.10.1. Soils Impacts/Mitigation

Soil impacts would be localized, and BMPs would be implemented to minimize these impacts. Surface disturbance caused by construction of the wind turbines and infrastructure improvements would result in the soil surface becoming more prone to erosion. Another soil resource issue is soil compaction, which can occur by use of heavy equipment. Silt and clay soils are especially susceptible to this. Mitigation for soil impacts would not be required, though BMPs to reduce impacts should be implemented. These may include the use of erosion and sediment control during and after construction, noxious weed control, segregating topsoil from subsurface materials, reseeding of disturbed areas, the use of construction equipment appropriately sized to the scope and scale of the Project, ensuring access road grades fit closely with the natural terrain, proper on-site disposal of soil cuttings from turbine foundation construction and maintaining proper drainage.

The Project is proposed to permanently impact less than 1 percent of the total land in the Project Area that could be considered prime farmland or farmland of statewide importance. As such, the acreage of prime farmland and farmland of statewide importance removed from use for the life of the Project will have a negligible impact on agricultural production. Therefore, in accordance with NDAC Section 69-06-08-01(1)(d), Lindahl Wind requests that the Commission determine that a prime farmland exclusion shall not apply to the Project.

## 6.11. Geologic and Groundwater Resources

Surface geology within the Study Area is considered part of the Coleharbor Formation, which consists of glacial sediment including pockets of cross bedded sands and gravels as well as layers of silt and clay, approximately 100–200 feet thick. Due to these geological sequences, the region in which the Study Area is located is commonly referred to as the prairie pothole region, which was formed as large ice chunks left by melting glaciers created wetland basins. Please refer to **EXHIBIT A-9. GEOLOGIC AND GROUNDWATER RESOURCES**, in Appendix A.

No sole source aquifers occur within the Study Area. The nearest aquifer, Wildrose Aquifer, is approximately 4 miles northwest of the Study Area or over 5 miles northwest of the Project Area. According to North Dakota State Water Commission data, there are 63 domestic/stock/industrial wells located within the Study Area.

In addition to groundwater resources, the Study Area lies atop the Bakken and Three Forks Formations, geologic formations rich in oil and gas deposits. The U.S. Geological Survey (USGS) estimates that there are approximately 3.7 billion barrels of recoverable oil in each of the formations. In addition, the North Dakota Department of Mineral Resources estimates that there are 30–40 years of oil production remaining or more if technology improves. As of April 2015, there were 173 active or confidential oil and gas wells scattered throughout the Study Area and 81 within the Project Area.

### 6.11.1. Geologic and Groundwater Impacts/Mitigation

Impacts to geologic formations and/or groundwater resources are not anticipated; therefore, no mitigation is required.

Oil and gas and wind development have co-existed in the same areas successfully for many years across the United States. Tradewind has extensive experience developing wind projects in areas of high oil and gas production. In some of the most prominent oil and gas fields in Kansas and Oklahoma, Tradewind-developed projects alone have resulted in nearly 500 wind turbines and associated wind energy facilities being successfully installed amongst existing oil and gas facilities. In each of those projects, oil and gas leasing, drilling, and operations continued throughout construction and operation of the wind projects.

For this Project, Lindahl Wind is coordinating with oil and gas facility owners and/or operators in or near the Project Area. Lindahl Wind invited parties that own or operate underground facilities in the Project Area to a ‘utility meet’ at the Project site designed to help Lindahl Wind locate underground facilities (such as pipelines) and coordinate with facility owners. On March 11, 2015, Project representatives met with United Locating and 11 locators representing oil and gas operators/developers. All locators present were provided maps of the Project including a preliminary wind turbine array as well as oil and gas data that has been collected to that date. The locators also identified the underground infrastructure within 400 feet of all proposed turbine locations. Lindahl Wind’s preliminary Project design takes the location of the facilities identified into account to ensure no problems arise during construction or operations of the Project.

Prior to and during construction, Lindahl Wind will continue to coordinate with oil and gas parties in or near the Project Area to ensure the continued development of both the mineral and surface estates.

## 6.12. Surface Water and Floodplain Resources

The Study Area is located in the Lake Sakakawea Watershed Basin, which is located in the larger prairie pothole region of North Dakota. This region contains wetland basins of various sizes and water regimes. In addition, small streams, drainages and a few larger un-named perennial water bodies occur within the Study Area. Please refer to **EXHIBIT A-10. SURFACE WATERS AND USFWS NWI WETLANDS**, in Appendix A. These water complexes may be used for hunting, bird watching, and potentially fishing purposes; however, they are likely not utilized for boating activities other than occasional occurrences of smaller watercraft associated with hunting or fishing.

A search revealed no flood rating maps compiled for the Study Area due to its rural location. Additionally, the NDSWC stated in a letter that there are no floodplains identified and/or mapped within the Study Area.

### 6.12.1. Surface Water and Floodplain Resources Impacts/Mitigation

Project facilities have been designed to avoid impacts on surface water resources to the extent practicable. Wind turbines will be built on uplands to avoid surface water resources in the lower elevations to the extent practicable. However, Project facilities, such as underground electrical collection lines, access roads, turbine pads, and the O&M building, will impact land and; therefore, potentially impact surface water runoff within the Study Area. These impacts are expected to be minimal. Impacts to surface water would be avoided and/or minimized through use of BMPs. In addition, if more than 1,320 gallons of oil storage occurs on site, the Project will complete and implement a SPCC Plan.

The Project will not impact known floodplain areas.

## 6.13. Wetlands

Wetlands are defined both in the 1977 Executive Order 11990, Protection of Wetlands, and in Section 404 of the Clean Water Act (CWA) of 1986, as those areas that are inundated by surface or groundwater with a frequency to support and, under normal circumstances, do or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Three parameters that define a wetland, as outlined in the Federal Manual for Delineating Jurisdictional Wetlands, are hydric soils, hydrophytic vegetation, and hydrology. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands are important natural resources that often serve many functions, such as providing habitat for wildlife, storing floodwaters, recharging groundwater, and improving water quality through purification.

The Study Area is located in the ecoregion identified by the USGS as the Glacial Lake Deltas of North Dakota. The ecoregion is composed of a flat to gently rolling landscape with glacial drift. The subhumid conditions foster a grassland transition between the tall and short grass prairie. High concentrations of temporary and seasonal wetlands create favorable conditions for duck nesting and migration. Dunes in the delta areas have a thin vegetative cover and high risks for wind erosion, and thus are used mainly for grazing or irrigated agriculture.

The potential for wetlands within the Study Area was identified by using USFWS National Wetlands Inventory data (NWI). Please refer to **EXHIBIT A-10. SURFACE WATERS AND USFWS NWI WETLANDS**, in Appendix A.

A field wetland delineation was completed on May 4–6, 2015 to better assess the wetlands. A total of 72 wetlands spanning a total area of approximately 16 acres was delineated within the Project Area.

In addition, several wetland basins are protected by USFWS wetland easements as mentioned in SECTION 6.2. LAND USE ON PAGE 27.

#### 6.13.1. Wetland Impacts/Mitigation

Wetland impacts will be avoided to the extent practicable and USFWS wetland easement basins will be avoided. Due to the nature and location of wetlands identified within the Project Area, some collection lines will need to be bored underneath wetland basins.

Any impacts to U.S. Army Corps of Engineers (USACE) jurisdictional waters will be permitted and mitigated in accordance with Section 404 of the Clean Water Act.

Coordination with USFWS is ongoing with respect to potential impacts to USFWS wetland easements.

#### 6.14. Vegetation

According to the NDGFD *North Dakota Comprehensive Wildlife Strategy*, the Study Area is located within the EPA designated Level IV Ecoregion of the Northwestern Glaciated Plains, commonly referred to as the Missouri Coteau Region. This ecoregion is associated with mixed-grass prairie. Vegetation of the mixed-grass prairie consists of wheatgrass (*Agropyron cristatum* and *Pascopyrum smithii*), bluestem (*Andropogon gerardii* and *Schizachyrium scoparium*), needleandthread (*Hesperostipa comate*), green needlegrass (*Achnatherum sp.*), with prairie cordgrass (*Spartina pectinata*), and northern reedgrass (*Calamagrostis stricta*) near wetlands.

Approximately 30 percent of the Study Area and Project Area consists of grassland. In addition, three grassland easements located in the Study Area (but outside of the Project Area) are protected by the USFWS, as mentioned in SECTION 6.2. LAND USE ON PAGE 27.

Woodlands comprise less than one percent of the total Study Area and Project Area. The trees consist of wooded draws and planted hardwood shelterbelts for wind protection around farmsteads or in cropland fields.

#### 6.14.1. Vegetation Impacts/Mitigation

The wind turbines and associated facilities will be constructed on both cropland and grasslands. Access roads have been sited to follow section lines wherever practicable and lessen the impact and fragmentation of existing grasslands. Following construction, the temporarily disturbed areas will be re-vegetated with a seed mixture consistent with the surrounding vegetation and free of noxious weeds. Once re-vegetated, these areas will be available for their present use (e.g., cultivation, grazing, and prairie).

The grassland easements are not within the Project Area; therefore, they will not be impacted.

Tree mitigation was previously addressed in SECTION 6.9.1. LAND BASED ECONOMICS IMPACTS/MITIGATION ON PAGE 38.

## 6.15. Wildlife

### *Avian Species*

The Study Area lies within a major bird migration route following the Great Plains of the U.S. and Canada, known as the Central Flyway. Within the Central Flyway lies the Prairie Pothole Region, which provides migration and breeding habitat in the form of abundant grasslands and wetland basins for ducks, geese and other bird species.

Protection is provided for bald and golden eagles, as well as 836 species of migratory birds (58 of which are hunted), through the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). Both laws are intended to prohibit 'take' and regulate impacts to eagles and other migratory birds from direct mortality, habitat degradation, and/or displacement of individual birds.

To determine the presence of bird species that may occur within the Study Area, the North Dakota Parks and Recreation Department (NDPRD) Natural Heritage Inventory Database (NHID) and the North American Breeding Bird Survey (BBS) databases were reviewed. The BBS is an annual survey conducted at the height

of the breeding season (June), with over 4,100 routes surveyed within Canada and the U.S. The nearest survey route is Wild Rose, less than 2 miles west of the Study Area. The Wild Rose route has been surveyed annually from 1982–2013. Over the 31 years of surveys, approximately 35,500 individuals have been identified, comprising 119 species of songbirds, shorebirds, raptors and waterfowl.

Twenty-five avian species were identified during field surveys conducted on May 4–6, 2015. They included songbirds, raptors and waterfowl.

Species of habitat fragmentation concern (SHFC) are species of concern 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, 2012a). As of February 2013, the USFWS of North Dakota has identified 11 SHFC, 9 of which have primary habitat within the Study Area. Nine of the SHFC have been recorded during the BBS survey and two were documented during May 2015 field surveys. Please refer to **TABLE 15. SPECIES OF HABITAT FRAGMENTATION CONCERN.**



**Table 15. Species of Habitat Fragmentation Concern**

COMMON NAME	SCIENTIFIC NAME	PRIMARY HABITAT	SPECIES IDENTIFIED ON WILD ROSE SURVEY ROUTE	SPECIES IDENTIFIED DURING MAY 2015 FIELD SURVEY
Baird's Sparrow	<i>Ammodramus bairdii</i>	X	X	
Bobolink	<i>Dolichonyx oryzivorus</i>	X	X	
Chestnut-collared Longspur	<i>Calcarius ornatus</i>	X	X	
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	X	X	
Greater Prairie Chicken	<i>Tympanuchus cupido</i>			
Greater Sage Grouse	<i>Centrocercus urophasianus</i>			
Northern Harrier	<i>Circus cyaneus</i>	X	X	X
Sedge Wren	<i>Cistothorus platensis</i>	X	X	
Sharp-tailed Grouse	<i>Tympanuchus phasianellus</i>	X	X	X
Sprague's Pipit	<i>Anthus spragueii</i>	X	X	
Upland Sandpiper	<i>Bartramia longicauda</i>	X	X	

Review of bald and golden eagle habitat revealed that only bald eagle habitat occurs near the Study Area. No bald or golden eagle sightings were recorded on the Wild Rose survey route within the 31 years of data collection. Additionally, according to 2013 raptor spatial data from the NDGFD and the NDPRD NHID, no historically documented bald or golden eagle nests have been identified within 1-mile of the Study Area.

Field raptor surveys were completed on May 21, 2015 for the Project Area plus a 1-mile buffer and no bald or golden eagle sightings were documented.

#### Mammals

Common mammals that may occur within the Study Area include white-tailed deer, coyote, red fox, white-tailed jackrabbit, raccoon, badger, striped skunk. All of these species can be found throughout North Dakota and do not require special habitat types. During field surveys, a white-tailed deer, coyote and white-tailed jackrabbit were identified. All of these species are habitat generalists whose ranges coincide with the Project Area.



#### Bat Species

According to a study of bat distribution and habitat use conducted by Gillam and Barnhart, 2010, 11 bat species are found in North Dakota. Areas of highest bat diversity contain a range of elevations, vegetation types and roost types (rock crevices and trees), such as the Badlands, Missouri River Valley and the Turtle Mountains. The Study Area lacks trees for roosting and consists of gently rolling hills. While bat species may use the Study Area for foraging or as a migration route, potential hibernacula and roosting sites are limited.



Additionally, acoustic monitors have been placed on three temporary MET towers and collecting data since May 2015. This data will be analyzed to document the prevalence of bat species in the Project Area.



## 6.15.1. Wildlife Impacts/Mitigation

### *Avian Species*

Potential impacts to avian species from the construction of the Project include turbine rotor strikes, direct impacts to nests or individuals during construction of the Project, as well as the removal, degradation, and fragmentation of habitat.

To prevent bird strikes with electric lines, all collection lines would be buried underground. To minimize degradation of habitat, a majority of the turbines have been sited on existing cropland to avoid disturbing grassland habitats. Additionally, all areas of temporary disturbance will be reclaimed with vegetation consistent with the surrounding vegetation types and in accordance with NRCS recommendations, unless otherwise specified by the landowner and approved by the Commission. Tree impacts will be mitigated in kind, as approved by the landowner and consistent with the Commission's tree and shrub mitigation specifications. To prevent further fragmentation on the landscape, existing access roads will be used to the extent practicable.

