October 13, 2017

<u>VIA ELECTRONIC FILING</u>

Mr. Daniel P. Wolf
Executive Secretary
Minnesota Public Utilities Commission
121 Seventh Place East, Suite 350
Saint Paul, MN 55101-2147

Re: In the Matter of the Application of Nobles 2 Power Partners, LLC for a Large Wind Energy Conversation System Site Permit for the up to 260 MW Nobles 2 Wind Project and Associated Facilities in Nobles County, Minnesota
MPUC Docket No. IP-6961/WS-17-597

Dear Mr. Wolf:

Please find enclosed the Site Permit Application, Figures and Appendices for the up to 260 MW Nobles 2 Wind Project and Associated Facilities in Nobles County, Minnesota. The Application is being submitted on behalf of Nobles 2 Power Partners, LLC ("Nobles 2") and has been efiled through www.edockets.state.mn.us.

Nobles 2 requests that the processing of this Application be combined to the extent practicable with the associated Certificate of Need Application for the project, PUC Docket No. IP-6961/CN-16-289.

In accordance with Minnesota Rules, parts 7829.0500 and 7854.0400, subp. 4, and Minnesota Statutes, Chapter 13 ("Government Data Practices Act"), Nobles 2 has designated as trade secret certain commercially sensitive information, i.e., certain cost information, which is considered confidential and proprietary information, included with the NONPUBLIC Site Permit Application. Release of this data would have a detrimental effect on Nobles 2 by providing potential competitors and others with valuable information not otherwise readily ascertainable and from which these persons would obtain economic value. Given the need to include trade secret information, Nobles 2 has prepared and is e-filing both NON-PUBLIC AND TRADE SECRET and public versions of the Site Permit Application.

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A copy of this filing is also being served upon the persons on the persons on the attached Service List. Please let me know if you have any questions regarding this filing.

Sincerely,

/s/ *Jeremy P. Duehr*

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Application to the Minnesota Public Utilities Commission
Site Permit for a Large Wind Energy Conversion System

Nobles 2 Power Partners, LLC

Nobles County, Minnesota

October 13, 2017

Prepared For:

Nobles 2 Power Partners, LLC
14302 FNB Parkway
Omaha, NE 68154-5212

Application to the Minnesota Public Utilities Commission Site Permit for a Large Wind Energy Conversion System

Nobles 2 Wind Project

Nobles County, Minnesota

MPUC Docket Number: 17-597

Prepared for:

Nobles 2 Power Partners, LLC
14302 FNB Parkway
Omaha, NE 68154-5212

Prepared by:

Westwood Professional Services, Inc.
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Eden Prairie, Minnesota 55344

Project Number: 0001661.00

October 13, 2017

Project Name:	Nobles 2 Wind Project
Project Location:	Nobles County
Applicant:	Nobles 2 Power Partners, LLC
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APPENDICES

ACRONYM	DEFINITIONS
AADT	Average Annual Daily Traffic
ACS	American Community Survey
Aggregate Surface	Road cover used for proposed access roads
AMSL	Above Mean Sea Level
APE	Area of Potential Effect
ANSI	American National Standards Institute
APLIC	Avian Power Line Interaction Committee
ASTM	American Society for Testing and Materials
BBCS	Bird and Bat Conservation Strategy
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
BMPs	Best Management Practices; prevents soil erosion and sedimentation
BOP	Balance of Plant
BWSR	Board of Water and Soil Resources
Capacity	The maximum amount of electricity a generator produces over a specific period of time
Phase Ia	Cultural Resources Literature Search – a large-scale review and compilation of known cultural resource data.
Phase I	Cultural Resources Reconnaissance Survey – physical inspection and identification of cultural resources within a specific area.
Commission or PUC	Minnesota Public Utilities Commission
CON	Certificate of Need
CR	County Road
CREP	Conservation Reserve Easement Program
CRP	Conservation Reserve Program
CSAH	County State Aid Highway
CWA	Clean Water Act
dB	Decibels
dB(A)	A-weighted decibel
Distribution	Relatively low-voltage lines that deliver electricity to the retail customer’s home or business
DOC	Department of Commerce
DOC-EERA	Department of Commerce – Energy Environmental Review and Analysis
DOE	United States Department of Energy
DPP	Definitive Planning Phase
EBH	Environmental Bore Hole
ECPG	Eagle Conservation Plan Guidance
EERA	Energy Environmental Review and Analysis – Minnesota Department of Commerce
Electromechanical (or EM)	Of, relating to, or being a mechanical process or device actuated or controlled electrically; especially being a transducer for converting

	electrical energy to mechanical energy
EMF	Electromagnetic Field
EPC	Engineering, procurement, and construction
EQIP	Environmental Quality Incentives Program
ESA	Environmental Site Assessment
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
FPPA	Farmland Protection Policy Act
ft	foot/feet
FSA	Farm Service Agency
Gearbox	An assembly of parts including the speed-changing gears and the propeller shaft by which the power is transmitted from an automobile engine to a live axle; the speed-changing gears in such an assembly
Generator	A machine by which mechanical energy is changed into electrical energy
GSU	Generator Step Up
Geotechnical	A science that deals with the application of geology to engineering
HLWD	Heron Lake Watershed District
HPRCC	High Plains Regional Climate Center
Hub	The central component of the wind turbine which connects the rotors to the generator.
HVTL	High Voltage Transmission Line
Interconnection	Location of project connection to the power grid.
ISTH	Interstate Trunk Highway
KLRWD	Kanaranzi-Little Rock Watershed District
kV	kilovolt
kW	kilowatt
LEGF	Large Energy Generation Facility
Leq	Equivalent Sound Level
LGU	Local Government Unit
LMIC	Land Management Information Center
LWECS	Large Wind Energy Conversion System
MCBS	Minnesota County Biological Survey
MW	megawatt
m	meter
m/s	meters-per-second
MBS	Minnesota Biological Survey
MCP	Measure, Correlate, Predict process
MDH	Minnesota Department of Health
micrositing	The process in which the wind resources, potential environmentally sensitive areas, soil conditions, and other site factors, as identified by local, state and federal agencies, are evaluated to locate wind turbines

	and associated facilities.
MISO	Midcontinent Independent System Operator
MNDNR	Minnesota Department of Natural Resources
MnDOT	Minnesota Department of Transportation
MNTH	Minnesota Trunk Highway
MP	Minnesota Power
mph	miles-per-hour
MPCA	Minnesota Pollution Control Agency
MPUC, PUC or Commission	Minnesota Public Utilities Commission
Nacelle	A streamlined enclosure (as for an engine), which houses the gearbox, generator, brake, cooling system and other electrical and mechanical systems
NCAR	National Center for Atmospheric Research
NCDC	National Climatic Data Center
NCEP	National Center for Environmental Prediction
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NESC	National Electric Safety Code
NHIS	Natural Heritage Information System
NIEHS	National Institute of Environmental Health Sciences
NLCD	National Land Cover Dataset
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
O & M	Operations and Maintenance
OCC	Operations Control Center
O-OWD	Okabena-Ocheda Watershed District
OSA	Office of the State Archaeologist
OSHA	Occupational Safety and Health Administration
Pitch	The action or a manner of changing orientation; especially an up-and-down movement
POI	Point of Interconnection
PPA	Power Purchase Agreement
Project	Nobles 2 Wind Project
PTC	Production Tax Credit
PWI	Public Waters Inventory
PWP	Permanent Wetland Preserve
QCEW	Quarterly Census of Employment and Wages

RECs	Recognized Environmental Conditions
Resistance	The opposition offered by a body or substance to the passage through it of a steady electric current
RIM	Reinvest in Minnesota
RIM-WRP	RIM-Wetland Reserve Program
Rotor	The rotor consists of three blades mounted to a rotor hub
RD	Rotor Diameter: Diameter of the rotor from the tip of a single blade to the tip of the opposite blade
ROW	Right-of-Way
RSA	Rotor Swept Area
SBS	Sites of biodiversity significance
SCADA	Supervisory Control and Data Acquisitions (communications technology)
SCS	Site Characterization Study
SHPO	Minnesota State Historic Preservation Office
SNA	Scientific and Natural Areas
SPCC	Spill Prevention Control and Countermeasure
Step-up Transformer	A transformer that increases voltage
Substation	A subsidiary station in which electric current is transformed
SWCD	Soil and Water Conservation District
SWPPP	Storm Water Pollution Prevention Plan
TI	Turbulence Intensity – a measure of the standard deviation of wind speed over an hour, divided by the mean for the same time period
Torque	A force that produces or tends to produce rotation or torsion; also a measure of the effectiveness of such a force that consists of the product of the force and the perpendicular distance from the line of action of the force to the axis of rotation : a turning or twisting force
Transformer	An electrical device by which alternating current of one voltage is changed to another voltage
Transmission	The bulk movement of electrical energy from a generating site, such as a power plant, to an electrical substation
USACE	US Army Corps of Engineers
USDA	US Department of Agriculture
USFWS	US Fish and Wildlife Service
WCA	Wetland Conservation Act
WMA	Wildlife Management Area
WPA	Waterfowl Protection Area
WIRS	Wildlife Incident Reporting System
Yaw	The action or a manner of changing orientation; especially a side-to-side movement

1.0 APPLICANT INFORMATION

Nobles 2 Power Partners, LLC ("Applicant", or "Nobles 2"), is a wholly owned subsidiary of Tenaska Wind Holdings II, LLC. Tenaska Wind Holdings II, LLC is an affiliate of Tenaska, Inc. Nobles 2 respectfully submits this Site Permit Application ("Application") to the Minnesota Public Utilities Commission ("Commission" or "MPUC") for a Site Permit to construct and operate the Nobles 2 Wind Project ("Project"). The Project will be a large wind energy conversion system ("LWECS") as defined in the Wind Siting Act, Minnesota Statues Chapter 216F and will be an up to 260 megawatt (MW) wind project. The Nobles 2 Wind Project will be located in Nobles County in southwestern Minnesota, approximately 11 miles northwest of Worthington.