Coordination and discussion to determine potential mitigation/minimization measures are ongoing with USFWS. In addition, Lindahl Wind will prepare a Bird & Bat Conservation Strategy (BBCS) prior to operation of the proposed Project, which will outline specific mitigation measures.

### *Mammals*

Ground clearing activities associated with construction of the turbines and associated facilities would result in the direct conversion of habitat, as well as the degradation and fragmentation of habitat for ground dwelling mammals and other wildlife species. The white-tailed deer, coyote, red fox, white-tailed jackrabbit, raccoon, striped skunk, and badger discussed in the previous section are habitat generalists and can readily relocate to adjacent unaffected areas and continue to thrive.

To minimize degradation of habitat, all areas of temporary disturbance will be reclaimed with vegetation consistent with the surrounding vegetation types and in accordance with NRCS recommendations, unless otherwise specified by the landowner and approved by the Commission. Additionally, tree impacts would be mitigated in kind, as approved by the landowner and consistent with the Commission's tree and shrub mitigation specifications.

### *Bat Species*



Potential impacts to bat species from the construction of the Project include turbine rotor strikes, barotrauma from turbine blades, as well as the removal, degradation, and fragmentation of foraging habitat. Turbines and access roads have been sited to avoid wooded draws and shelterbelts to the extent possible and minimal tree removal is expected.

To minimize degradation of habitat, all areas of temporary disturbance will be reclaimed with vegetation consistent with the surrounding vegetation types and in accordance with NRCS recommendations, unless otherwise specified by the landowner and approved by the Commission. Additionally, tree impacts will be mitigated in kind, as approved by the landowner and consistent with the Commission's tree and shrub mitigation specifications. Coordination and discussion with the USFWS to determine potential mitigation/minimization measures are ongoing. Minimization measures will be implemented per the BBCS.

## 6.16. Rare and Unique Natural Resources

An endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future. A candidate species is a plant or animal for which USFWS has sufficient information on its biological status and threats to propose it as endangered or threatened under the Endangered Species Act (ESA), but for which development of a proposed listing regulation is precluded by other higher priority listing activities. While candidate species are not legally protected under the ESA, it is within the spirit of the ESA to consider said species as having significant value and being worth protecting. A proposed species is one that was found to warrant listing as either threatened or endangered and was officially proposed as such in a Federal Register notice after the completion of a status review and consideration of other protective conservation measures. USFWS has one year after a species is proposed for listing under the ESA to make a final determination whether to list a species as threatened or endangered. Finally, critical 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. Critical habitat must contain physical or biological features essential to conservation and may require special management considerations or protection.

An inquiry via the USFWS Environmental Conservation Online System—Information, Planning, and Conservation (ECOS-IPaC) website identified the following federally protected resources within Williams County: gray wolf (endangered), interior least tern (endangered), pallid sturgeon (endangered), whooping crane (endangered), piping plover (threatened), red knot (threatened), northern long-eared bat (threatened), Sprague's pipit (candidate) and piping plover designated critical habitat. Please refer to **APPENDIX G. USFWS OFFICIAL SPECIES LIST.**

### *Gray Wolf (Canis lupus)*

The gray wolf (*Canis lupus*) is a keystone predator capable of surviving in a wide range of habitats including forests, mountains and grasslands. This species is uncommon in North Dakota; however, individual wolves occasionally pass through the state. Grassland habitat with sufficient ungulate and small mammal prey occurs within the Study Area; however, the Study Area would be located far from other known gray wolf populations.

### *Interior Least Tern (Sterna antillarum)*

In North Dakota, the interior least tern (*Sternula antillarum*) are known to breed on the sparsely vegetated sandbars of the Yellowstone and Missouri River systems, as well as the shoreline of Lake Sakakawea, between mid-May to mid-August.

Nesting adults usually forage in wetlands or riverine habitat within one mile of nest sites; however, they have been documented to travel up to 3 miles to forage. According to the USACE Missouri River Recovery Least Tern and Piping Plover Data Management System, historical least tern sightings have occurred along the shoreline of Lake Sakakawea, approximately 18 miles south of the Study Area.



*Northern Long-Eared Bat (Myotis septentrionalis)*

The northern long-eared bat (*Myotis septentrionalis*) is a threatened species due to the widespread decline in bat populations from the fungus known as white-nose syndrome (*Pseudogymnoascus destructans*)—as evidenced in the accompanying reference photo. The western population of northern long-eared bats occurs partially in North Dakota, where the bats have been observed during the summer in the Turtle Mountains, Missouri River Valley and the Badlands. Northern long-eared bats spend winter months hibernating in caves and mines (hibernacula) and the summer/fall months roosting in trees or snags. Preferred hibernacula include large caves or mines with large passages and entrances; constant, cooler temperatures (32 to 48 degrees Fahrenheit); and high humidity with no air currents. No hibernacula are known to exist in the state; however, this may be a function of lack of adequate survey data.



Suitable habitat for summer maternity/non-maternity activities, as well as spring staging/fall swarming includes forests and woodlots, as well as fencerows, riparian forests and other wooded corridors. Density and canopy cover is variable within these forested habitats, which may be interspersed with wetlands, agricultural or fallow fields, or pastures. Potential roost sites include live trees or snags that are greater than or equal to 3 inches diameter at breast height (DBH) and may include the following: exfoliating bark, cracks, crevices, or cavities. Isolated trees may be potential roost sites if they exhibit the characteristics described above and are less than 1,000 feet from the nearest roosting site or suitable forested habitat.

Based on a desktop analysis of the 2013 NASS data and National Agriculture Imagery Program (NAIP) imagery, no suitable winter habitat in the form of caves or mines is located within the Study Area; however, wooded draws and shelterbelts for potential summer habitat are present. Turbines and access roads have been sited to avoid wooded draws and shelterbelts to the extent possible and minimal tree removal is expected.

The northern long-eared bat was not documented during field surveys conducted on May 4–6, 2015.

Acoustic monitors have been placed on three temporary MET towers and collecting data since May 2015. This data will be analyzed to document the prevalence of the northern long-eared bat in the Project Area.

*Piping Plover (Charadrius melodus)*

In western North Dakota, suitable habitat for the piping plover (*Charadrius melodus*) occurs along the Missouri and Yellowstone rivers in the form of riverine sandbars, gravel beaches, and flat, sandy beaches with little vegetation. Suitable habitat also consists of alkali areas of wetlands, which occur throughout North Dakota. According to the USACE Missouri River Recovery Least Tern and Piping Plover Data Management System, historical piping plover sightings have occurred along the shoreline of Lake Sakakawea, approximately 18 miles south of the Study Area.



The piping plover was not documented during field surveys conducted on May 4–6, 2015; however, one wetland was identified to have the potential of being piping plover habitat. The potential habitat was located in Section 16, Township 158 N, Range 95 W and did exhibit a gravel shoreline with little vegetation; however, it was likely due to livestock.

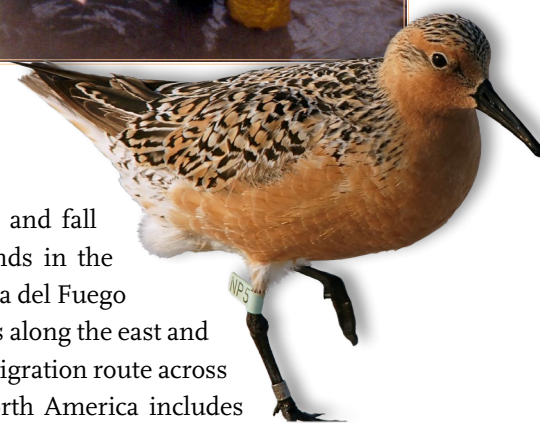
*Pallid Sturgeon (Scaphirhynchus albus)*

In North Dakota, the pallid sturgeon (*Scaphirhynchus albus*) has been documented downstream from the Fort Peck Dam, Montana to the headwaters of Lake Sakakawea, North Dakota and downstream from the Garrison Dam, North Dakota to the headwaters of Lake Oahe, North Dakota. Preferred habitat for the pallid sturgeon includes the bottom of silty river systems, which provide a wide range of depths and flow velocities. Potential habitat associated with Lake Sakakawea is located approximately 18 miles south of the Study Area. No potential habitat occurs within the Study Area.



*Rufa Red Knot (Rufa Red Knot)*

The rufa red knot (*Calidris canutus rufa*) migrates during the spring and fall between breeding grounds in northern Canada and wintering grounds in the southeast U.S., the northeast Gulf of Mexico, northern Brazil, and Tierra del Fuego in South America. While a majority of red knots follow migration routes along the east and west coast of the U.S., small numbers of this species follow an inland migration route across the Midwest along the Great Lakes. Preferred stopover habitat in North America includes sandy or gravelly beaches, tidal mudflats, salt marshes, shallow coastal impoundments and peat banks. Preferred prey found in non-breeding habitats including snails, mollusks and insect larvae. No documented sightings of rufa red knot have occurred within the Study Area.



The rufa red knot was not documented during field surveys conducted on May 4–6, 2015; however, one wetland was identified to have the potential of being rufa red knot habitat. The potential habitat was located in Section 16, Township 158 N, Range 95 W and did exhibit a gravel shoreline with little vegetation; however, it was likely due to livestock.

*Sprague's Pipit (Anthus spragueii)*

The Sprague's pipit (*Anthus spragueii*) is a small, ground nesting bird that breeds on open grasslands throughout the Northern Great Plains and winters in grasslands in the southern plains, the southwest, and Mexico. Within North Dakota, the Sprague's pipit breeds on well-drained, open grasslands, feeding mostly on insects, spiders and seeds. During the breeding season, this species prefers large patches of native grassland with a minimum size requirement thought to be approximately 360 acres; they have not been observed in patches of grassland less than approximately 72 acres. Native grassland with grass height between 4 to 12 inches and lacking shrubs is preferred; however, they will occasionally use non-native planted grassland. According to a desktop analysis of 2014 NASS data, the Study Area contains 8,243

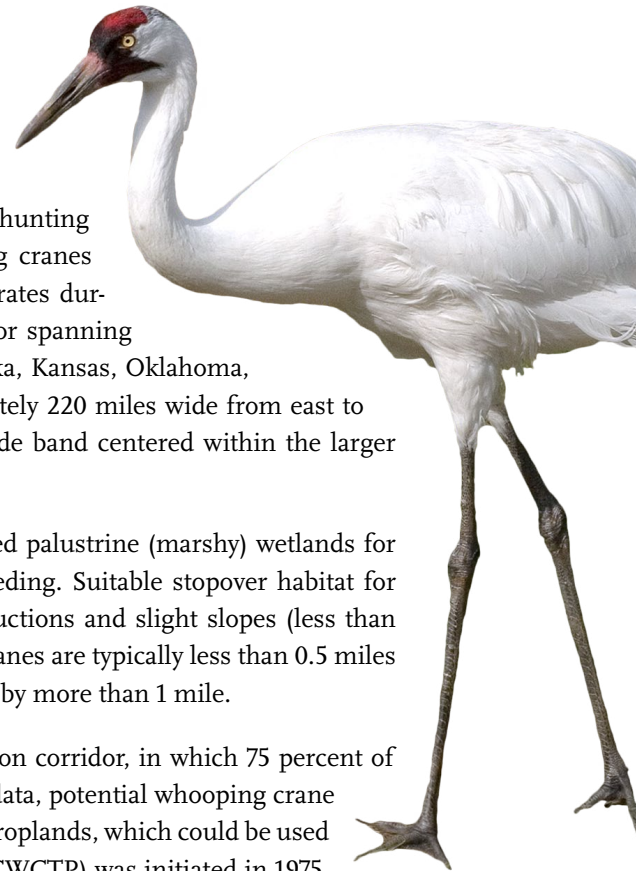


acres of contiguous grasslands larger than 72 acres, which may provide suitable habitat for the Sprague's pipit; however, only 3,038 acres are located in the Project Area.

The call of a Sprague's pipit was identified during field surveys conducted on May 4–6, 2015. It was identified in Section 32, Township 159 N, Range 95 W.

#### *Whooping Crane (Grus Americana)*

The whooping crane (*Grus americana*) was listed as a federally endangered species in 1967 due to declines in populations from alteration and destruction of habitat from widespread agricultural activities and hunting pressures. Currently, the only self-sustaining population of whooping cranes consists of the Aransas-Wood Buffalo Population (AWBP), which migrates during spring and fall through a 2,400-mile long by 200-mile wide corridor spanning Saskatchewan, eastern Montana, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas. In North Dakota, the migratory corridor extends approximately 220 miles wide from east to west; however, 75 percent of the sightings occur within an 80-mile wide band centered within the larger corridor.



Whooping cranes use shallow, seasonally and semi-permanently flooded palustrine (marshy) wetlands for roosting, and various cropland (grains) and emergent wetlands for feeding. Suitable stopover habitat for whooping cranes includes areas of shallow water without visual obstructions and slight slopes (less than five percent). Feeding and palustrine roosting locations for whooping cranes are typically less than 0.5 miles apart; however, distance from feeding to roosting sites can be separated by more than 1 mile.

The Study Area is located in the center of the whooping crane migration corridor, in which 75 percent of whooping crane sightings have occurred. According to the 2013 NASS data, potential whooping crane habitat exists in the Study Area in the form of wetlands, grasslands and croplands, which could be used for feeding. Since the Cooperative Whooping Crane Tracking Project (CWCTP) was initiated in 1975, sightings of whooping cranes in the Central Flyway have been collected by a network of federal and state cooperating agencies. Five whooping crane sightings have been documented within 1 mile of the Study Area. The sightings occurred in 1996 (2 sightings), 2000 (1 sighting), 2002 (1 sighting), and 2004 (1 sighting). **EXHIBIT A-11. WHOOPING CRANE MIGRATION CORRIDOR**, in Appendix A identifies the North Dakota whooping crane migration corridor, along with sightings of whooping cranes from 1955–2009.

The whooping crane was not documented during field surveys conducted on May 4–6, 2015.

#### *State Listed Species*

In addition to the threatened and endangered species and conservation priority species discussed above, the NDPRD NHID identifies state sensitive species and ecosystems known to occur in North Dakota. A search of the database identified no plant or wildlife species or ecosystems of concern within the Study Area. The NHID notes that the absence of data cannot be construed to mean no significant resources are present, but may indicate that the Study Area has not been surveyed.

### **6.16.1. Rare and Unique Natural Resources Impacts/Mitigation**

Tradewind, the Project developer, is a member of the Wind Energy Whooping Crane Action Group (WEWAG) who, in coordination with the USFWS and nine state wildlife agencies, are developing a Programmatic

Habitat Conservation Plan (HCP) and associated National Environmental Policy Act (NEPA) document to analyze the potential impacts to the whooping crane, interior least tern, piping plover and lesser prairie-chicken. Lindahl Wind is engaged in ongoing coordination with USFWS to determine potential mitigation/minimization measures with respect to whooping cranes, the northern long-eared bat, piping plover, rufa red knot and Sprague's pipit. Mitigation/minimization measures will be included in the *Threatened and Endangered Species Effects Summary and Commitments* document and BBCS, which will be completed prior to operation of the proposed Project.

#### *Gray Wolf*

Grassland habitat with sufficient ungulate and small mammal prey occurs within the Study Area; however, the Project Area would be located far from other known gray wolf populations. Moreover, the wolf is a wide-ranging habitat generalist that can tolerate human disturbances. Therefore, no impacts are anticipated and no mitigation is proposed for this species.

#### *Interior Least Tern*

No suitable habitat for the interior least tern occurs within the Study Area; therefore, no impacts are anticipated and no mitigation is proposed for this species.

#### *Northern Long-Eared Bat*

Turbines and access roads have been sited to avoid wooded draws and shelterbelts to the extent possible and minimal tree removal is expected.

Coordination and discussion with the USFWS to determine appropriate mitigation/minimization measures are ongoing. These measures will be included in the *Threatened and Endangered Species Effects Summary and Commitments* document, which will be completed prior to operation of the proposed Project.

#### *Pallid Sturgeon*

No suitable habitat for the pallid sturgeon occurs within the Study Area; therefore, no impacts are anticipated and no mitigation is proposed for this species.

#### *Piping Plover*

Potential impacts to piping plover from the construction of the Project include turbine rotor strikes, direct impacts to nests or individuals during construction of the Project, as well as the removal, degradation, and fragmentation of habitat. Coordination between WEWAG and the USFWS to determine appropriate mitigation/minimization measures are ongoing. These measures will be included in the *Threatened and Endangered Species Effects Summary and Commitments* document and BBCS, which will be completed prior to operation of the proposed Project.

#### *Rufa Red Knot*

Little is known about inland rufa red knot migration habitat. Wetlands occur within the Study Area; however, these wetlands do not contain the sandy and gravelly beaches utilized in coastal areas. No suitable habitat for the rufa red knot occurs within the Study Area, therefore no impacts are anticipated and no mitigation is proposed for this species.

### *Sprague's pipit*

Potential impacts to Sprague's pipit from the construction of the Project include turbine rotor strikes, direct impacts to nests or individuals during construction of the Project, as well as the removal, degradation, and fragmentation of habitat. Sprague's pipits have low site fidelity rates, as is typical of many passerines breeding in northern grasslands where habitat suitability varies with annual weather patterns, fire frequency and grazing intensity. However, due to large expanses of grasslands required as habitat for this species, it has been listed as one of the SHFC for North Dakota. To prevent further fragmentation on the landscape, existing access roads will be used to the extent practicable. Additionally, all areas of temporary disturbance will be reclaimed with vegetation consistent with the surrounding vegetation types and in accordance with NRCS recommendations, unless otherwise specified by the landowner and approved by the Commission. To prevent bird strikes with electric lines, all collection lines would be buried underground.

Coordination and discussion with USFWS to determine potential mitigation/minimization measures are ongoing. These measures will be included in the *Threatened and Endangered Species Effects Summary and Commitments* document and BBCS, which will be completed prior to operation of the proposed Project.

### *Whooping Crane*

Potential impacts to whooping crane from the construction of the Project include turbine rotor strikes, as well as the removal, degradation, and fragmentation of migration habitat. The Project Area is located within the center of the whooping crane migration corridor, where 75 percent of sightings have occurred. Suitable stopover habitat occurs within the Project Area, as well as throughout the prairie pothole region of the U.S. and Canada. To avoid impacts to potential roosting sites, wetlands in the Project Area will be avoided to the extent practicable. Additionally, Lindahl Wind has committed to burying all collection lines within the Project Area.

Coordination between WEWAG and the USFWS to determine potential mitigation/minimization measures is ongoing. These measures will be included in the *Threatened and Endangered Species Effects Summary and Commitments* document and BBCS, which will be completed prior to operation of the proposed Project.

## 6.17. Summary of Impacts

Please refer to **TABLE 16. SUMMARY COMPARISON OF IMPACTS.**

**Table 16. Summary Comparison of Impacts**

RESOURCE	POTENTIAL IMPACT	PROPOSED MITIGATION
Demographics	Profits to landowners from part ownership in the Project may increase per capita income within the Project Area and surrounding counties. No long-term changes to demographics are anticipated.	No mitigation is proposed.
Land Use	The Project will permanently convert approximately 53.0 acres of land in the Project Area into a renewable, alternative energy source. The proposed Project would also result in approximately 598.0 acres of temporary impacts. CRP lands could also be impacted.	No mitigation is proposed for general land use conversion; however, lease payments would be made to landowners for placement of wind turbines, access roads, and collection lines. Lindahl Wind will coordinate with local landowners with respect to any areas of CRP land that cannot be avoided to determine seeding specifications for the reclamation of temporarily impacted land and payment requirements for permanently disturbed land.
Public Services	Construction of the Project will temporarily increase traffic on haul roads. Additionally, electric, telephone, and fiber optic lines may be impacted during construction.	Local utility companies will be contacted prior to construction. Lindahl Wind will utilize North Dakota One Call prior to construction to identify existing utilities. Roadways will be returned to pre-existing conditions unless otherwise requested by County authorities during coordination. All applicable road permits will be obtained from Williams County and townships. Lindahl Wind will enter into a road use and maintenance agreement with Williams County and applicable townships, if needed.
Human Health and Safety	No adverse impacts are anticipated.	Wind turbines have been set back at least 1,400 feet from occupied residences and collection lines will be buried to a depth of at least four feet.
Sound	A sound assessment was completed, and using the turbine model with the highest sound emission level and modeling for ground attenuation, sound levels were below 50 dBA within 100 feet of any inhabited residences.	N/A
Visual	The Project will have visual and potential aesthetic impacts from construction of turbines. A detailed shadow flicker analysis was performed and indicated that, if the turbine with the maximum shadow flicker potential is used, one residence would experience more than 30 hours of shadow flicker per year.	Use of setbacks and minimum FAA lighting and marking requirements are anticipated to minimize visual impacts. If the turbine with the maximum shadow flicker potential is used, mitigation measures will be taken to ensure that shadow flicker will be 30 hours per year or less at all occupied residences.
Cultural and Archaeological Resources	Identified cultural resource sites recommended for avoidance will be avoided; therefore, no historic properties will be affected.	A Class III Pedestrian Survey has been completed and wind turbines, access roads, and associated facilities will be sited to avoid known/existing archaeological sites. In addition, an Unanticipated Discoveries Plan has been completed. If cultural resources are discovered during construction or operation, work shall immediately be stopped, the affected site secured, and SHSND notified. As outlined in Chapter 55 of the North Dakota Century Code, distribution of cultural resource data is prohibited.
Recreational Resources	There are no designated recreation areas, public or private parks or designated trails in the Project Area.	No mitigation.
Land Based Economics	Permanent conversion and temporary conversion of land that would consist of farmland, rangeland and potentially prime farmland.	Areas of temporary disturbance will be re-vegetated or available for agricultural purposes, following construction. Economic loss to producers due to land conversion is anticipated to be minor in comparison to additional income provided by wind farm.

RESOURCE		POTENTIAL IMPACT	PROPOSED MITIGATION
Soils		May cause soil surface to become more prone to wind and water erosion and may result in soil compaction and the spread of noxious weeds.	Erosion and sediment control measures will be utilized during and after construction including segregation of topsoil, noxious weed control and the use of construction equipment appropriately sized for the scope of the work. Additionally, Lindahl Wind will ensure that access road grades fit closely with the natural terrain, soil cuttings are properly disposed of, and proper drainage is maintained.
Geologic and Groundwater Impacts		No adverse impacts anticipated.	No mitigation is proposed.
Surface Water and Floodplain Resources		No adverse impacts anticipated.	Use of BMPs such as silt fence, straw wattles, earth berms, retention ponds, and/or rock check dams.
Wetlands		All permanent impacts to wetland basins under USFWS easements will be avoided. The Project may need to bore some collection lines underneath basins to avoid permanent impacts, but neither the act of boring nor the installation of collection lines will permanently impact the hydrology of the wetland.	Any impacts to USACE jurisdictional waters will be permitted and mitigated for in accordance with Section 404 of the Clean Water Act. Coordination with USFWS is ongoing for impacts to USFWS wetland easements.
Vegetation		Temporary and permanent vegetation impacts will occur during construction.	Following construction, temporarily disturbed areas will be reclaimed with vegetation consistent with the surrounding vegetation types and in accordance with NRCS recommendations, unless otherwise specified by and approved by the landowner and approved by the Commission. Seed mixtures will be free of noxious weeds.
Wildlife	Mammal Species	The Project will impact potential habitat for ground dwelling mammals.	Disturbed areas will be re-vegetated, as appropriate. A BBCS will be prepared prior to operation of the Project that outlines proposed mitigation measures.
	Avian Species	The Project may result in impacts to avian species through increasing the potential for bird strikes with the turbine rotors and habitat fragmentation.	All collection lines will be buried. Coordination with the USFWS is ongoing regarding potential mitigation measures. A BBCS will be prepared prior to operation of the Project that outlines proposed mitigation measures.
Rare and Unique Resources	Threatened and Endangered Species	The Project may result in impacts to avian species through increasing the potential for bird strikes with the turbine rotors and habitat fragmentation.	All collection lines will be buried. Coordination with the USFWS is ongoing regarding potential mitigation measures. A Threatened and Endangered Species Effects Summary and Commitments document and BBCS will be prepared prior to operation of the Project that outlines proposed mitigation measures.
	Rare and Sensitive Species	A search of the NHID database identified no species or ecosystems of concern within the Project Area.	Coordination with the USFWS is ongoing, but no mitigation measures are anticipated to be necessary.

## 7. Identification of Potential Permits/Approvals

A permitting matrix was created showing potential federal, state, and local permits that may be needed prior to construction of a wind farm within the Project Area. Please refer to **TABLE 17. POTENTIAL PERMITS/APPROVALS.**

**Table 17. Potential Permits/Approvals**

AGENCY	PERMIT	APPLICABILITY	PERMIT STATUS AND TIMING
FAA	Notice of Proposed Construction or Alteration (Form 7460-1)	<ul style="list-style-type: none"> <li>&gt; Construction or alteration of structures standing higher than 200 feet above ground level</li> <li>&gt; Construction or alteration of structures near airports; 14 CFR 77.13 provides details</li> <li>&gt; Siting within radar line-of-sight of an air defense facility</li> </ul>	<p>The Project has filed Form 7460-1 Notice of Proposed Construction with the FAA for representative turbine locations within the Project Area and has received Determinations of No Hazard for those locations.</p> <p>After Project design is finalized, the Project will submit additional Form 7460-1 Notices of Proposed Construction, as necessary.</p>
	Notice of Actual Construction or Alteration (Form 7460-2)	Supplemental notice provided to FAA within 5 days of turbine reaching final height.	Notice to be submitted within 5 days of reaching final height
USACE	Section 404 Permit	Dredging or filling jurisdictional waters of the United States	May or may not be required dependent upon presence of jurisdictional wetlands.
USEPA	Spill Prevention Control and Countermeasures (SPCC) Plan	Required if any facility associated with the Project (O&M or substation) has oil storage of more than 1,320 gallons.	To be obtained prior to construction, if necessary.
USFWS	Consultation pursuant to ESA Section 10	Regulates a wide range of non-federal activities affecting plants and animals designated as endangered or threatened, and the habitats upon which they depend.	In progress.
USDA-NRCS	Farmland Impact Conversion Rating Form AD-1006	Conversion of prime or unique farmland (only for Projects with federal involvement)	Not anticipated at this time.
USDA-FSA	Right-Of-Way Easement	If siting turbines or access roads on CRP land	To be obtained prior to construction, if necessary.
ND PSC	Certificate of Site Compatibility	Construction of energy conversion facility	To be obtained prior to construction.
NDDH	NDPDES General Permit for Stormwater Discharge Related to Construction (includes SWPPP)	For stormwater discharges from construction activities with disturbances greater than one acre.	To be obtained prior to construction.
	401 Water Quality Certification	Required for filling in jurisdictional waters of United States.	May or may not be required dependent upon presence of jurisdictional wetlands.
	Air Quality Permit (Concrete Batch Plant)	Requested by NDDH	May be required prior to construction.
	Potable/Wastewater Permit	Required for installation of septic system.	To be obtained prior to construction of the septic system.
North Dakota State Water Commission	Drain Permit	Required for any pond, slough, lake or sheetwater drainage for areas with a watershed of 80 acres or more.	Not anticipated at this time.
	Water Permit	Required when withdrawn water is greater than 12.5 acre-feet	To be obtained prior to construction.
ND Highway Patrol	Oversize/Overweight Permit	Required to transport oversize loads on state maintained roads.	To be obtained prior to construction.