Nobles 2 has entered into a 20-year power purchase agreement ("PPA") with Minnesota Power ("MP") for the sale of energy to be generated by the Project. Nobles 2 anticipates overseeing and managing all aspects of Project execution. "All aspects of project execution" includes, but is not limited to, design, solicitation and award of construction contracts; construction; construction monitoring and oversight; third party quality assurance; final commissioning and acceptance; and operations and maintenance activities once the Project commences commercial operations. Nobles 2 intends to be the long-term owner and operator of the Project.[1]

Construction of the Project is scheduled to begin as early as Q3, 2018. The wind energy facility will include turbines, a project substation and interconnection facilities, collection lines, an operation and maintenance building ("O&M Building"), permanent meteorological tower(s), and gravel access roads. The Project will interconnect via a line tap at the existing Northern States Power d/b/a Xcel Energy ("Xcel") Nobles-Fenton 115kV line that is located in the west-central portion of the Project footprint. Nobles 2 filed an interconnection request with the Midcontinent Independent System Operator ("MISO") on June 30, 2016. The request is currently in MISO's Definitive Planning Process. The Project does not anticipate the need for any new high voltage transmissions lines ("HVTL").

Consistent with the Commission objectives, the Applicant is committed to optimizing the wind resource for the Project. Decisions about equipment selection, site layout, and spacing have been made with the objective of responsibly maximizing efficient use of land and wind resources. The Applicant has evaluated the site to optimize wind resources, transmission interconnection opportunities and economic factors while avoiding or minimizing impacts to human and environmental resources. Project siting priorities include avoidance of aviation facilities; preservation of wildlife species, habitat and environmentally sensitive areas; minimization of sound and shadow propagation; and avoidance of an adverse effect on the community or its agricultural lands.

[1] Nobles 2 reserves the right to sell or assign the Project to another qualified entity before, during, or after the Project's construction.

Tenaska, Inc., ("Tenaska") based in Omaha, Nebraska, is one of the largest private, independent energy companies in the United States. Tenaska and its affiliates have developed 10,000 megawatts (MW) of natural gas-fueled and renewable power generating facilities and currently manage operations for 7,000 MW of power generating facilities. Tenaska presently has wind development projects across the Midwest. Affiliate Tenaska Power Services Co. offers scheduling, marketing and energy management services to the renewable energy industry and is the leading provider of power marketing services to the Texas wind industry. Another Tenaska affiliate markets natural gas. Additionally, individual employees of Tenaska are one-third owners of Elkhorn Ridge Wind, LLC, an 81-MW wind farm in Nebraska.

2.0 CERTIFICATE OF NEED

A certificate of need ("CN") from the Minnesota Public Utilities Commission is required for all "large energy facilities," defined to include generators greater than 50 MW in size, constructed in Minnesota, unless a statutory exemption applies.[2] Nobles 2 proposes to construct a Large Wind Energy Conversion System ("LWECS") of up to 260 MW in Nobles County, Minnesota. Therefore, absent an exemption, a CN will be required for the Project.

On May 10, 2017, Nobles 2 Wind entered into a Power Purchase Agreement ("PPA") with Minnesota Power ("MP") for up to 250 MW of the energy to be generated by the Project.[3] MP sought and entered into the PPA with Nobles 2 after the Commission issued an Order Approving Resource Plan with Modifications ("July 2016 IRP Order"), on July 18, 2016, whereby the Commission, in part, ordered MP to begin a competitive acquisition process, by the end of 2017, to procure 100-300 MW of installed wind capacity.[4] On July 27, 2016, MP issued a request for proposal ("RFP") for a wind resource of up to 300 MW.[5] MP submitted a petition ("MP Petition") on July 28, 2017 seeking Commission approval of the PPA and two other resource acquisition requests.[6] While the MP Petition provided the Commission with the type of information considered

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[2] Minn. Stat. §§ 216B.243 and 216B.2421.

[3] Nobles 2 is also requesting the ability to construct up to 10 MW of additional nameplate capacity to, in part, account for the terms of the PPA with MP, which defines Installed Capacity as 247 to 253 MWs (see Section 3.1 of the PPA with MP) and, to, in part, provide a hedge against expected and unexpected disruptions in turbine availability.

[4] Order. *In the Matter of Minnesota Power's 2016-2030 Integrated Resource Plan.* Docket ID. E-015/RP-15-690 (July 18, 2016) eDockets ID No. 2016-123403-01.

[5] Minnesota Power Informational Response. *In the Matter of Minnesota Power's 2016-2030 Integrated Resource Plan.* Docket ID. E-015/RP-15-690 (March 30, 2017) eDockets ID No. 2017-130375-01. See also, Compliance Filing. *In the Matter of Minnesota Power's 2016-2030 Integrated Resource Plan.* Docket ID. E-015/RP-15-690 (July 28, 2017) eDockets ID Nos. 20177-134359-01 through 10.

[6] Compliance Filing. *In the Matter of Minnesota Power's 2016-2030 Integrated Resource Plan.* Docket ID. E-015/RP-15-690 (July 28, 2017) eDockets ID No. 20177-134359-03

in a CN proceeding, MP has not requested that the Commission issue a CN for the Project as part of the Commission's consideration of the Nobles 2 PPA.[7] On September 19, 2017 the Commission issued an order on MP's Petition and noted, in part, that the "Commission has already approved the acquisition of additional wind and solar generation by Minnesota Power, and the Company shall refile its wind and solar PPAs for Commission approval in a separate docket."[8] As of the date of this Application, MP has not yet refiled the Nobles 2 PPA in a separate docket for Commission approval. Therefore, the Commission has not determined the need for the Project or approved the PPA. Moreover, MP's RFP process was not a Commission-approved resource acquisition process; therefore, the Project is not exempt from the CN requirement.[9] On April 5, 2016, Nobles 2 requested an exemption from several of the informational requirements in Minn. R. Ch. 7849. On May 25, 2016, the Commission granted Nobles 2's Exemption Request.[10] Nobles 2 submitted an Application for a CN on October 13, 2017 in PUC Docket No. IP-6964/CN-16-289.

3.0 STATE POLICY

Pursuant to Minnesota Statutes § 216F.03, the Applicant will further State policy by siting the Project in an orderly manner compatible with environmental preservation, sustainable development, and the efficient use of resources. The Applicant is designing the Project and spacing turbines to maximize wind development while minimizing the impact on area land resources.

The Wind Siting Act (Minnesota Statutes § 216F) requires an application for a site permit for a LWECS to meet the substantive criteria set forth in Minnesota Statutes § 216E.03, subd. 7. This Application provides the necessary information to comply with these criteria and Minnesota Rules Chapter 7854.

The Wind Siting Rules (Minnesota Rules Chapter 7854) govern the content and treatment of an application for a LWECS site permit under the Wind Siting Act. To the extent available, the Applicant has presented information required by the Wind Siting Rules. In addition, sufficient project design, wind resource, and technical information have been provided for a thorough evaluation of the reasonableness of the proposed site as a location for the Project.

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[7] *Id*. at 1-9

[8] Order In the Matter of Minnesota Power's 2016-2030 Integrated Resource Plan. Docket ID. E-015/RP-15-690 (September 19, 2017) eDockets ID No. 2017-135644-02.

[9] Minn. Stat § 216B.2422, subd. 5

[10] Order, *In the Matter of the Application of Nobles 2 Power Partners, LLC for a Certificate of Need for the up to 300 Megawatt Nobles 2 Wind Project in Nobles and Murray Counties, Minnesota*, Docket No. IP-6964/CN-16-289 (May 25, 2016), eDockets Doc. ID 20165-121609-01.

This application has been prepared following the Minnesota Department of Commerce, Energy Environmental Review and Analysis ("EERA") Application Guidance for Site Permitting of Large Wind Energy Conversion Systems in Minnesota (DOC, 2010) ("LWECS Application Guidance").

4.0 PROJECT DESCRIPTION AND OVERVIEW

4.1 Project Description and Location

The Project is located in Nobles County in southwestern Minnesota, approximately 11 miles northwest of Worthington, Minnesota (**Maps 1a and 1b,** and as also shown on **Map 2a** ("Project Area"). **Table 4.1** lists the Township, Range, and Sections in which the Project Area is located.