AGENCY	PERMIT	APPLICABILITY	PERMIT STATUS AND TIMING
ND State Electrical Board	Electrical Permit	Installation of electrical facilities	To be obtained prior to construction.
ND Department of Trust Lands	Site Plan Approval	Construction of Project facilities	To be obtained prior to construction.
Williams County	Approach Permits	Installation of approach roads	To be obtained as necessary prior to construction.
	Building Permits	Construction of infrastructure	To be obtained prior to construction.
	Conditional Use Permit	Siting of turbines on property not zoned for such a use	In progress.
	Haul Road Permits	Using local roadways for haul roads	To be obtained as necessary prior to construction.
	Utility Crossing Permits	Encroaching on roadways	To be obtained as necessary prior to construction.
Townships	Approach Permits	Installation of approach roads	To be obtained as necessary prior to construction.
	Haul Road Permits	Using local roadways for haul roads	To be obtained as necessary prior to construction.
	Utility Crossing Permits	Encroaching on roadways	To be obtained as necessary prior to construction.

## 8. Factors Considered

The Siting Act (see NDCC § 49-22-09) lists the following factors to guide the Commission in assessing and designating the site for the proposed facility.

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

The preceding sections of this Application provide the research and investigations relating to the Project's potential impacts on public health and welfare, natural resources, and the environment. In addition, SECTION 6.17. SUMMARY OF IMPACTS ON PAGE 52 provides a summary of impacts and proposed mitigation measures to minimize these impacts.

### 8.2. Minimizing Adverse Environmental Effects

Lindahl Wind has utilized or will utilize the most current technologies available to site, construct and operate the Project so as to optimize wind resources, while minimizing potential adverse environmental impacts. Mitigation and minimization measures associated with various resources are identified in their corresponding sections within SECTION 6. ENVIRONMENTAL ANALYSIS.

### 8.3. Potential for Beneficial Uses of Waste Energy

Since wind energy does not create waste energy, there would be no use of waste energy associated with this Project.

### 8.4. Unavoidable Adverse Environmental Effects

Unavoidable adverse environmental effects are described for each resource area in SECTION 6. ENVIRONMENTAL ANALYSIS. Unavoidable permanent ground disturbance will include the permanent conversion of land to a renewable energy generation resource and alteration of the visual landscape through construction and lighting of turbines for the life of the Project. Any additional acreage that will be temporarily impacted during construction will be restored to its original condition to the extent practicable following construction. Lindahl Wind selected its site so as to minimize unavoidable environmental impacts, and will implement appropriate mitigation measures throughout Project development.

### 8.5. Alternatives to the Proposed Site

As discussed in SECTION 2.2. ALTERNATIVES ON PAGE 8, wind energy is the most cost-effective and beneficial option of potential energy alternatives. After considering the initial Project Area and evaluating data received through agency feedback, landowner coordination, literature reviews and site studies, Lindahl Wind believes that the proposed site is the best possible location for the Project.

### 8.6. Irreversible and Irretrievable Commitment of Natural Resources

With a renewable energy project, such as the proposed Project, there are relatively few irreversible and irretrievable commitments of natural resources. Project construction activities are expected to be the primary source of the irreversible and irretrievable commitment of natural resources. Natural resources will be used

in the fabrication and preparation of construction materials, such as concrete, steel, and aggregate, and the vehicles traveling to and from the site during construction will use hydrocarbon fuel. While these materials may not be retrievable after use, these materials are not in short supply, and their use will not have an adverse effect on the availability of these resources. Further, the anticipated benefits will balance the irretrievable commitment of resources for the Project.

### 8.7. Direct and Indirect Economic Impacts

The direct economic impacts resulting from the Project will be primarily positive. The Project will result in the permanent conversion of land; however, the majority of the Project Area will still be available for agricultural practices and landowners will be compensated for the land occupied by the wind turbines and associated facilities.

The Project may also indirectly benefit economies in surrounding communities due to wages and salaries paid to local hires and increased spending at local businesses. Further, long-term benefits to the Williams County tax base resulting from the Project will improve the local economy. Continuing to establish North Dakota as a producer of renewable energy sources may spur the development of related businesses in the area, which will contribute to the economic growth in the region.

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

No conflicts with the existing development plans of state, local, or private entities within the Project Area are anticipated. The Project will comply with applicable provisions of the Williams County Zoning Ordinance.

### 8.9. Effect of Site on Cultural Resources

Wind turbines, access roads, and associated facilities will be sited to avoid archaeological sites and traditional cultural properties. If additional cultural resources are discovered, Lindahl Wind will work with SHSND to avoid or mitigate impacts. Lindahl Wind has prepared an Unanticipated Discoveries Plan, which was approved by SHSND. The plan details a process for prompt communication and action regarding the discovery of previously unknown cultural resources or human remains, should they be encountered during construction. See SECTION 6.7. CULTURAL AND ARCHAEOLOGICAL RESOURCES ON PAGE 35 for further discussion of cultural resource survey efforts and SHSND consultation.

### 8.10. Effect of Site on Biological Resources

Efforts would be made to avoid or minimize impacts to biological resources during and after construction. Wildlife impacts are anticipated to be minimal; however, the potential for avian collisions with the wind turbines exists. The site would be designed to minimize impacts to avian species. Lindahl Wind is committed to working with USFWS regarding potential mitigation measures for threatened and endangered species and other protected species.

## 9. Agency Comments

On November 21, 2014, KLJ distributed a scoping package to 58 local, state, and federal agencies and other interested parties, including all agencies and officers designated for notice pursuant to NDAC § 69-06-01-05. In addition, a scoping package was sent to the Three Affiliated Tribes and the Turtle Mountain Band of Chippewa on February 2, 2015. These scoping packages included information on the Project and a Project location map.<sup>6</sup> To date, KLJ has received 15 responses. These comments, which are summarized below, have been referenced and incorporated where appropriate within the document. Please refer to **APPENDIX F. SCOPING PACKAGE AND RESPONSES** for the scoping letter, mailing list, and responses.

### 9.1. US Department of Agriculture – Natural Resources Conservation Service

In a letter dated December 9, 2014, the NRCS stated that it is responsible for documenting conversion of farmland to non-agriculture use when federal funds are utilized pursuant to the Farmland Protection Policy Act (FPPA). Lindahl Wind does not anticipate that the Project will be federally funded. Thus, the FPPA requirements will not apply to the Project.

### 9.2. US Department of the Air Force – Minot Air Force Base North Dakota

In a letter dated January 7, 2015, Minot Air Force Base found no issues of encroachment to Air Force assets from the Project.

Additionally, the Project has filed 7460-1 Notice of Proposed Construction with the FAA for wind turbines on the Project Area, and has received Determinations of No Hazard for representative turbine locations inside the Project Area. These determinations demonstrate that the Project will have no impacts on air navigation.

### 9.3. US Department of Defense – Army Corps of Engineers, North Dakota Regulatory Office

In a letter dated November 26, 2014, the USACE noted that if the Project results in work over, in, or under navigable waters (Section 10 of the Rivers and Harbors Act) or the discharge of dredged or fill materials into waters of the United States (Section 404 Clean Water Act), a Section 10 and/or Section 404 permit will need to be acquired from the North Dakota Regulatory Office.

The Project is not located near navigable waters; therefore, a Section 10 permit is not required. A field wetland delineation has been completed to better assess wetlands in the Project Area. Information gathered during this field assessment will be utilized during final design to avoid or minimize impacts to wetlands. If wetlands within the jurisdiction of the USACE cannot be completely avoided, the Project will obtain the appropriate Section 404 Nationwide Permit from the USACE.

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<sup>6</sup> Due to refinement of the Project location, the current Project Area is only portion of the Project area depicted in the maps provided with the scoping packages.

## 9.4. US Department of Transportation – Federal Aviation Administration

The FAA provided comments on the Project via email on December 4, 2014. The FAA recommended the Project consider the Tioga Municipal Airport and its airspace, and contact the airport's planning manager to review the Airport Layout Plan and filing notices under the FAA OE/AAA website.

As discussed below in SECTION 9.17. TIOGA AIRPORT AUTHORITY ON PAGE 63, the Project consulted with the Tioga Municipal Airport. In addition, the Project has filed 7460-1 Notice of Proposed Construction with the FAA for wind turbines in the Project Area, and has received Determinations of No Hazard for representative turbine locations inside the Project Area. These determinations demonstrate that the Project will have no impacts on air navigation, specifically in relation to the Tioga Municipal Airport.

## 9.5. U.S. Department of Commerce – National Telecommunications and Information Administration

In a letter dated March 17, 2015, the National Telecommunications and Information Administration (NTIA) provided information about the Project to the federal agencies represented in the Interdepartment Radio Advisory Committee (IRAC). After a 45+ day review period, no agencies identified any concerns regarding radio frequency blockage.

## 9.6. U.S. Department of Interior – Fish & Wildlife Service

Lindhahl Wind has coordinated via two in person meetings since 2013 with USFWS. Early discussions were centered around potential impacts to threatened, endangered, proposed, and candidate species and determining appropriate mitigation/minimization measures.

In a letter dated January 8, 2015, the USFWS provided Lindahl Wind with a species list identifying threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat that may occur within the Project Area or be affected by the Project. The USFWS identified the following threatened, endangered, or candidate species: least tern; piping plover; red knot; Sprague's pipit; whooping crane; pallid sturgeon; gray wolf; and, northern long-eared bat. The USFWS did not identify any critical habitats within the Project Area. For more information about minimization and avoidance of potential impacts to these species, see SECTION 6.16. RARE AND UNIQUE NATURAL RESOURCES ON PAGE 47.

## 9.7. North Dakota Aeronautics Commission

The NDAC provided feedback on a preliminary Project boundary via an email dated December 18, 2014. The NDAC expressed concern about the proximity of the Project to the Tioga Municipal Airport. Since that time, the Project Area has been revised, taking operations at the Tioga Municipal Airport into account. The Project has also received Determinations of No Hazard from the FAA for representative turbine locations inside the Project Area. These determinations demonstrate that the Project will have no impacts on air navigation, specifically in relation to the Tioga Municipal Airport.

Following review of the FAA documentation, in an email dated April 15, 2015, the North Dakota Aeronautics Commission provided the following statement:

*"In response to the proposed Lindahl Wind Project near Tioga, ND, the North Dakota Aeronautics Commission concurs with the FAA's documentation concerning the Determination*

*of No Hazards for all turbines and the Tioga Airport Authority's approval of this project on January 15, 2015. At this time, the North Dakota Aeronautics Commission has no further concerns on the Lindahl Wind Project."*

## 9.8. North Dakota Department of Commerce

By a letter dated November 24, 2014, the North Dakota Department of Commerce provided clearance in conformance with the North Dakota Federal Program Review System for the Project and requested the opportunity for complete review of applications for renewal or continuation grants within one year after November 24, 2014. If the Project changes in duration, scope, description, budget, location or area of impact, then they request additional review.

## 9.9. North Dakota Department of Health

In a letter dated December 8, 2014, the NDDH stated that they believed the environmental impacts from the proposed construction will be minor and can be controlled by proper construction methods. These methods included minimizing fugitive dust emissions, adverse effects to water bodies, and sound, and obtaining a NDPDES permit. Included in the letter were NDDH's construction and environmental disturbance requirements. NDDH further stated that it owns no land in or adjacent to the Project Area and that the Project is consistent with the State Implementation Plan for the Control of Air Pollution for the State of North Dakota.

The Project will utilize water from local sources for dust control during construction. Construction equipment will be kept in good working order, including mufflers as recommended by the equipment manufacturer. The Project will also comply with the Commission's sound requirements. If oil storage in excess of 1,320 gallons of petroleum products is located on site, Lindahl Wind will complete an SPCC plan. Project access roads and permanent facilities are designed to avoid existing water bodies, wetland and streams to the extent practicable. The Project will comply with EPA regulations regarding storm water runoff, including the creation of a SWPPP. Lindahl Wind will also comply with the requirements of the NDDH's construction and environmental disturbance requirements.

## 9.10. North Dakota Department of Trust Lands

The North Dakota Department of Trust Lands (NDDTL) is a participating landowner in the Project, having executed an easement for placement of wind turbines and additional facilities. Also, the Project point of interconnection, known as the Lindahl Switching Station is located on NDDTL property within the central portion of the Project Area.

In a letter dated December 17, 2014, the NDDTL noted that it had executed an easement for the Project, and indicated it has not yet approved Project improvements on trust lands. Lindahl continues to coordinate with NDDTL staff relative to the siting of wind energy facilities on NDDTL property.

The NDDTL also advised consulting with the North Dakota Oil and Gas Commission regarding mineral lessees and future oil and gas development. Lindahl provided information regarding the Project to the North Dakota Oil and Gas Commission through two letters to the North Dakota Industrial Commission on November 21, 2014. In addition, on March 11, 2015, Project representatives held a One-Call meeting with United Locating and 11 locators representing oil and gas operators/developers. All locators present were provided maps of the Project including a preliminary wind turbine array as well as oil and gas data that has

been collected to that date. The locators also identified the underground infrastructure within 400 feet of all proposed turbine locations. Per standard development procedures, Lindahl Wind will continue coordination efforts with oil and gas parties prior to and during construction.

### 9.11. North Dakota Game & Fish Department

In a letter dated December 19, 2014, NDGFD noted that its primary concern with regard to the Project is disturbance or loss of native prairie. NDGFD requested that native prairie be avoided to the greatest extent practicable and that micro-siting of turbines be done on previously disturbed lands. NDGFD also recommended that unavoidable wetland impacts be mitigated in-kind, aboveground structures not be placed in wetlands, drainage patterns be unaltered and routine avian and bat mortality monitoring be conducted. Additionally, NDGFD manages the McGregor Dam WMA adjacent to the Project Area. They recommend that wind turbines and communication towers be set-back ½-mile from WMA boundaries to minimize disturbance to wildlife.