Table 4.1: Nobles 2 Wind Project Location				
Township	**Range**	**Sections**	**Township Name**	**County**
104N	43W	13, 24-26, 33-36	Leota	Nobles
104N	42W	S2-4, 9-35	Wilmont	Nobles
104N	41W	S2-11, 15, 16, 19-22, 28-35	Bloom	Nobles
103N	43W	S1-3	Lismore	Nobles
103N	42W	S2-6	Larkin	Nobles
103N	41W	S2-6	Summit Lake	Nobles

The Project Area was selected after assessing a broader area for wind resource, landowner interest, environmental resources, transmission availability and economic potential. The Project Area was selected because of its generally unobstructed land, proximity to viable interconnection options, interested landowners, optimal wind resource, its low probability for significant environmental impacts and favorable economics.

The overall footprint of the Project Area has been modified over time to respond to the identified presence of state and federal lands criteria, environmentally sensitive natural resource areas, airports and landowner input. Nobles 2 has selected the Vestas V136-3.6 MW wind turbine generator as the primary wind turbine model for the Project. If the technology is economical and commercially proven, Nobles 2 may elect to utilize Vestas V136-3.45 MW, V136-4.0 MW or V136-4.2 MW turbines instead. These turbine model variants have siting requirements that are equal to or lesser than the V136-3.6 MW. The Project will also include 10 to 21 Vestas V110-2.0 MW wind turbines for the purpose of qualifying for the Federal Production Tax Credit ("PTC"). The final number of Vestas V110-2.0 MW turbines will be determined by Nobles 2 based upon PTC requirements, turbine availability and other economic considerations. As a result, the number of turbines installed could range from 65 to 82, depending on the configuration selected. The Project Area contains approximately 42,547 acres, of which 30,356 are currently leased for the Project, which is sufficient to support the construction and operations of the Project. The above-ground facilities for the Project will occupy less than one percent of that area.

Associated facilities will include wind turbines mounted on towers, underground electrical collection and communications lines, project substation and interconnection switchyard, an O&M building, permanent meteorological tower(s), and gravel access roads. The project substation is where the electricity collected from the wind turbines is aggregated and conditioned for connection to the interconnect switchyard. The interconnect switchyard connects the project substation to the utility transmission grid to become usable power for consumers and businesses. At least one, and potentially up to six permanent meteorological tower(s) used to measure climatic data for predicting and optimizing the Project's operation will also be included in the Project Area.

The physical Point of Interconnection ("POI") is where the electricity generated by the Project enters the transmission grid and is further defined during the interconnection agreement process. The Project's generator interconnection agreement will be negotiated and executed upon completion of the MISO Definitive Planning Process. The Applicant plans to interconnect the Project at the Xcel Nobles-Fenton 115kV transmission line, which is in close proximity to the planned Project substation (see Section 6.1). Nobles 2 plans to construct the Project on a schedule that facilitates an in-service date of Q3 or Q4 2019.

4.2 Size of the Project Area in Acres

The Project Area is composed of 42,547 acres (66 square miles) of mostly agricultural land. The Applicant plans to site the Project within the 42,547-acre Project Area as shown in **Map 2a.** The extent of the Project Area enables the inclusion of limited spare turbine pads that may be necessary to utilize if adverse circumstances arise in final field survey and construction. It also allows sufficient room for setbacks and buffers required for avoidance of homes, infrastructure, and natural resources. Overall, a small fraction of the Project Area, approximately 115.5 acres, will be utilized for Project facilities.

4.3 Rated Capacity

The rated capacity of the Project is up to 260 megawatts (MW).

4.4 Number of Turbine Sites

Nobles 2 has selected the Vestas V136-3.6 MW as the primary wind turbine model for the Project. If the technology is economical and commercially proven, Nobles 2 may elect to utilize Vestas V136-3.45 MW[11], V136-4.0 MW or V136-4.2 MW turbines instead. These

[11] The Vestas V136-3.45 MW and V136-3.6 MW wind turbine generators are the same machine; the V136-3.6 MW turbine uses a generator capacity uprate option that requires only a control software change (i.e. no equipment modifications).

turbine model variants have siting requirements that are equal to or lesser than the V136-3.6 MW turbine. The Project will also include 10 to 21 Vestas V110-2.0 MW wind turbines for the purpose of qualifying for the PTC. The final number of Vestas V110-2.0 MW turbines will be determined by Nobles 2 based upon PTC requirements, turbine availability and other economic considerations. As result, the number of turbines installed could range from 65 to 82, depending on the configuration selected. For the primary configuration (64 V136-3.6 and 10 V110-2.0 turbines), a total of 12 alternate turbines are currently proposed, for a total of 86 turbine sites.

Nobles 2 has purchased Vestas V110-2.0 MW turbines as a “safe harbor” to qualify for the PTC and, accordingly, will need to incorporate at least ten (10) Vestas V110-2.0 MW turbines into the Project to satisfy PTC rules. The use of the V110-2.0 MW turbine will be in combination with V136-3.6 MW turbine. Vestas, the wind turbine manufacturer, has indicated that the V136-3.6 MW turbine is also offered with a larger generator and other changes that increase the nameplate capacity to 4.0 or 4.2 MW without increasing the size of the turbine. Nobles 2 is in the process of evaluating the potential use of these turbines and may use them if commercially available prior to construction and if the cost of such turbines does not exceed the benefits realized by increasing the nameplate capacity of turbines (e.g., fewer turbine sites would be required to construct the Project).

4.5 Meteorological Towers

At present, there are six temporary meteorological towers within and adjacent to the Project Area which are shown in **Map 2a**. Once the Project is constructed, the Applicant may install up to six permanent meteorological towers within the Project Area that will remain for the duration of the Project; however, the exact number of meteorological towers is still being reviewed. The permanent meteorological towers are expected to be made of steel and will be meet FAA and any local requirements. Additional details regarding the permanent meteorological tower(s) can be found in Section 6.3.2.

4.6 Percent of Wind Rights Secured

Nobles 2 currently has agreements with landowners over approximately 30,356 acres of private land within the Project Area, or 71 percent, which is sufficient to support an up to 260 MW Project (see Section 7 for more information on wind rights). Additionally, Nobles 2 has agreements covering approximately 5,673 acres of land adjacent to the Project Area boundary for a wind access buffer for added flexibility in siting the Project.

4.7 Ownership Statement

Nobles 2 does not have ownership or financial interests in any other LWECS in Minnesota.

5.0 PROJECT DESIGN

5.1 Description of Project Layout

The Project has been designed to site wind turbines and associated facilities to optimize the wind resource and minimize impacts to potentially sensitive infrastructure, sensitive natural resources, and cultural features. Approximately 89 percent of the Project Area is mapped as agricultural cropland. As such, wind turbines and the associated facilities are located primarily on agricultural land currently cultivated for row crops. Smaller amounts of other cover types such as wetland, grassland and shrubland may be affected, but will not be completely quantifiable until further field studies are completed. Estimated land cover impacts per type are provided in Section 8.18.

The Project layout closely adheres to the wind energy conversion facility siting criteria outlined in the Commission's *Order Establishing General Wind Permit Standards*, Docket No. E,G999/M-07- 1102 (MPUC, 2007) ("PUC General Permit Standards"), applicable local government ordinances, discussions with the Minnesota Department of Natural Resources (MNDNR), U.S. Fish and Wildlife Service (USFWS), and industry standard siting practices. Turbine siting and spacing is further dictated by the selected turbine model, setback requirements, proximity to existing residences, interconnection with available transmission, and proximity to natural resources.

The proposed layout for the V136-3.6 MW turbine[12] is shown on **Map 3a** along with the preliminary Project substation location and planned POI. The V136-3.6 MW layout is representative of a layout that could include the V110 2.0 MW, V136-3.45MW, V136-3.6 MW, V136-4.0 MW, and V136-4.2 MW turbine models. The substitution of turbine models in either layout is not expected to significantly change any turbine location as each layout reflects the most restrictive setbacks applicable to the suite of turbines that could be included in each layout. The Project has been designed to ensure consistency with setbacks and standards established by applicable rules and statutes, and by the Commission. This includes a wind access buffer of 5 rotor diameters (“RD”) in the prevailing wind direction and 3 RD in the non-prevailing wind direction from other turbines and from non-participating parcels (**Maps 2a and 2b**) and State and Federal conservation lands; a noise setback meeting Minnesota Noise Standards, Minnesota Rules Chapter 7030; a minimum 1,600 foot setback from homes, and 1x turbine height from road rights-of-way. Other constraints used in determining Project siting included the presence of jurisdictional wetlands, designated critical habitat for State and Federal protected species, sensitive and unique ecosystems identified by the MNDNR, and the presence of existing wind generation infrastructure. The remaining lands within the Project Area where turbines can be sited after incorporating all the noted setbacks and constraints for the turbine models under consideration is provided on **Map 3b.** The setbacks and constraints are further discussed in Section 8.2.1.2.

Nobles County has not assumed responsibility for processing permit application for LWECS with a combined nameplate capacity of less than 25,000 kilowatts, pursuant to Minnesota

[12] As discussed in Section 4.4, the proposed V136-3.6 MW turbine layout will include 10 V110-2.0 MW wind turbine generators.

Statutes section 216F.08, and it has not adopted ordinance standards for LWECS, pursuant to Minn. Stat. 216F.081. However, Nobles County Zoning Ordinance, section 729.4, has established setbacks for commercial and non-commercial wind energy conversion systems ("WECS") and meteorological towers. Certain standards adopted by Nobles County ordinance are more stringent than the Commission's General Permit Standards as set forth in Docket No. E-G-999/M-07-1102. However, by letter dated March 21, 2016, Nobles County indicated the Commission's setback and standards are adequate for the Project (Appendix B).