The Project will comply with the NDGFD's setback recommendation regarding the McGregor Dam WMA. The Project has completed field assessments for wetlands under the USACE survey protocol. Information gathered during the field assessment will be utilized during final design to avoid or minimize impacts to wetlands. If wetlands within the jurisdiction of the USACE cannot be completely avoided, the Project will obtain the appropriate Section 404 Nationwide Permit from the USACE, as well as mitigate permanently impacted wetland features. The Project is coordinating with the USFWS on potential avian and bat-related mitigation measures and will develop a BBCS. This data will be provided to the NDGFD.

### 9.12. North Dakota Parks and Recreation Department

In a letter dated December 10, 2014, the NDPRD noted that the Project does not affect state park lands or Land and Water Conservation Fund recreation projects. The NDPRD noted that the North Dakota Natural Heritage biological conservation database was reviewed to find one location of plant species of concern just beyond the Project Area boundary. The NDPRD recommends all efforts be made to avoid impacts to wildlife species and their habitats.

Lindahl Wind will continue to coordinate with the USFWS to ensure appropriate mitigation and conservation strategies are implemented to avoid or mitigate impacts to wildlife species and habitats.

### 9.13. North Dakota State Water Commission

In a letter dated December 11, 2014, the NDSWC noted that: the Project is not in an identified floodplain; a Drain Permit may be needed; all waste material must be disposed of properly and not within floodways; no sole-source aquifers have been designated within the state; and the Project sponsor is responsible for contacting local, state, and federal officials to determine required permits and approvals. Furthermore, the NDSWC recommended obtaining water well location information to alleviate accidental damage.

The Project is collecting water well location information from landowners and will avoid construction near existing water wells. The Project will also obtain all applicable permits and approvals, including a Drain Permit (if required), and will properly dispose of all waste materials.

#### 9.14. State Historical Society of North Dakota

In their letter dated November 24, 2014, the SHSND, State Historic Preservation Office (SHPO) recommended that a Class I Cultural Resource Inventory, a Class II Architectural History Reconnaissance Survey and a Class III Pedestrian Survey be completed for the Project. In addition, Project staff met with SHPO staff on December 10, 2014 to establish the scope of the Class II survey.

The Project has completed a Class I Literature Review, a Class II Architectural History Reconnaissance Survey a Class III Pedestrian Survey. Corresponding reports will be finalized and results submitted to SHPO for review and concurrence on the findings. Lindahl Wind also prepared an *Unanticipated Discoveries Plan*. The plan details a process for prompt communication and action regarding the discovery of previously unknown archaeological resources or human remains, should they be encountered during construction. The *Unanticipated Discoveries Plan* was submitted and found to be acceptable by SHSND on March 26, 2015.

#### 9.15. City of Tioga

In a December 5, 2014 phone conversation with KLJ, a representative of the City of Tioga expressed concerns regarding the Project. The City was also interested in what benefits the Project would create, including permanent jobs.

In a letter dated February 23, 2015 to Williams County Planning and Zoning, the City noted that, while the Project Area is not within the City's jurisdiction nor was it the City's ultimate decision to approve or deny the Project, it is opposed to the Project.

Lindahl Wind has taken a number of measures to address the City's concerns. Specifically, Lindahl Wind has removed all proposed Project facilities from Tioga Township and has reduced the size of the Project Area from what was originally evaluated. As a result of these measures, the Project is now approximately 4 miles away from the City.

Lindahl Wind has also increased its turbine setbacks from nonparticipating landowner residences to at least 3,500 feet, and all but two nonparticipating landowner residences are over one mile away from a preliminary turbine location.

#### 9.16. Mountrail-Williams Electric Cooperative

Lindahl Wind has coordinated via in person meetings, phone calls, email, and the aforementioned scoping letter with Mountrail-Williams Electric Cooperative (MWEC) since 2013. Early coordination with MWEC in 2013 illustrated the significant demand for electricity in and around the Project Area. Further discussion revealed that MWEC's existing infrastructure on-site included a robust transmission system that could facilitate delivery of the energy created by Lindahl Wind to the electric grid. In addition, the parties are coordinating in regards to Lindahl Wind's Project facilities encroaching upon rights or facilities owned by MWEC in the Project Area.

#### 9.17. Tioga Airport Authority

The Tioga Airport Authority initially had concerns regarding the Project potentially affecting flight patterns and the instrument approach at the Tioga Municipal Airport. Following a meeting with Lindahl Wind on

January 15, 2015, the Tioga Airport Authority stated that, based on information provided to the Tioga Airport Authority by Lindahl Wind, the Tioga Airport Authority is not opposed to the Project, as long as all current and future FAA guidelines are met and a Determination of No Hazard is issued by the FAA. The Project has filed Form 7460-1 Notice of Proposed Construction with the FAA for wind turbines in the Project Area, and has received Determinations of No Hazard for representative turbine locations inside the Project Area. These determinations demonstrate that the Project will have no impacts on air navigation, specifically in relation to the Tioga Municipal Airport.

## 10. Qualifications of Contributors to Siting Study

### *Grady Wolf*

Grady has 13 years of experience in completing environmental surveys, planning and project management associated with land and water management issues. He leads numerous complex environmental projects requiring NEPA and other permitting compliance for a variety of federal, state and local agencies. Grady has managed and authored more than 50 Environmental Assessments as well as numerous Environmental Assessment Addendums, Categorical Exclusions, Biological Assessments and Environmental Reports. His experience includes project management, conducting biological and botanical studies, authoring resource reports, impact analysis and wetland delineations, mitigation and monitoring. Grady has extensive experience in the energy and renewable energy fields. His background includes holistic management on agricultural lands including watershed planning, dealing with water quality issues, fish and wildlife concerns and botanical studies. Grady has coordinated efforts for securing funding, acquiring permits, completed mitigation plans for projects through state and federal agencies and managed the projects during implementation.

### *Skip Skattum*

Skip holds a B.A. degree in Education from the University of North Dakota and an Associate of Applied Science degree in Geographic Information Systems from the Alexandria Technical School. Skip has 13 years of experience working with a variety of clients on environmental documentation including mapping, modeling, and impact quantification. He has managed GIS projects involving the securing of funds, project implementation, project design, and management.

### *Duane Klinner*

Duane has served as a Principal Investigator for KLJ for nine years. Since 1989, Duane has conducted approximately 2,200 surveys for identifying cultural resources in North Dakota, South Dakota, Montana and Arizona. He has conducted various testing and mitigation projects for the Section 106 process in North Dakota, South Dakota, Montana and Arizona, and compiled more than 900 reports on surveys, testing and mitigation of cultural resources for the Section 106 process in North Dakota, South Dakota, Montana and Arizona.

Duane reviewed and provided comments on more than 4,600 federal undertakings in North Dakota and participated in the development and review of more than 40 Memorandums of Agreement, Memorandums of Understanding and Programmatic Agreements. He participated in the development of eight cultural resource management plans and assisted private, public, political and governmental entities in understanding and participating in the Section 106 process. Duane has excellent knowledge of the National Historic Preservation Act. He has attended and participated in discussions and conferences regarding federal regulations on cultural resources.

### *Ashley Ross*

Ashley has seven years of experience in conservation and environmental planning. This has allowed Ashley to work in coordination with private landowners, local, state, federal and tribal agencies. Ashley has experience in identifying and completing impact assessments, public and agency coordination, permitting, GIS analysis, and biological and botanical surveys. Ashley has written numerous NEPA documents including Environmental Assessments, Categorical Exclusions and Environmental Reports for a variety of

environmental projects. Ashley holds a Bachelor's degree in Natural Resource Management from Dickinson State University.

*Andrea Hewitt*

Andrea graduated with a B.S in Fisheries and Wildlife Biology from the University of North Dakota and is currently completing her Masters of Environmental Management from the Department of Earth System Science and Policy at the University of North Dakota. Her experience with KLJ includes field work to identify environmental concerns, including raptor surveys, threatened and endangered species habitat surveys, wetland delineations, and Forest Service botany surveys. She has also completed environmental documents to satisfy NEPA requirements, including Categorical Exclusions and Environmental Assessments.

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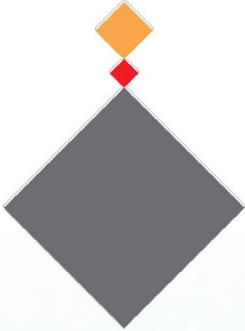
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WEWAG (Wind Energy Whooping Crane Action  
Group) 50

WMA (Wildlife Management Areas) 28

WPA (Waterfowl Production Areas) 28

# Appendix A. Exhibits

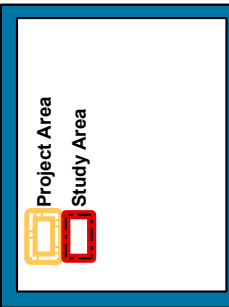
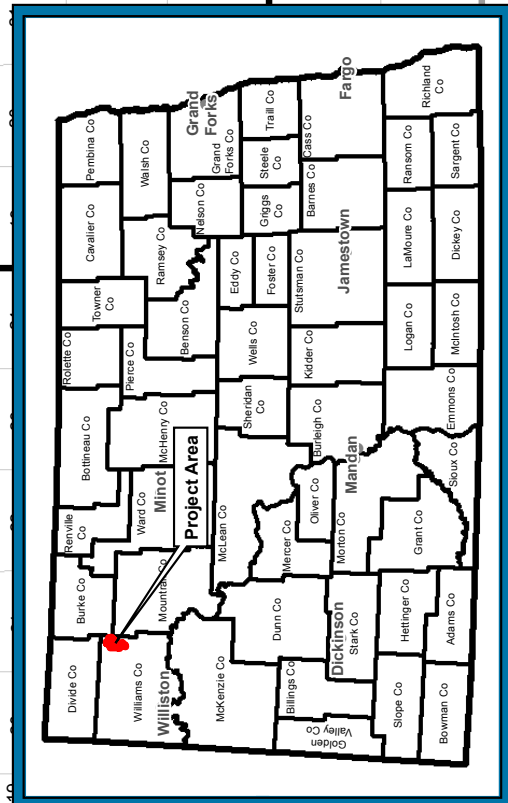


- EXHIBIT A-1. PROJECT LOCATION MAP
- EXHIBIT A-2. EXCLUSION AREAS
- EXHIBIT A-3. AVOIDANCE AREAS
- EXHIBIT A-4. FACILITIES LAYOUT
- EXHIBIT A-5. LAND USE
- EXHIBIT A-6. INFRASTRUCTURE
- EXHIBIT A-7. MICROWAVE BEAM PATHS
- EXHIBIT A-8. PRIME AND UNIQUE FARMLAND
- EXHIBIT A-9. GEOLOGIC AND GROUNDWATER RESOURCES
- EXHIBIT A-10. SURFACE WATERS AND USFWS NWI WETLANDS
- EXHIBIT A-11. WHOOPING CRANE MIGRATION CORRIDOR





# Exhibit 1 - Project Location Map



The following companies and organizations provided data that contributed to the production of this map.

U.S. Geological Survey (USGS)  
 Environmental Systems Research Institute (ESRI)  
 U.S. Department of Agriculture (USDA)  
 U.S. Federal Aviation Administration (FAA)  
 WhiteStar Corporation  
 Ventyx Inc.  
 KU

Analyst: n.cameron  
 Date: 6/24/2015

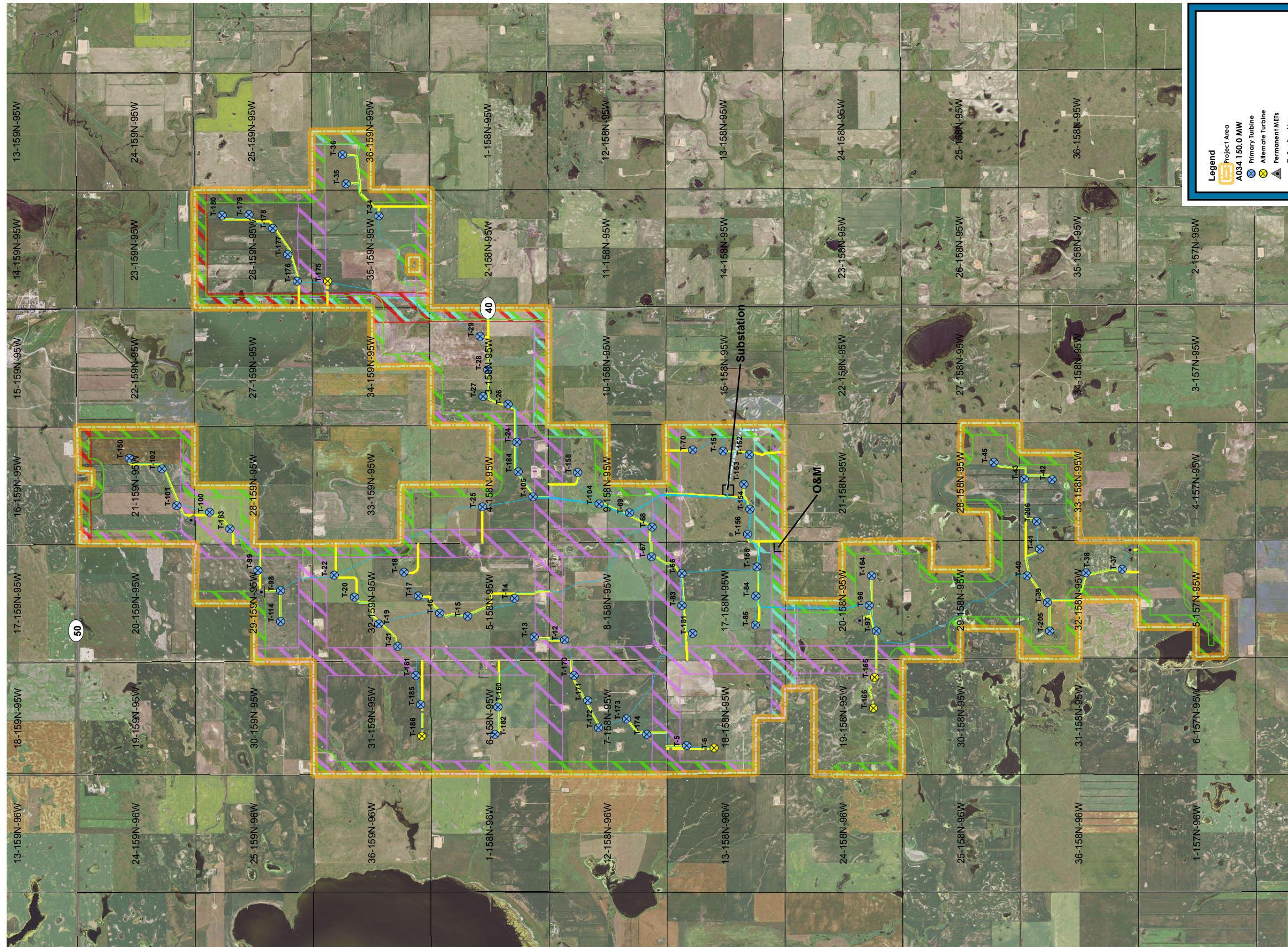
0 1 2 4 Miles

Scale: 1:100,884

Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3201 Feet

Confidential and proprietary information.  
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# Exhibit 2 - Exclusion Areas



The following companies and organizations provided data that contributed to the production of this map.

U.S. Geological Survey (USGS)  
Environmental Systems Research Institute (ESRI)  
U.S. Department of Agriculture (USDA)  
U.S. Federal Aviation Administration (FAA)  
WhiteStar Corporation  
Ventyx Inc.  
KU

Analyst: ncameron  
Date: 7/15/2015

North Arrow

Scale: 1:47,932

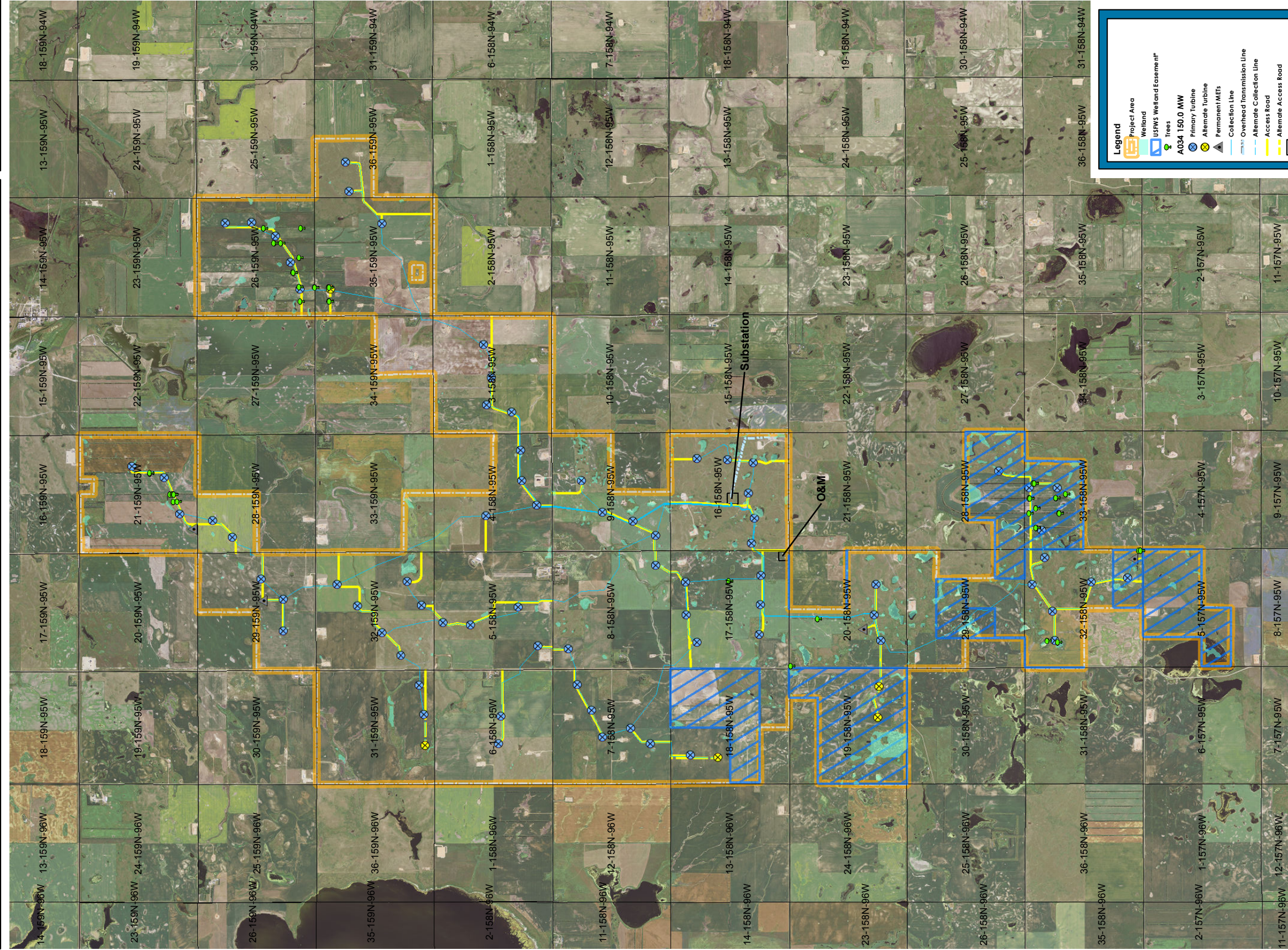
Coordinates System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet

0 0.5 1 2 Miles

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Exhibit A-2. Exclusion Areas

# Exhibit 3 - Avoidance Areas



**Legend**

- Project Area
- Wetland
- USFS Wetland Easement\*
- Trees
- A034 150.0 MW
- Primary Turbine
- Alternate Turbine
- Permanent METs
- Collection Line
- Overhead Transmission Line
- Alternate Collection Line
- Access Road
- Alternate Access Road
- Facilities

\*Only wetland basins are subject to USFS wetland easements; however, the wetland basins have not yet been delineated.  
 \*\*Due to the sensitive nature of cultural resources, cultural resource avoidance areas are not identified in this exhibit.

The following companies and organizations provided data that contributed to the production of this map.

U.S. Geological Survey (USGS)  
 Environmental Systems Research Institute (ESRI)  
 U.S. Department of Agriculture (USDA)  
 U.S. Federal Aviation Administration (FAA)  
 WhiteStar Corporation  
 Ventyx Inc.  
 KU

Analyst: ncomeron

Date: 6/24/2015

N

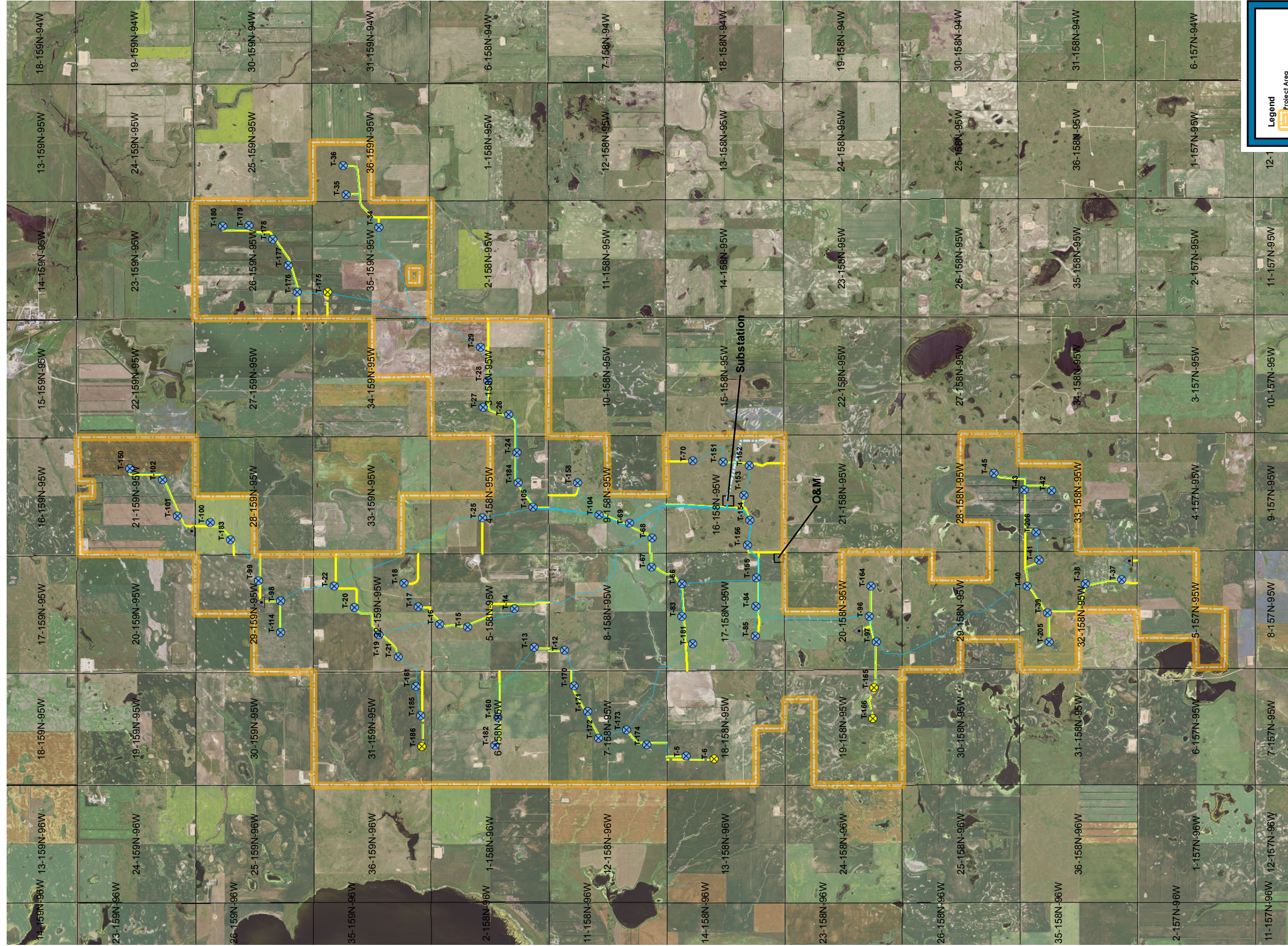
0 0.5 1 2 Miles

Scale: 1:47,974

Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3201 Feet

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# Exhibit 4 - Facilities Layout



**Legend**

- Project Area
- A034 150.0 MW
- Primary Turbine
- Alternate Turbine
- Permanent METs
- Collection Line
- Overhead Transmission Line
- Alternate Collection Line
- Access Roads
- Alternate Access Road
- Facilities

The following companies and organizations provided data that contributed to the production of this map.

- U.S. Geological Survey (USGS)
- Environmental Systems Research Institute (ESRI)
- U.S. Department of Agriculture (USDA)
- U.S. Federal Aviation Administration (FAA)
- WhiteStar Corporation
- Ventyx Inc.
- KJ

Analyst: ncameron  
Date: 6/22/2015

**Scale: 1:47,974**

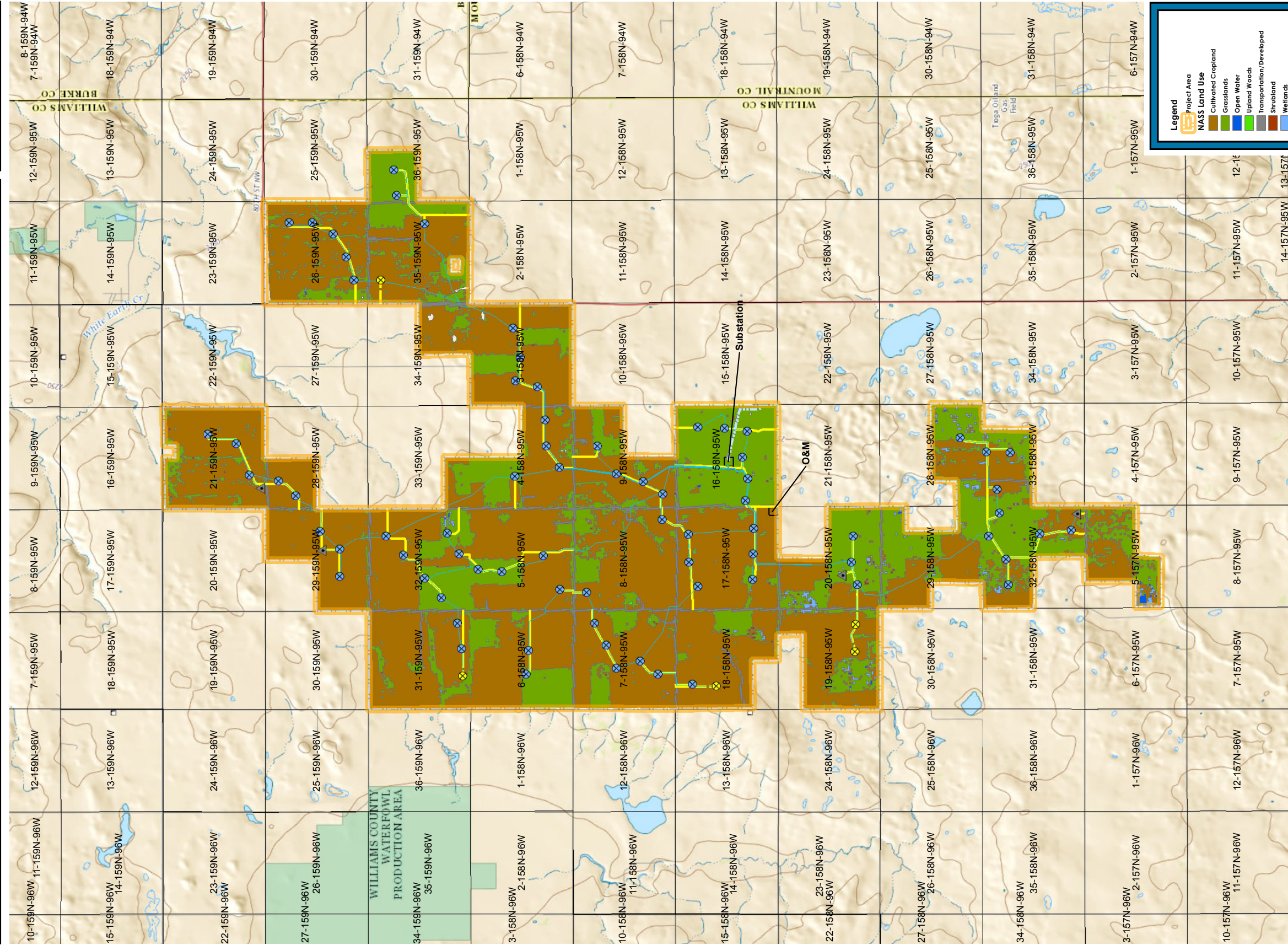
0 0.5 1 2 Miles

Coordinates System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet

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Exhibit A-4. Facilities Layout