Nonetheless, Nobles 2 does not anticipate conflicts with the current Nobles County ordinances and has designed the Project to generally meet or exceed setbacks required by the Commission and Nobles County. Section 8.2.1.2 and **Table 8.2.1.2** demonstrate how the setbacks established by Nobles 2 compare to those setbacks required by the Commission and Nobles County.

While turbine procurement efforts have not been finalized, **Map 3a** depicts the layout for the V136 3.6 MW turbines, including alternates. As noted earlier, the uprated V136-4.0 or 4.2 MW wind turbine generators, or the V136-3.45 MW turbines, may replace the V136-3.6 MW turbines if deemed economical and commercially proven[13]. In addition, 10 to 21 of the V110 model will be used in combination with V136 model. The final number of Vestas V110-2.0 MW turbines will be determined by Nobles 2 based upon PTC requirements, turbine availability and other economic considerations. Turbine locations are subject to adjustment based upon final turbine model selection, findings of Project preconstruction geotechnical and environmental surveys, micro-siting and field constructability reviews. A total of twelve (12) alternate turbine locations within the Project Area boundary are currently proposed. Final alternatives and layout will be presented as part of the Project's preconstruction compliance filing.

The Applicant will prepare the final siting layout to optimize generation while minimizing the impact on land and other potentially sensitive resources, and to ensure compliance with setback and other siting requirements. The topography of the site, environmental constraints, as well as the selected turbine technology dictates turbine spacing and layout of electric collection lines. The Project engineering and operational design is summarized in the following sections of this report.

5.2 Description of Turbines and Towers

Nobles 2 has selected the Vestas V136-3.6 MW as the primary wind turbine model for the Project in combination with the Vestas V110-2.0 MW turbine as described in previous sections. Turbines under consideration are three bladed, active yaw, and active aerodynamic control regulated wind turbine generators with power/torque control capabilities. The rotors utilize blade pitch regulation and other technologies to achieve optimum power output under

[13] If the V136-3.45 MW turbines are used, three of the alternate locations will become primary locations. If the V136-4.0 MW or V136-4.2 MW turbines are used, fewer of the primary proposed turbine locations will be used.

various site conditions and wind speeds. **Table 5.2** shows the characteristics for Vestas V136-3.6 MW turbines as well as specifications for the Vestas V110-2.0 MW, V136-3.45 MW, V136-4.0 MW and V136-4.2 MW turbine models.

Table 5.2: Wind Turbine Characteristics

Design Features	Vestas V110-2.0 MW Wind Turbine	Vestas V136-3.45 MW Wind Turbine	Vestas V136-3.6 MW Wind Turbine	Vestas V136-4.0 MW Wind Turbine	Vestas V136-4.2 MW Wind Turbine
Nameplate Capacity	2,000 kW	3,450 kW	3,600 kW	4,000 kW	4,200 kW
Hub Height	262.5 ft (80 m)	269.0 ft (82 m)	269.0 ft (82 m)	269.0 ft (82 m)	269.0 ft (82 m)
Total Height	442.9 ft (135 m)	492.1 feet (150 m)	492.1 feet (150 m)	492.1 feet (150 m)	492.1 feet (150 m)
Rotor Diameter	360.9 ft (110 m)	446.2 ft (136 m)	446.2 ft (136 m)	446.2 ft (136 m)	446.2 ft (136 m)
Design Life	Minimum of 20 years	Minimum of 20 years	Minimum of 20 years	Minimum of 20 years	Minimum of 20 years
Cut in Wind Speed	6.7 mph (3m/s)	6.7 mph (3m/s)	6.7 mph (3m/s)	6.7 mph (3m/s)	6.7 mph (3m/s)
IEC Wind Class	IIIC	IIIA	S / IIIA	IIB / S	S
Cut out Wind Speed	44.7 mph (20m/s)	50.3 mph (22.5m/s)	50.3 mph (22.5m/s)	55.9 mph (25 m/s)	55.9 mph (25 m/s)
Sound at Turbine	107.9 dB(A)	108.2 dB(A)	108.7 dB(A)	103.9 dB(A)	103.9 dB(A)
Power Regulation	All turbine models/variants utilize a microprocessor pitch control system called OptiTip® and the OptiSpeed™ (variable speed) feature. With these features, the wind turbine is able to operate the rotor at variable speed (rpm), helping to maintain output at or near rated power. Unit is also equipped with low voltage ride thru technology for demanding reliability standards				
Generation	2.0 MW per turbine	3.45 MW per turbine	3.6 MW per turbine	4.0 MW per turbine	4.2 MW per turbine
Tower	All turbine types utilize a multi-coated, conical tubular steel with safety ladder with climb assist to the nacelle				
Nacelle bedplate	All turbine types have a 2 part nacelle bedplate - cast iron front part; girder structure rear part				
Main Bearings	All turbine models utilize spherical roller bearings				
Supervisory Control and Data Acquisition (SCADA)	Each turbine is equipped with SCADA controller hardware, software and database storage capability				
FAA Lighting	Standard FAA lighting				
Foundation	Per manufacturer specifications, foundation structural engineer design and site conditions				

Source: Manufacturer-supplied turbine data.

A control panel inside each turbine houses communication and electronic circuitry. Each turbine is equipped with a wind speed and direction sensor that communicates to the turbine's control system to signal when sufficient winds are present for operation. The development site will also include an automated Supervisory Control and Data Acquisition ("SCADA") system located at the Project O&M Building which provides local and remote supervision and control of key aspects of the Project's performance and equipment. Turbines feature variable-speed control and independent blade pitch to enhance aerodynamic efficiency.

The towers are cylindrical/tapered tubular steel. The turbine towers, upon which the nacelle is mounted, consist of three to four manufactured steel sections. Welds are factory fabricated in automatically controlled welding machines and ultrasonically inspected during manufacturing per American National Standards Institute ("ANSI") specifications. Surfaces are sandblasted and multi-layer coated for protection against corrosion. Access to the turbine is through a lockable steel door at the base of the tower. Platforms inside the tower are accessed by a ladder within the tower and include attachments for a fall arresting safety system to facilitate access to the interior and exterior of the nacelle.

5.3 Description of Electrical System

Construction of the Project will add up to 82 wind turbines with generator step-up transformers located within the nacelle. Energy from the turbines will be routed through underground and potentially limited above-ground electrical collection systems that will deliver power to the Project substation. This power will be converted within the Project substation from the 34.5 kilovolts (kV) collector line voltage to the transmission voltage of 115 kV. See Section 6.1 and 6.2 for a more detailed description of the proposed electrical system. The preliminary electrical collection layout for the primary configuration (64 Vestas V136-3.6 MW, 10 Vestas V110-2.0 MW, and alternates) is shown on **Map 3b**. This design encompasses all prospective turbine layout configurations. For the maximum scenario, where 21 V110-2.0 turbines are utilized along with the V136-3.45 MW turbines, 82 turbines would be installed. For the minimum scenario, where only 10 V110-2.0 turbines are utilized and the V136-4.2 MW variant is technically viable, commercially available and economic, only 65 turbines would be installed.

Nobles 2 will contract to have the final electrical system designed by a professional, experienced and qualified electrical system design firm. The entire collection system will be designed to meet National Electric Safety Code ("NESC"), National Electric Code ("NEC"), and ANSI, National Electrical Manufacturers Association ("NEMA") and Occupational Safety and Health Administration ("OSHA") standards. The design work includes a load flow analysis for the Project to ensure the facility will meet the power factor and voltage control specifications. A coordination study will determine the appropriate protective relay settings for optimum protection and selectivity for the Project's electrical system and transmission system interface requirements.

6.0 DESCRIPTION AND LOCATION OF ASSOCIATED FACILITIES

Facilities that will be constructed to support the operation of the wind turbines and facilitate the delivery of electricity to consumers include, but are not limited to, an O&M building, permanent meteorological tower(s), laydown yard(s) and access roads. Nobles 2 is pursuing permitting approval from the Commission through an LWECS site permit for the facilities described below.

6.1 Transmission and Project Substations

Nobles 2 is currently in the Definitive Planning Phase (DPP) of the MISO queue, which is the final phase of the MISO process before Generator Interconnection Agreement negotiations begin. The Project intends to pursue an Interconnection Agreement with MISO and Xcel, which has existing 115kV overhead transmission facilities that abut the planned location of the new Project substation within the boundary of the overall Project Area. The POI, as further defined during the MISO interconnection study process, is anticipated to be in close proximity to the Project substation, as shown on **Map 3a**. Because the planned Project collection substation is directly adjacent to the expected POI, construction of additional transmission lines for the Project is not planned. The Project substation is expected to be located in the central portion of the Project Area in the southeast quadrant of the intersection of Erickson Avenue and 140th Street.

6.2 Collector Lines and Feeder Lines

Power from each turbine will be fed down the tower from the generator and the power conditioning equipment to the breaker panel. The generator voltage is stepped up to the collector system voltage of 34.5 kV by means of a Generator Step Up transformer (“GSU”), which is located within each turbine nacelle. The electricity from each turbine’s GSU is connected to the Project collection substation through the underground collection lines. The collector lines coming into the substation will combine the electrical output of the wind turbines into two 34.5kV circuits and will be stepped up to the 115kV transmission voltage within the Project substation, and then to the POI on the power grid.

The total length of collector lines for the Vestas V136-3.6 MW proposed layout is approximately 66 miles. The total length of collector lines ranges from 59 miles to 75 miles when considering all turbine model configurations. New transmission interconnection facilities will be constructed, owned, operated and maintained by the transmission owner, Xcel, which will be specifically defined and located during the interconnection agreement process. The new interconnection facilities at the POI are expected to be sited in close proximity to the Project substation because the existing Xcel Nobles-Fenton 115kV transmission line is adjacent to the parcel where construction of the Project substation is planned (**Map 3a**).

6.3 Other Associated Facilities

6.3.1 O & M Building

An O&M Building will be needed on or near the Project Area and will provide access and storage for Project maintenance and operations. The O&M Building is currently planned to be located on a parcel directly west of the proposed Project substation, in the southwest quadrant of the intersection of Erickson Avenue and 140th Street. Nobles 2 anticipates contracting with the turbine OEM for turbine service and maintenance for the Project. The Balance of Plant will either be operated and maintained by an affiliate of Nobles 2 or contracted to an experienced third party operator overseen by Nobles 2 and its affiliates.

6.3.2 Permanent Meteorological Tower

The Applicant may install up to six permanent meteorological towers within the Project Area that will remain operational for the duration of the Project. Permanent meteorological towers will be made of steel and meet FAA and local requirements. The location of permanent meteorological towers is yet to be determined.

Meteorological tower site selection, including the number of towers, is dependent upon the final locations of the wind turbines and the wind turbine OEM's requirements for proper operation of wind assessment equipment. They will be placed no closer than 300 feet from the edge of the road rights-of-way and from the site control boundaries (wind and land rights). The tower will contain instruments such as anemometers, data loggers, wind direction sensors, temperature probes that can be configured at various elevations and a communication system for providing remote reporting of the data being collected. The temporary area required to construct the meteorological tower is expected to be approximately 400 by 400 feet and includes equipment storage, material lay down, and construction staging. The permanently impacted area will be approximately 20 by 20 feet after the tower is operational, with some minor additional impacts depending on whether the meteorological towers are free-standing or guyed.

6.3.3 Turbines Access Roads and Temporary Laydown/Staging Areas

Access road networks for the Project will be designed to serve the Project in an efficient manner, taking into consideration the needs of landowners and comments from local road authorities. Each turbine will be accessible by a low profile gravel road extending from the turbine base to a public road. The access roads will be all-weather gravel construction and will be approximately 16 feet wide once the wind farm is operational. To facilitate crane movement and equipment delivery during construction, additional temporary, gravel roadways will be installed on either side of the permanent access roadway. The temporary roads will be approximately 40 to 45 feet wide. The total preliminary length of permanent access roads for the primary configuration comprised of 64 Vestas V136-3.6 MW turbines and 10 V110-2.0 MW turbines is approximately 21 miles, and a total of 24 miles when including access roads to all 12 alternates.

The Project will also require grading of a main, centrally-located, temporary laydown area of approximately 10 acres to serve both as a staging area for turbine components during construction and a parking area for construction personnel. Other temporary staging areas may be needed for parking and unloading of large equipment deliveries.

7.0 WIND RIGHTS

The Applicant is substantially complete with securing landowner agreements for wind rights and property easements necessary to build, operate and maintain the Project. The overall area within the Project boundary consists of approximately 42,547 acres. The Applicant has executed and recorded landowner agreements for approximately 30,356 acres of private land within the Project Area, which is roughly 71 percent of the land within the overall Project Area boundary. Additional landowner agreements within the Project Area are being pursued to extend the opportunity for interested landowners within the Project Area to participate; however, there will likely be non-participating parcels within the Project Area. Current participating and non-participating parcels and landowners are shown on **Map 2a,** with five parcels noted as "Potential Participating Land". Nobles 2 expects these parcels to become participating prior to issuance of the Site Permit and will provide updated **Maps 2a** and **2b** in the event these or other currently non-participating parcels become participating. The secured easement agreements ensure access for construction and operation of the Project and identify landowner and Nobles 2 obligations and responsibilities during the implementation and operation of the Project. Project facilities will be sited on leased land, and the current leasehold is sufficient to accommodate the proposed up to 260 MW project.

8.0 ENVIRONMENTAL IMPACTS

In accordance with Minnesota Rules Chapter 7854, the Applicant provides the following description of the environmental conditions of the Project Area. Nobles 2 has considered exclusion and avoidance criteria in selecting the Project Area, consistent with MPUC procedures on LWECS siting criteria.

The Applicant sent letters on March 18, 2016 to various regulatory and governmental authorities to request review of the Project Area for applicable comments and concerns. At the time, the Project Area boundary included land within Murray County, therefore, the list of contacted agencies included several Murray County contacts. The Project Area no longer includes lands within Murray County. A list of the agencies who received this letter is included in **Appendix A.** Responses from agencies that included comments regarding the proposed Project are discussed in the following sections. A copy of agency responses is included in **Appendix B.** In total, comments were received from 11 government agencies and organizations; however, some consisted of informal phone calls acknowledging receipt of the letter and minimal comments.

The Project location is rural with an agricultural-based economy. Corn and soybeans are the predominant crops in Nobles County, and the top livestock inventory is hogs and pigs, broilers and other meat-type chickens, and cattle. Typical landscape photographs of the Project Area are provided on **Map 4**.

8.1 Demographics

The Project is located in southwestern Minnesota in a rural/agricultural region within Nobles County. The 2010 census population for Nobles County was 21,378, and the U.S. Census 2011-2015 American Community Survey (ACS) 5-Year Estimates, the population estimate was 21,687, resulting in an increase of 1.5 percent. The household size for Nobles County based on the 2010 Census data was 2.64 people, with 8,535 housing units.

Table 8.1 presents the U.S. Census Bureau 2011-2015 ACS demographic profile data of Nobles County and relevant cities and townships. The Project Area is located within the following Nobles County townships: Bloom, Larkin, Leota, Lismore, Summit Lake and Wilmont. The demographic profile summarizes some of the population and economic characteristics of the county, cities and townships in which the Project is located. The estimated median household income for the period between 2011 and 2015 (in 2015 dollars) for Nobles County was $50,625.

The per capita income for most of the townships in the Project Area is higher than the overall Nobles County per capita income.

Table 8.1: Population and Economic Characteristics

Location	Population[1]	Housing Units[2]	Per Capita Income[3]	Persons with income below Poverty Level[4] (%)
Nobles County	**21,378**	**8,569**	**$23,515**	**15.6%**
City of Wilmont	339	164	$22,722	10.2%
Bloom Township	158	66	$29,135	9.8%
Larkin Township	188	89	$38,852	4.3%
Leota Township	390	194	$30,842	4.9%
Lismore Township	175	72	$23,700	3.0%
Summit Lake Township	323	160	$27,704	5.0%
Wilmont Township	184	67	$33,610	2.5%

Source: U.S. Census Bureau, 2011-2015 American Community Survey and 2010 United States Census Data

[1] 2010 United States Census data

[2] 2011-2015 American Community Survey 5-Year Estimates

[3] Per capita income in past 12 months (in 2015 dollars), 2011-2015

[4] The Small Area Income and Poverty Estimates (SAIPE) and 2011-2015 American Community Survey 5-year Estimates

There are three population centers near the Project Area. The city of Lismore is located on the southwestern boundary of the Project Area and has a population of 227 (2010 Census). The city of Wilmont is located adjacent to the south-central boundary of the Project Area and has a population of 339. The city of Kenneth is located approximately 2.5 miles west of the Project Area and has a population of 68. The largest nearby population center is the City of Worthington with a population of 12,764. The northern extent of Worthington is located approximately 11 miles southeast of the Project Area.

According to the U.S. Economic Census 2011-2015 ACS, the largest industry employing residents in Nobles County is manufacturing which make up 25.9 percent of the workforce while educational services, health care and social assistance make up 18.2 percent of the workforce. The retail trade makes up 11.8 percent of the workforce and agriculture, forestry, fishing, hunting and mining make up 8.6 percent of the workforce in Nobles County.

8.1.1 Potential Impacts

The Project is anticipated to result in positive socioeconomic impacts and benefit landowners, local governments, and communities. The Project is likely to result in an influx of spending and wages as a result of construction and operation of the Project. In addition, the Project will result in a significant increase to the Nobles County tax base.

Participating landowners will also benefit economically through lease payments, which will offset potential financial losses associated with removing small amounts of land from agricultural production. In general, the land surrounding each turbine can continue to be utilized for crop production and grazing. On average, approximately 0.5 acre to 1 acre of land per turbine is removed from agricultural production. Landowner compensation is established by voluntary land lease and/or wind easement agreements.

No significant demand increases are anticipated on long-term housing due to the Project. Out-of-town laborers will require temporary housing, which is anticipated to be furnished by local short-term lodging providers. The operations and maintenance of the facility will require approximately 15 permanent staff plus additional seasonal and support staff. The Project anticipates that sufficient permanent housing will be available in or near the Project to accommodate these employees.