# Exhibit 5 - Land Use



**Legend**

- Project Area
- NASS Land Use
  - Cultivated Cropland
  - Grasslands
  - Open Water
  - Upland Woods
  - Transportation/Developed
  - Wetlands
- A034 150.0 MW
  - Primary Turbine
  - Alternate Turbine
  - Permanent MEIs
  - Collection Line
  - Overhead Transmission Line
  - Alternate Collection Line
  - Access Roads
  - Alternate Access Road
  - Facilities

Scale: 1:55,000
   
 Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3201 Feet

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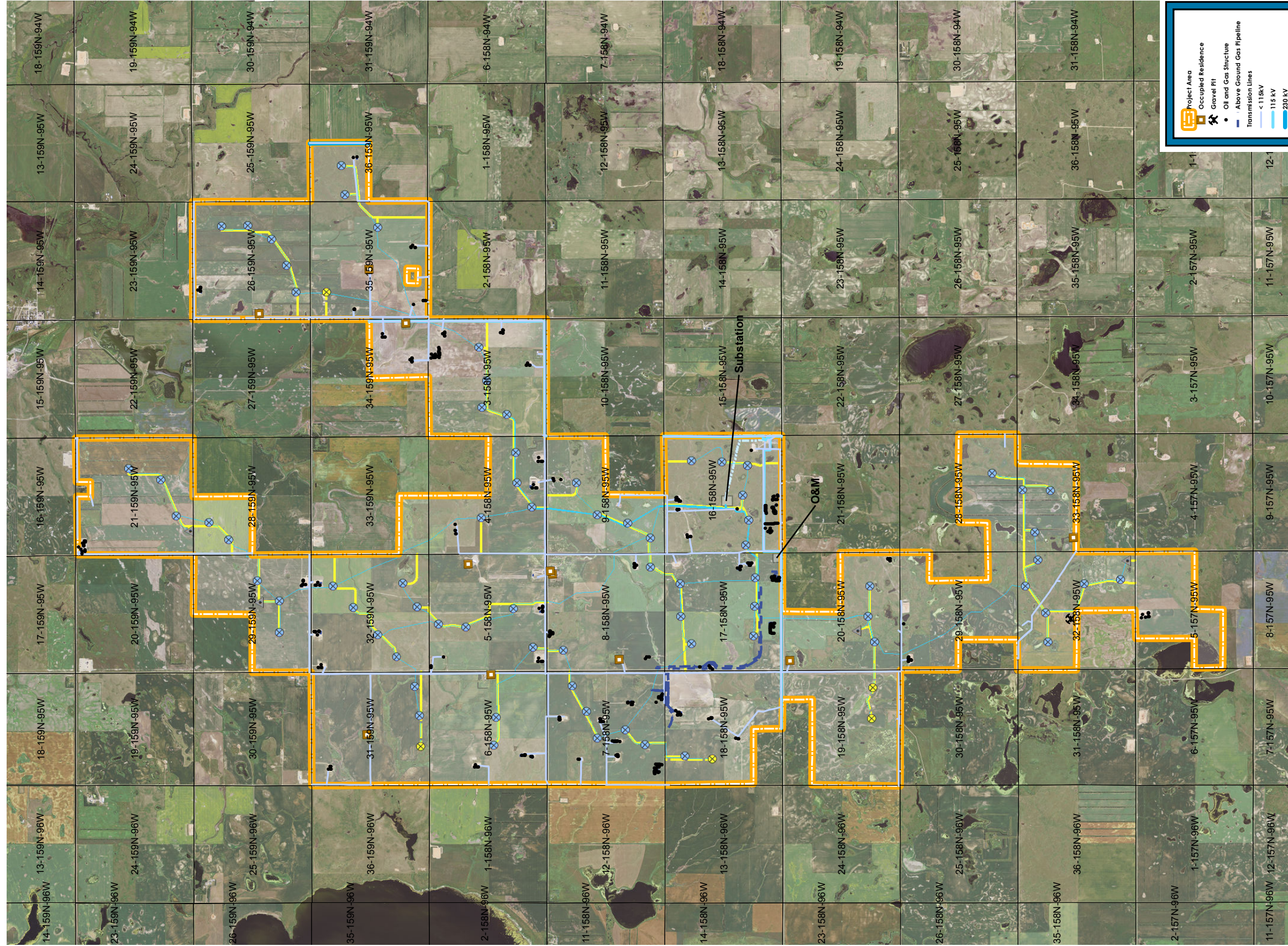
The following companies and organizations provided data that contributed to the production of this map.

- U.S. Geological Survey (USGS)
- Environmental Systems Research Institute (ESRI)
- U.S. Department of Agriculture (USDA)
- U.S. Federal Aviation Administration (FAA)
- WhiteStar Corporation
- Venhyx Inc.
- KJ

Analyst: n.cameron  
 Date: 6/22/2015



# Exhibit 6 - Infrastructure



**Legend**

- Project Area
- Occupied Residence
- Gravel Pit
- Oil and Gas Structure
- Above Ground Gas Pipeline
- Transmission Lines
  - < 115kV
  - 115 kV
  - 230 kV
- A034 150.0 MW
  - Primary Turbine
  - Permanent METs
  - Collection Line
  - Overhead Transmission Line
  - Alternate Collection Line
  - Access Road
  - Alternate Access Road
  - Facilities

North Arrow

0 0.5 1 2 Miles

Scale: 1:47,974

Coordinates System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet

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The following companies and organizations provided data that contributed to the production of this map.

- U.S. Geological Survey (USGS)
- Environmental Systems Research Institute (ESRI)
- U.S. Department of Agriculture (USDA)
- U.S. Federal Aviation Administration (FAA)
- WhiteStar Corporation
- Ventyx Inc.
- KU

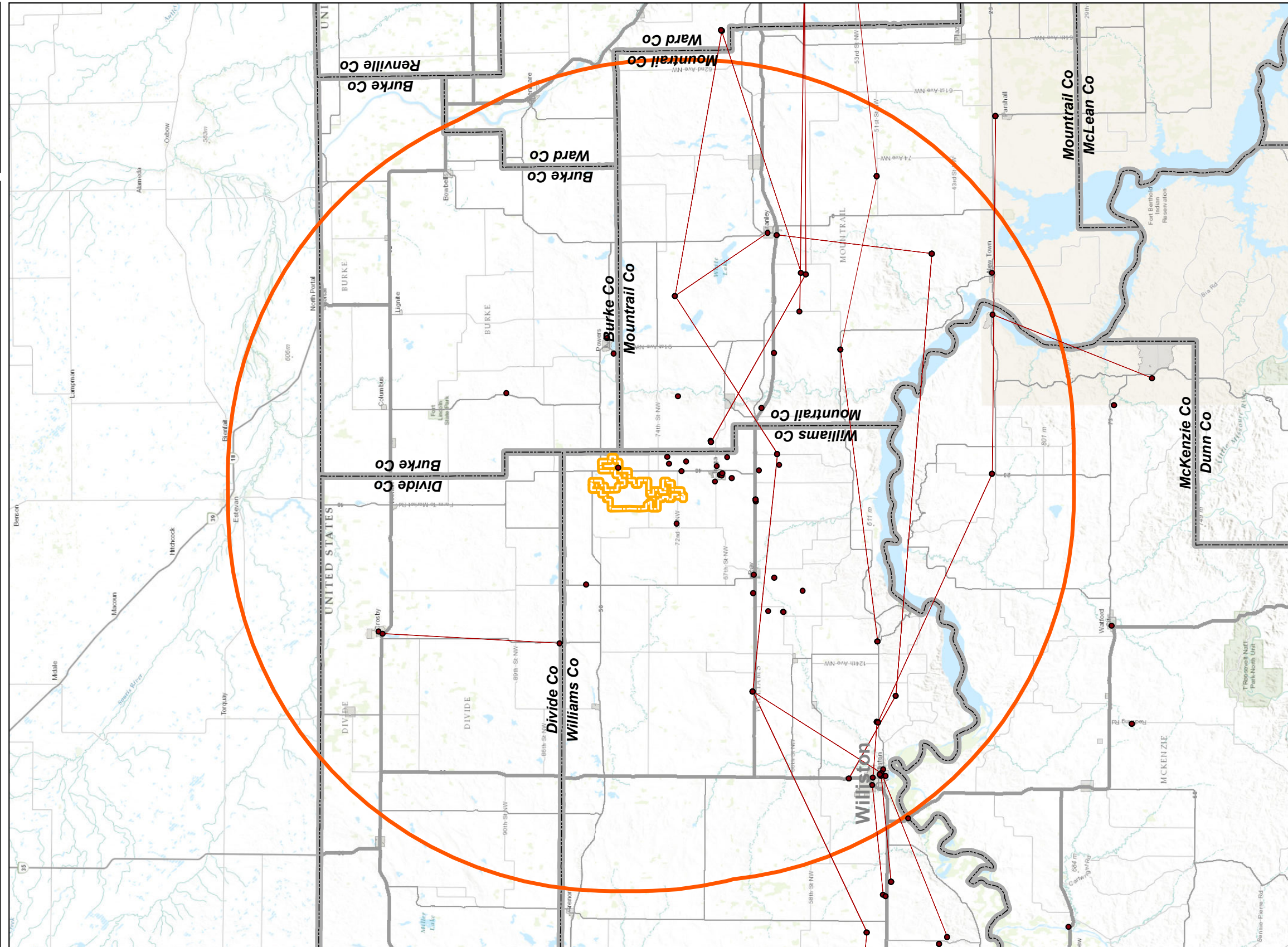
Analyst: ncameron

Date: 6/24/2015

Exhibit A-6. Infrastructure



# Exhibit 7 - Microwave Beam Paths



**Project Area**  
 40 Mile Radius  
 Microwave Beams  
 Antenna Structure

The following companies and organizations provided data that contributed to the production of this map.

U.S. Geological Survey (USGS)  
 Environmental Systems Research Institute (ESRI)  
 U.S. Department of Agriculture (USDA)  
 U.S. Federal Aviation Administration (FAA)  
 WhiteStar Corporation  
 Venlyx, Inc.  
 KLJ

Date: 6/24/2015

Analyst: incameron

N

0 5 10 20 Miles

Scale: 1:591,125

Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet

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Exhibit A-7. Microwave Beam Paths

# Exhibit 8 - Prime and Unique Farmland



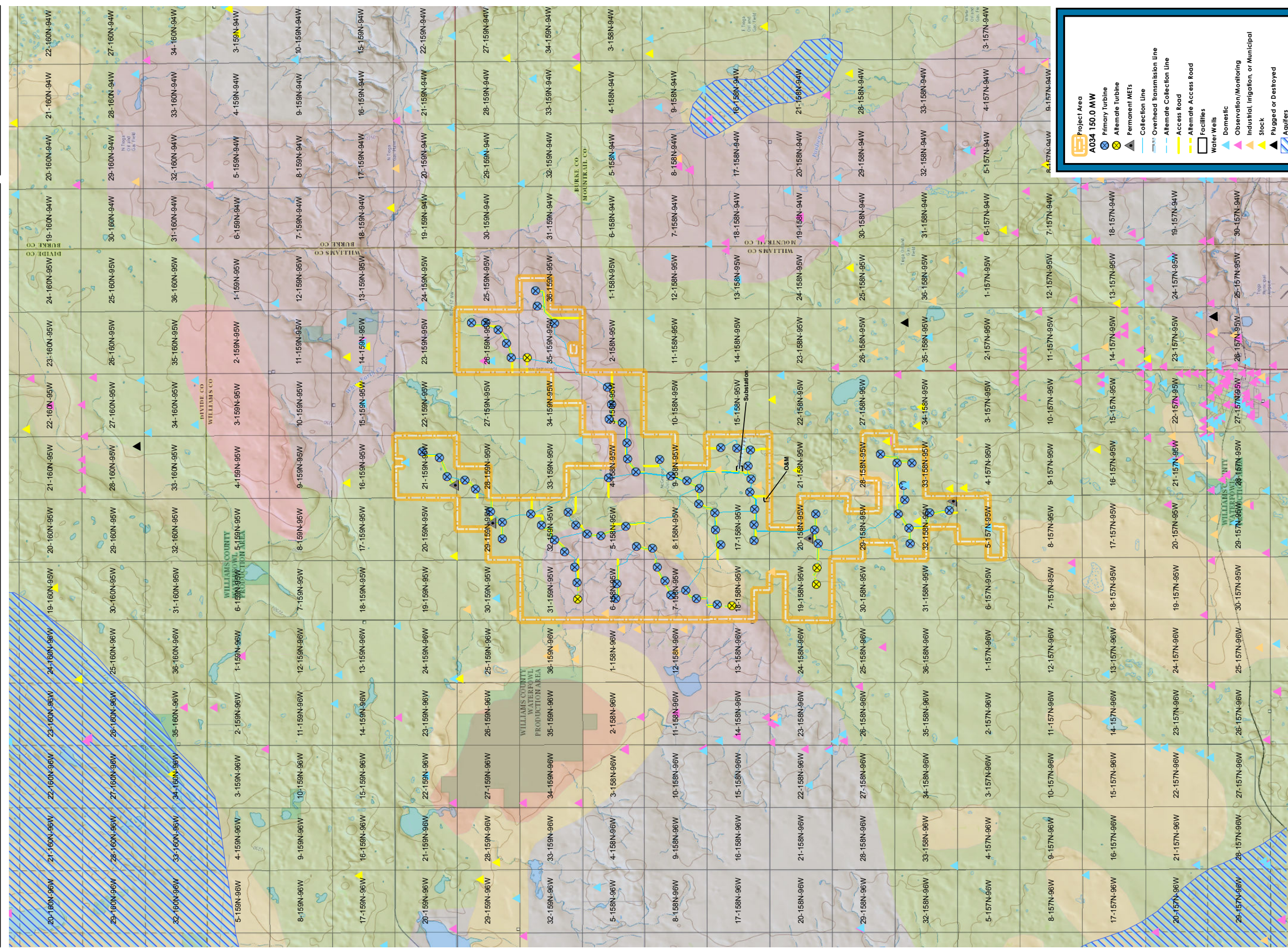
**Project Area**  
 All areas are prime farmland  
 Farmland of statewide importance  
**A034 150.0 MW**  
 Primary Turbine  
 Alternate Turbine  
 Permanent IMETs  
 Collection Line  
 Overhead Transmission Line  
 Alternate Collection Line  
 Access Road  
 Alternate Access Road  
 Facilities