8.1.2 Mitigation Measures

Compensation for minor losses in agricultural production will be provided through the established lease and wind rights terms agreed upon with landowners. Additional compensatory monetary measures are not anticipated as the socioeconomic impacts associated with the Project will be largely positive.

8.2 Land Use

8.2.1 Local Zoning and Comprehensive Plans

A comprehensive plan is a land use and community planning tool used to guide the growth and intentions of a county or municipality. Generally, comprehensive plans include details regarding existing and future land use, population and housing trends, economic development, and environmental characteristics. In preparing this application, the Applicant reviewed and analyzed the most recently adopted comprehensive plans of Nobles County and municipalities adjacent to the proposed Project Area. A list of the plans reviewed can be found in **Table 8.2.1.1.**

Nobles County has WECS ordinances that serve to regulate the installation and operation of WECS not otherwise subject to siting and oversight by the State of Minnesota under Minnesota Statute 216F.

The Nobles County Zoning Ordinance Section 729 discusses WECS Regulations. According to Nobles County Environmental Services Office, the Nobles 2 Project Area is situated entirely within the Agricultural Preservation District (AG) of Bloom, Larkin, Leota, Lismore, Summit Lake, and Wilmont Townships as defined by the Nobles County Zoning Ordinance. Specific Nobles County setback requirements are outlined in Section 729.4 of the Ordinance.

While Nobles County has a specific WECS ordinances, the ordinance exists “to regulate the installation and operation of WECS not otherwise subject to siting and oversight by the State of Minnesota”. The Project is exempt from the County’s WECS ordinances because the Project is over 25 MW in size; however, the Project will be designed to generally meet or exceed the minimum setback requirements identified by Nobles County’s WECS ordinances. Notwithstanding, Nobles County has indicated that “the statewide standards for permitting such as setbacks for wind access, homes, noise standards, public roads, drain tile avoidance and repair, wetland buffers, site determination, permittee responsibilities, survey, decommissioning plans, reports, and additional standards adequately address the concerns of our residents" (**Appendix B**).

8.2.1.1 Adopted Comprehensive Plans

Table 8.2.1.1 provides an inventory of Land Use Plans for Local Governments within and adjacent to the Project Area.

Table 8.2.1.1: Comprehensive Plan Inventory for Local Government Units

Local Government	Plan Name	Year Adopted/Updated	Associated Development Plan(s)
Nobles County	Comprehensive Plan	1966/2001	Zoning Ordinance
City of Wilmont	NA	NA	NA
Bloom Township	NA	NA	NA
Larkin Township	NA	NA	NA
Leota Township	NA	NA	NA
Lismore Township	NA	NA	NA
Summit Lake Township	NA	NA	NA
Wilmont Township	NA	NA	NA

8.2.1.2 County or Local Ordinances

Table 8.2.1.2 compares the Project design and setbacks with those indicated by the Nobles County ordinances, and those subject to MPUC requirements.

Table 8.2.1.2: Nobles 2 Wind Project Setback Comparison

Resource	MPUC	Nobles	Project Design
Non-participating/ Participating Property Lines	3 RD on east-west axis and 5 RD on north-south axis from non-participating property lines[1]	1.25 times the total height[3]	3 RD on east-west axis and 5 RD on north-south axis from non-participating property lines[1]
Residential Dwellings	500 feet (152 meters) and sufficient distance to meet state noise standard.	750 feet (228 meters)	1,600 Feet (488 meters)
Meteorological Towers	250 feet from the edge of road ROW and boundaries of developer's site control	The fall zone, as certified by a professional engineer +10 feet or 1.1 times the total height[2].	1.1 times total height[2]

Table 8.2.1.2: Nobles 2 Wind Project Setback Comparison			
Resource	**MPUC**	**Nobles**	**Project Design**
Other Structures	None specified.	To be considered, 600 feet for meteorological towers	None specified.
Public Roads	250 feet (76 meters)	1x the height, may be reduced for minimum maintenance roads or a road with an Average Daily Traffic Count of less than 10. (or equivalent to centerline)	1x total height[4]
Recreational Trails	250 feet (76 meters)	None specified	300 Feet
Public Lands	3 RD east-west axis and 5 RD on north-south[1]	600 feet	3 X 5 RD[1]
Wetlands, Streams and Ditches	No turbines, towers or associated facilities allowed. Electric collector and feeder lines may cross or placed subject to DNR, FWS, and/or USACOE permits.	600 feet (USFWS Types III, IV, and V).	Avoidance of wetlands and water resources with turbines. Avoid or minimize impacts to water resources to the degree practicable with other project facilities.
Internal Turbine Spacing	3 RD on east-west axis and 5 RD on north south axis[1]	None specified.	3 X 5 RD[1]
Public Conservation Lands Managed as Grasslands	None specified.	600 feet	Avoided (there are no RIM or USFWS lands within the Project Area)
Native Prairies	Turbines and associated facilities shall not be placed in native prairies, unless approved in the native prairie protection plan	None specified.	Turbines and associated facilities will not be placed in native prairies unless approved in the native prairie protection plan

Table 8.2.1.2: Nobles 2 Wind Project Setback Comparison			
Resource	**MPUC**	**Nobles**	**Project Design**
Sand & Gravel Operations	Turbines and associated facilities shall not be placed in active sand and gravel operations, unless negotiated with landowner.	None specified.	Project located outside of active gravel mines.
Aviation	Turbines and associated facilities shall not be located so as to create an obstruction to navigable airspace of public and private airports.	None specified.	6 miles.

[1] 3 RD for Vestas V136 turbine is 408 meters (1,339 feet); 5RD for Vestas V136 turbine is 680 meters (2,231 feet).

[2] 1.1 times the total height for meteorological tower of 82 meters (269 feet) = 90.2 meters (296 feet) from edge of public right-of-way

[3] 1.25 times height for Vestas V136 turbine = 206 meters (677 feet).

[4] 1 times height for Vestas V136 = 165 meters (541 feet)

8.2.1.3 Current and Future Zoning

The Nobles County Comprehensive Plan mentions the countywide goal to ensure that energy services will be able to sustain the County for many years. A strategy is proposed in the Nobles County Comprehensive Plan for the use of renewable energy generation through wind power production. One of the objectives in the Comprehensive Plan is involvement in the Southwest Minnesota Energy Task Force, which includes nine counties in the southwest region and focuses on electric deregulation and all sustainable or alternative energy sources.

The Nobles County Comprehensive Plan mentions the positive impacts of wind development such as diversifying the economy, job creation, increased tax base, and income for local landowners. The increase of economic development with wind energy through locally owned cooperatives will increase the public's overall benefit. The plan also mentions the negative aspects of large wind turbines such as the perceived unpleasant aesthetic views to residents, and potential impacts on wildlife populations and native plant communities. However, these impacts can be reduced by careful attention to these issues during micro-siting.

8.2.2 Conservation Easements

The USFWS, U.S. Department of Agriculture ("USDA"), and Minnesota Board of Water and Soil Resources ("BWSR") offer conservation programs that encourage setting aside wetlands and grasslands for conservation purposes or the implementation of conservation practices on private land. These programs can provide another source of income for local farms and landowners. Some of these programs include the Conservation Reserve Program ("CRP") administered through the USDA Farm Service Agency ("FSA"), the Environmental Quality Incentives Program ("EQIP") administered through the USDA

Natural Resource Conservation Service ("NRCS"), and Reinvest in Minnesota ("RIM") easement programs administered by BWSR. RIM includes several easement programs including the Conservation Reserve Easement Program ("CREP"), RIM-Wetland Reserve Program ("RIM-WRP"), and Permanent Wetland Preserve ("PWP"). These programs vary in their requirements, payments, and the length of time for which a piece of property must be enrolled. Some of these easements are perpetual in nature.

There are no RIM or USFWS lands within the Project Area boundary. As shown on **Map 5**, there are approximately 127 separate areas totaling 536 acres of land within the Project Area boundary that have been set aside under the CRP (USDA FSA State Office Dataset, February 2007). It is worth noting that the total number of CRP areas within the Project Area boundary that have not expired (based on the 2007 data) are 33 with a total of 98 acres. Alternatively, 94 areas totaling 438 acres have expired according to the 2007 data. It must also be noted that additional lands may have been enrolled in CRP within the Project Area since the 2007 data was published.

As shown on **Map 3b**, the preliminary layout avoids impacts to all 536 acres of CRP land within the Project Area with the exception of one proposed collector line that is routed through land that may still be under CRP. CRP areas will be verified by evaluating current land lease agreements for participating landowners prior to construction. Nobles 2 plans to avoid CRP lands as it continues to develop the Project. However, if these lands are unavoidable, Nobles 2 will work collaboratively with the USDA and the landowner to remove the impacted portion of the parcel from the applicable program.

8.2.3 Potential Impacts

The Project is generally consistent with the County comprehensive plan. Agricultural use of the Project Area will continue. The Project will positively impact local economies by providing a diversified income stream for landowners, possible temporary jobs for local workers, and tax benefits to the local governments.

8.2.4 Mitigation Measures

Because negative impacts to local zoning and comprehensive plans are not expected, Nobles 2 is not proposing mitigative measures addressing these subjects. No mitigative measures are proposed for conservation easements because impacts to lands subject to conservation easements are not anticipated.

8.3 Noise

Noise is commonly used to describe unwanted sound. Sound is an audible variation of air pressure, and can vary in both intensity and frequency. The intensity of a sound wave can vary greatly and is measured on a logarithmic scale in units called decibels (dB). Each 10 dB increase is a doubling of the intensity. Because people are more sensitive to sounds of certain frequencies, the A-weighted [dB(A)] scale is used to discuss sound impacts on humans. The dB(A) scale gives more weight to sounds within the normal human hearing range and less weight to sounds that are at the upper and lower range of audible frequency. **Table 8.3** shows sound levels associated with some common sources and/or locations:

Table 8.3: Common Noise Sources and Sound Levels	
Sound in dB(A)	**Source**
140	Jet Engine (at 25 meters)
130	Jet Aircraft (at 100 meters)
120	Rock and Roll Concert
110	Pneumatic Chipper
100	Jointer/Planer
90	Chainsaw
80	Heavy Truck Traffic
70	Business Office
60	Conversational Speech
50	Library
40	Bedroom
30	Secluded Woods
20	Whisper

Source: MPCA, March 1999.

8.3.1 Description of Resources

Typical ambient night time sound levels for windy rural areas are in the low-to-mid 30 dB(A) range. Ambient levels up to 60 dB(A) may exist near roads, farmsteads and other areas of human activity during normal daytime work hours (EPA 1974). The windy conditions in the Project Area will tend to increase the natural ambient sound levels and mask other sound sources.

The Minnesota Pollution Control Agency (MPCA) establishes acceptable sound levels based on time of day and the use of an area. For example, higher sound levels are acceptable in industrial areas during the day than residential areas during the night. According to Minnesota Rules Chapter 7030.0040, night time sound levels in the Project Area must be below 50 dB(A) 50 percent of the time within any hour (referred to as the L50), and below 55 dB(A) 90 percent of the time within any hour (referred to as the L90).

8.3.2 Potential Impacts

Operation of wind turbines will contribute to sound levels in the Project Area. The sound associated with the Project will vary based on wind speed, distance from turbines, the number of turbines in operation, weather and surface conditions, and the nature of obstacles and/or the topography between the wind turbines and the location where the sound is heard. Generally, turbines produce more sound on windier days, but the wind also produces more ambient noise that will mask the sounds produced by the wind turbines. Therefore, perceived increases in sound levels within the Project Area as modeled for this Project are expected to be minimal.

Ambient sound monitoring was conducted at four residential locations and summarized in a pre-construction sound monitoring report (**Appendix C**). The objective of the study was to measure sound levels over a one-week period to establish representative pre-construction sound levels within and near the Project Area boundary. Monitoring was completed in conformance with Commerce, Energy Facility Permitting "Guidance for Large Wind Energy Conversion System Noise Study Protocol and Report". Sound level readings were taken every second for approximately four days between 9 March and 13 March 2016. Readings were taken with Larson-Davis Model 831 sound level meters located within 100 to 200 feet of homes on the residential properties. Average energy equivalent sound levels (Leq) and statistical sound levels including the L50 (level exceeded 50 percent of an hour) were automatically calculated and stored by each meter each hour of the monitoring period.

The four monitoring locations are as follows and shown on **Map 6**.

- Site M1: Located at 12171 Erickson Avenue, Wilmont MN
- Site M2: Located at 18407 McCall, Reading, MN
- Site M3: Located at 19067 160th St., Wilmont, MN
- Site M4: Located at 12129 Knauf Avenue, Fulda, MN

Sites M1 and M4 have similar Leq and L50 levels in both day and night periods and are lower than the levels from M2 and M3, likely because of the locations of M2 and M3 at homes adjacent to relatively busy roadways. Average Leq and L50 were estimated from the whole dataset from meters M1 through M4, however, the average was recalculated excluding the data reflecting nearby traffic at M2 and M3 meters. As shown in **Table 8.3.2**, in the existing condition, the current Leq sound levels range from 24.7 to 57.6 dB(A) during both the daytime and nighttime, and L50s range from 22.2 to 50 dB(A). The average L50s for the site (excluding traffic affected data) are well below Minnesota Noise Standards for both daytime and nighttime readings at 60 dB(A) and 50 dB(A), respectively.

Table 8.3.2: Average Pre-Construction Sound Levels dB(A)

		Wind		No Wind	
Period	**Location**	**Leq**	**L50**	**Leq**	**L50**
Nighttime	M1	39.4	37.9	30.6	26.0
	M2	48.0	48.2	37.9	28.8
	M3	50.0	43.7	45.3	27.9
	M4	41.3	41.3	24.7	22.2
	Average	**44.8**	**42.8**	**34.6**	**26.2**
Daytime	M1	47.7	42.2	37.8	30.1
	M2	56.2	48.2	52.1	30.2
	M3	57.6	50.0	55.7	39.7

	M4	48.5	44.9	37.0	29.3
	Average	**52.5**	**46.3**	**45.7**	**32.3**
Average Leq (No traffic)	Daytime: 43		Nighttime: 35		
Average L50 (No traffic)	Daytime: 37		Nighttime: 32		

Nobles 2 performed sound impact analysis for the Vestas V136-3.6 MW proposed turbine layout using sound data supplied by the turbine manufacturer, collected wind data, and site topography (elevation) (**Appendix D**). Other factors considered in the noise calculation were noise receptor coordinates, joint wind speed and direction frequency distribution, and existing turbines. Local obstacles such as trees and buildings may further attenuate sound and lessen Project impact, but were not included in the model. The noise calculations were completed using the Vestas V136-3.6 MW turbine, which has the highest sound levels and therefore is considered the worst case, at each of the 86 wind turbine pad sites. The other turbines proposed will result in lower sound levels within the Project.

Sound modeling was done in WindPRO version 3.1 using ISO-9613-2 general method for calculating the attenuation of sound outdoors. General ground attenuation and an attenuation factor of 0.5 was used. The model was based on the assumption that the wind turbines would be operating at a wind speed that caused the loudest sound. The loudest sound value was based on the Power Optimized Mode P01-OS (without serrated trailing edges), giving a loudest normal noise level of 108.2 dB(A) at 10 m/s and higher.

The analysis calculated the loudest realistic noise from the turbines at the 540 residences in the Project Area. The results of the noise study indicate that no locations will be above the Minnesota State Noise Standards of 50 dB(A). The highest noise level predicted at any residence is 48.8 dB(A).

Map 6 shows 40, 45, and 50 dB(A) cumulative sound lines for the proposed layout of the Vestas V136 turbine model. Additional sound modeling using the selected turbine sound characteristics and final locations will be completed prior to the start of construction to ensure compliance with state noise standards.

Two option agreements, one for 10 acres and one for 4 acres, have been executed between Nobles 2 and the parcel landowner for the Project substation. The final location of the Project substation within one of these optioned parcels has not been finalized and is contingent upon further civil design work, collector line routing, and coordination with the transmission owner in locating the interconnection facilities. The nearest occupied home to locations being considered for the proposed Project substation is located approximately 2,800 feet to the east. The substation's main power transformer is the primary source of substation sound, and the typical sound level for a transformer is 83 dB(A) or less. As such, sound associated with normal operation of the substation is not expected to be audible at this farmstead/home.

In accordance with the Nobles County Zoning ordinance, the substation will be setback at least 25 feet from rights-of -way and adjoining property lines.

8.3.3 Mitigation Measures

Nobles 2 has taken considerable effort to site turbines carefully and responsibly to satisfy the MPCA noise standards. Nobles 2 is maintaining a minimum setback distance of 1,600 feet to occupied dwellings. This distance facilitates the dissipation of sound waves before they reach homes in and around the Project Area to minimize adverse impacts to ambient sound levels. Nobles 2 will continue to take into account possible sound impacts to nearby rural residences, farmsteads, and other potentially affected parties during development, construction, and operation of the proposed Project.

8.4 Visual Impacts

The topography of the Project Area is gently undulating and includes occasional intermittent creeks (**Map 3a**). Elevations range from 1,560 feet to 1,812 feet above mean sea level. The typical visual landscape within the Project Area consists of agricultural fields, farmsteads with trees planted as windbreaks, and active or fallow fields.

The majority of the landscape within the Project Area is classified as agricultural and rural open space. Within the Project Area, local vegetation predominantly consists of agricultural crops, primarily corn and soybeans, which visually create a low uniform profile. A mix of deciduous and coniferous trees planted for windbreaks typically surrounds farmsteads, which are established to prevent wind erosion and to shelter dwellings.

Aside from the local vegetation, the main focal points present in the agricultural landscape are the farm residences and buildings. Of the structures present, a portion date back to the 19th and early 20th centuries and are representative of that era. In addition to structures, there are three inactive gravel pits located within the Project Area. Two cemeteries are located in the south half of Section 6 of Township 103, Range 42.

The Federal Communications Commission (FCC) database shows no AM/FM radio towers located within the Project Area boundary. There is one microwave communication tower located within the approximate center of the Project Area boundary. Within 10 miles of the Project Area, 63 towers, potentially including microwave, AM, FM, and other FAA permitted towers have been identified and have slightly altered the landscape from being strictly agricultural.

To date, southwestern Minnesota has experienced substantial wind energy development. Of the counties that are adjacent to Nobles County, Murray County has seen the most wind development (see Table 8.4 and **Map 7**). As of 2016, Nobles County has approximately 184 installed turbines.