**Scale: 1:47,974**  
 0 0.5 1 2 Miles  
 Coordinates System: NAD 1983 StatePlane North Dakota North FIPS 3201 Feet  
**Confidential and proprietary information.**  
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The following companies and organizations provided data that contributed to the production of this map.  
 U.S. Geological Survey (USGS)  
 Environmental Systems Research Institute (ESRI)  
 U.S. Department of Agriculture (USDA)  
 U.S. Federal Aviation Administration (FAA)  
 Ventyx Inc.  
 KU  
 Analyst: ncameron  
 Date: 6/22/2015

Exhibit A-8. Prime and Unique Farmland

# Exhibit 9 - Geologic & Groundwater Resources



**Project Area**  
A034 150.0 MW

- Primary Turbine
- Alternate Turbine
- Permanent METs
- Collection Line
- Overhead Transmission Line
- Alternate Collection Line
- Access Road
- Alternate Access Road
- Facilities
- Water Wells
- Domestic
- Observation/Monitoring
- Industrial, Irrigation, or Municipal
- Stock
- Plugged or Destroyed
- Aquifers

**Coastal Formation**

- Glacial, Collapsed
- Glacial, Draped On Older Surf
- Glacial, Thrust Masses
- Glacial, Transition Sed.
- Offshore, Ice walled Lake
- Pond Sediment
- River Sediment, Collapsed River
- River Sediment, Uncollapsed River
- River, Lake and Swamp

**Scale:** 1:90,000  
 Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet

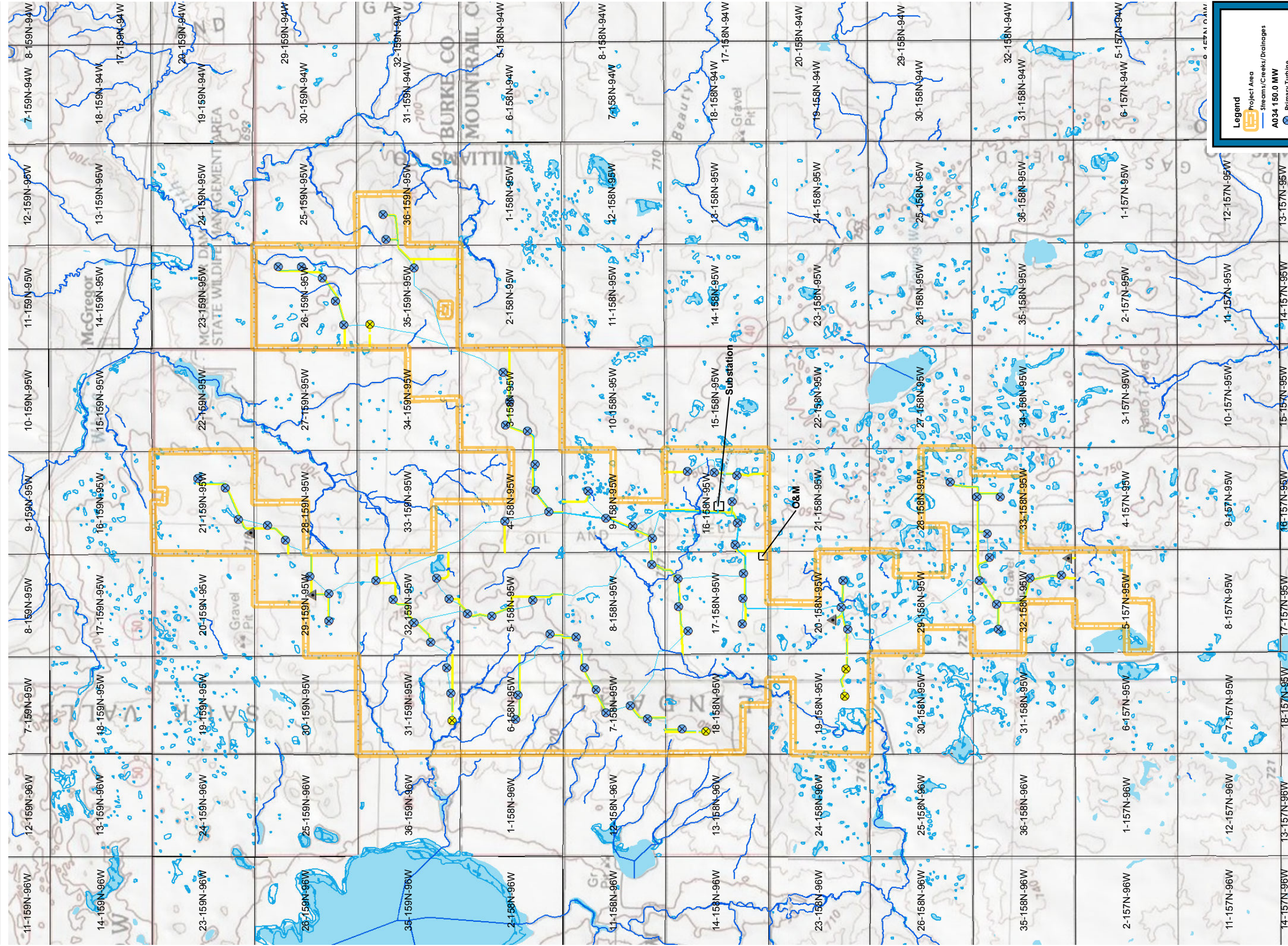
**Confidential and proprietary information.**  
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The following companies and organizations provided data that contributed to the production of this map.

- U.S. Geological Survey (USGS)
- Environmental Systems Research Institute (ESRI)
- U.S. Department of Agriculture (USDA)
- U.S. Federal Aviation Administration (FAA)
- WhiteStar Corporation
- Venturix Inc.
- KLJ

Analyst: incameron  
 Date: 6/22/2015

# Exhibit 10 - Surface Waters & USFWS NWI Wetlands

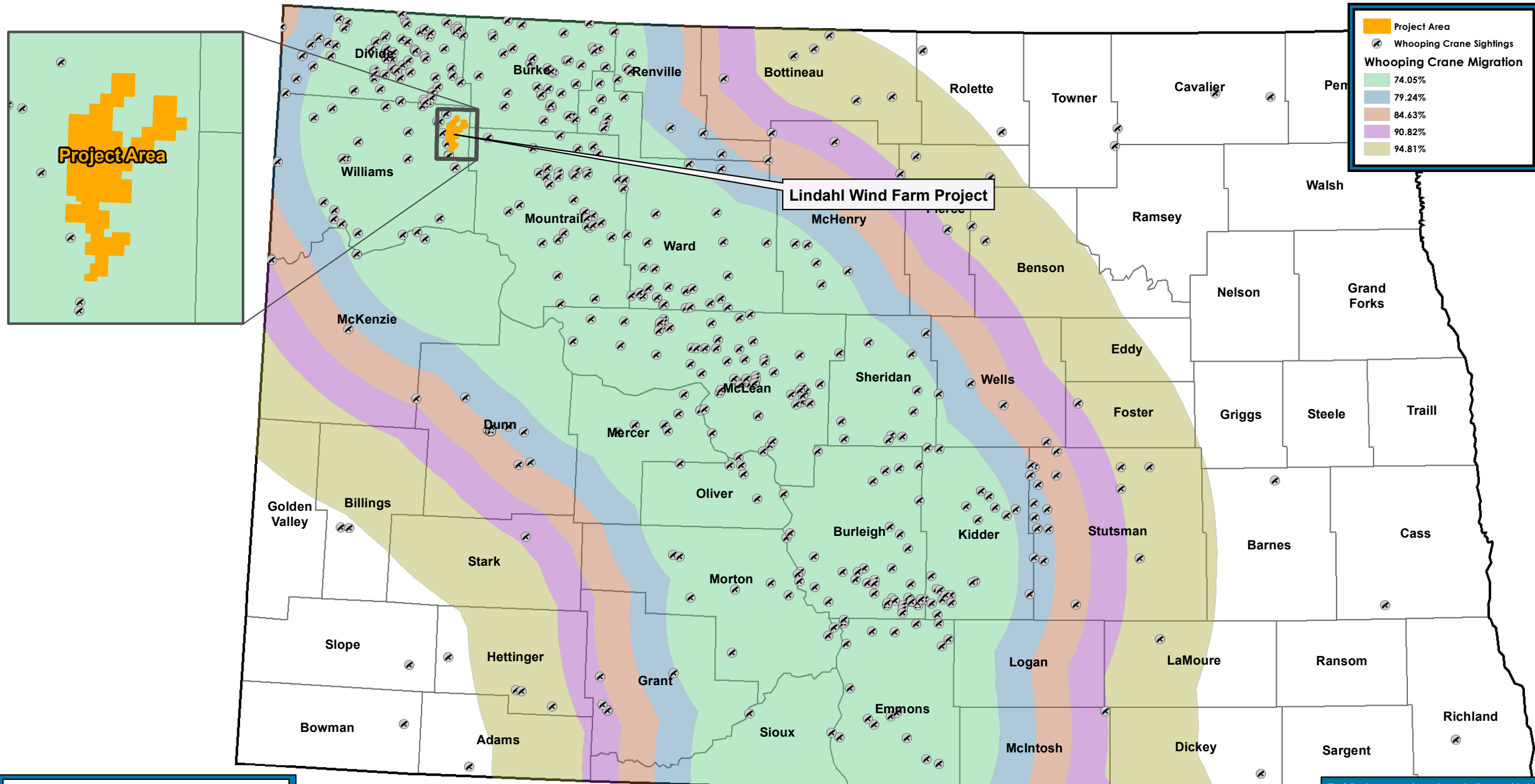


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 Coordinates System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet  
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The following companies and organizations provided data that contributed to the production of this map.  
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 Environmental Systems Research Institute (ESRI)  
 U.S. Department of Agriculture (USDA)  
 U.S. Federal Aviation Administration (FAA)  
 WhiteStar Corporation  
 Ventyx Inc.  
 KU  
 Analyst: ncameron  
 Date: 6/22/2015

Exhibit A-10. Surface Waters and USFWS NWI Wetlands

# Exhibit 11 - Whooping Crane Migration Corridor



**Project Area**

Whooping Crane Sightings

**Whooping Crane Migration**

- 74.05%
- 79.24%
- 84.63%
- 90.82%
- 94.81%

N

0 12.5 25 50 Miles

Scale: 1:1,650,000

Coordinate System: NAD 1983 UTM Zone 14N

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The following companies and organizations provided data that contributed to the production of this map.

- U.S. Geological Survey (USGS)
- Environmental Systems Research Institute (ESRI)
- U.S. Department of Agriculture (USDA)
- U.S. Federal Aviation Administration (FAA)
- WhiteStar Corporation
- Ventyx Inc.

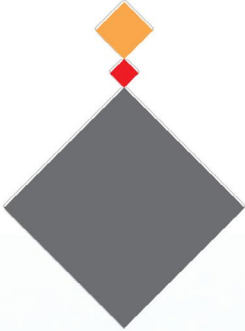
Analyst: ncameron KLJ Date: 6/24/2015

Whooping Crane Migration Corridor

Exhibit A-11.

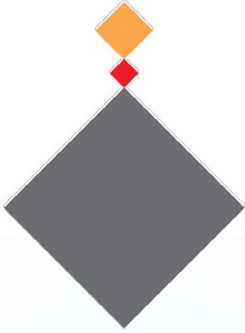


# Appendix B. Enel Policy Statement



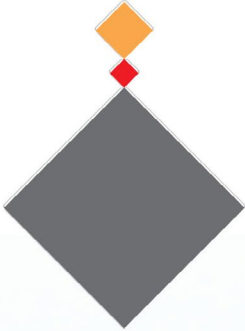


# Appendix C. Microwave and Radio Frequency Facilities Analysis



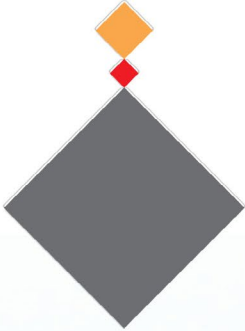


# Appendix D. Sound and Shadow Flicker Analysis



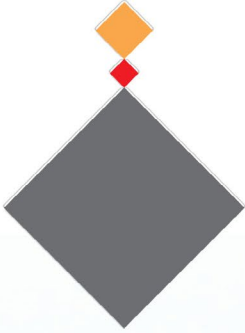


# Appendix E. Unanticipated Discoveries Plan



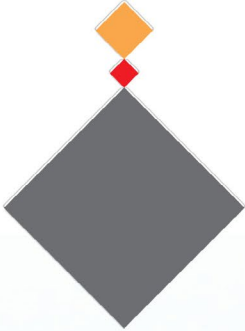


# Appendix F. Scoping Package and Responses





# Appendix G. USFWS Official Species List





# Appendix H. Black and White Project Area Map