Table 8.4: Wind Turbines in Surrounding Counties (FAA/AWEA)	
County	**Number of Turbines**
Rock	130
Pipestone	149
Murray	251
Nobles	184

Source: Ventyx FAA Windpoints

According to the American Wind Energy Association (AWEA), as of the end of 2016, there was 3,499 MW of installed wind capacity in the State. Minnesota currently ranks 7th in the nation for existing wind energy capacity. The presence and visual effect of towers and turbines have existed or will exist in the general vicinity of the Project Area.

8.4.1 Visual Impacts on Private Lands and Homes

The visual effect of the Project will depend largely upon perceptions of observers and residents within several miles of the Project Area. Wind farms may appear industrial to some; however, they are consistent with local land use. The visual contrast added by wind farms may be perceived as a visual disruption or as points of visual interest with their own aesthetic quality and appeal. Post-construction operation of the Project is not expected to significantly increase day-to-day human activity or traffic in the area. The Project Area will therefore retain its rural sense and remote character, which is defined primarily by row-crop agriculture and interspersed farmsteads that provide visual focal points on the landscape.

Existing wind farms are located immediately to the northwest and south of the proposed Project, which should also limit the extent to which the proposed Project is viewed as a disruption to the area's scenic integrity. The proposed Project is consistent with existing wind energy production land use in the area.

The FAA requires obstruction lighting or marking of structures over 200 feet above ground surface because they are considered obstructions to air navigation. To mitigate the visual impact of such lighting, Nobles 2 will apply FAA guidance and standards when applying to the FAA for approval of a lighting plan for the Project and will follow the approved plan to meet the minimum requirements of FAA regulations for obstruction lighting. It is the Applicant's intent to provide details of its lighting plan prior to construction.

8.4.2 Visual Impacts on Public Lands

The presence of turbines within the viewshed of natural areas may affect the aesthetic quality of those areas. However, the public lands that exist within the viewshed of the Project are typical of public lands in an agricultural setting, and are not classified as designated wilderness areas.

There are several Waterfowl Production Areas ("WPAs") and Wildlife Management Areas ("WMAs") located near or surrounded by the Project Area. Although construction and land disturbance in these areas will be avoided, turbines will be visible from within these locations.

Project turbines will be visible for users of an area State-funded snowmobile trail. Frosty Riders Snowmobile Trail arcs into the southwestern portion of the Project Area, extending from Lismore north to 150th Street and then turning south again through Wilmont (**Map 8**). No winter use information was available from the MNDNR or the county for this trail. However, the report Snowmobiling in Minnesota: Economic Impact and Consumer Profile (April 2005), indicates that snowmobilers participate in the activity about 18 times during the season on average, and most snowmobiling takes place in the northern portion of the State.

8.4.3 Mitigative Measures

Nobles 2 will work to avoid or minimize visual impacts in the final design and siting of the Project and will work with landowners to identify concerns related to Project aesthetics and to address visual impacts. Nobles 2 proposes the following mitigative measures:

1) Turbines will be uniform in color.

2) Turbines will not be located in biologically sensitive areas such as public parks, WMAs, Scientific and Natural Areas ("SNAs"), and WPAs.

3) Turbines will meet the minimum FAA requirements for obstruction lighting of wind turbine farms (e.g. reduce number of lights on turbines and synchronized red strobe lights).

4) Collector lines will be buried to minimize aboveground structures within the turbine array.

5) Existing roads will be used for construction and maintenance where possible to minimize the amount of new roads constructed.

6) Access roads created for the Project will be located on gentle grades to minimize erosion, visible cuts and fills.

7) Temporarily disturbed areas will be converted back to cropland or otherwise reseeded with native seed mixes appropriate for the region.

8) The primary use of large nameplate capacity turbines will result in a fewer number of turbines than would be utilized in a project that utilizes 1.5 or 2.0 MW turbines.

8.5 Shadow Flicker

Shadow flicker with regard to wind turbines is a recurring change in light intensity perceived by a receptor (person) caused by the shadow cast by moving turbine blades. Based on the proposed Nobles 2 turbine layout, the most shadow flicker expected on any one home is 29 hours and 7 minutes in a year, or less than 1 percent of all daytime hours. The shadow flicker study was completed using the Vestas V136, which has the largest rotor diameter of the turbines proposed by the Applicant, at each of the 86 wind turbine pad sites. The other turbines proposed will result in no higher shadow flicker than the Vestas V136 studied.

Multiple independent conditions must be met in order for shadow flicker to occur. These conditions are further described below:

- *Number, size, and position of windows:* In order for shadow flicker to be perceived within a building, windows must be facing the sun and an operating turbine blade must be between the window and the sun.

- *Ambient lighting conditions:* If inside, having lights on may significantly diminish the perception of shadow flicker.

- *Cloud cover:* When the sunlight is obscured by clouds, shadow flicker is reduced or eliminated.

- *Time of day:* It must be daytime for shadow flicker to occur. Very early and very late in the day, when the sun is very low to the horizon, the turbine's shadow is long and diffuse such that the perception of flicker is diminished. In the middle of the day the shadow does not extend far from the base of the turbine and is generally confined to areas within setback distances and away from homes.

- *Season:* The sun travels further from the horizon during the summer and closer to the horizon during the winter. As the seasons change the shape and location of a turbine's shadow will also change significantly. This limits the number of consecutive days a home may receive shadow flicker.

- *Visual Screening:* Objects such as trees, buildings, awnings, blinds and drapes can all reduce or eliminate the potential for shadow flicker.

- *Location of wind turbines:* Because Minnesota is in the northern hemisphere, the sun is in the southern sky, which causes turbine shadows to occur mostly to the north of the unit.

- *Operation of the wind turbine:* A wind turbine that is not spinning cannot cause shadow flicker. Turbines may not be spinning because the wind is above or below its operating speeds, or they may be offline for maintenance.

- *Orientation of the wind turbine:* A wind turbine faces into the wind, which may or may not be into the sun. The shape and size of a wind turbine's shadow changes based on which direction it is facing relative to the sun. If the turbine is facing directly into or away from the sun, it will cast the largest shadow. If it is facing directly perpendicular to the sun, it will cast the smallest shadow. Based on wind data measured at the project site, these turbines will generally face north by northwest in the winter, and south in the summer.

The above factors combined with careful and responsible project siting reduces the likelihood that shadow flicker will adversely impact the Project Area.

8.5.1 Potential Impacts

WindPRO software version 3.1 was used to model the preliminary project layout for potential shadow flicker at homes in and around the Project Area (**Appendix D**). Turbine operation assumptions are based on measured wind data from the Project Area and are shown in **Table 8.5.1a** below:

Table 8.5.1a: Modeled Annual Operating Hours by Wind Direction

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW
813	559	406	355	482	838	1269	1117	584	686	889	762

Table 8.5.1a shows the number of hours in a year each turbine is expected to be turning while facing the direction indicated. For example, turbines are expected to operate facing South by South East for 838 hours in a typical year.

Sunshine probability assumptions are based on 18 years of data for Sioux Falls, SD, which is the closest station and are shown in **Table 8.5.1b** below:

Table 8.5.1b: Expected Percent Sunshine by Month

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
53%	59%	46%	54%	55%	58%	71%	61%	59%	57%	49%	55%

Other inputs used in the shadow flicker calculation included the turbine coordinates, the specifications of a Vestas V136-3.6 MW turbine (or any of its variants), the shadow receptor coordinates, elevation model, and existing turbines.

WindPRO uses the above assumptions to simulate the turbine shadows throughout a year and determine the expected amount and location of shadow flicker. Local obstacles such as trees and specific window configurations were not included in the model and may further reduce the noticeable shadow.

As detailed above, the potential for shadow flicker is based on varying degrees and combinations of multiple independent conditions. Of the 590 residences, 80 percent received no shadow flicker. The expected hours of shadow flicker in a typical year for the home receiving the most shadow flicker from the Vestas V136-3.6 MW (or any of its variants) was 29 hours and 7 minutes. This remains below the 30 hours per year limit accepted by industry practice.

Map 9 shows 0, 5, 10, 30, and 50 hour/year shadow flicker lines for the Vestas V136-3.6 MW (or any of its variants) proposed layout under realistic case scenarios. Trees, buildings, drapes, blinds, and any other screening objects between these homes and the turbines causing the impact were not considered and will further minimize potential for shadow flicker. In addition, the receptors used during the study were omni-directional rather than modeling specific facades of the buildings in order to be conservative in assumptions. The effect of the conservative assumptions indicates that the number of hour of shadow flicker will likely be less than predicted in the study.

The shadow from a moving wind turbine blade pulses approximately once every second. According to the Epilepsy Foundation, pulses of this frequency are not harmful to the health of individuals with photosensitivity or epilepsy. Frequency of flicker is generally no greater than 1.5 hertz, or 1.5 flashes per second. The Epilepsy Foundation has determined that flashing lights in the frequency of 5 to 30 flashes per second are most likely to trigger seizure activity.

8.5.2 Mitigation Measures

Nobles 2 has taken considerable effort to site turbines carefully and responsibly to minimize the impact of shadow flicker to residences. In particular, a 1,600-foot minimum setback from existing residential dwellings will be used. The potential for shadow flicker will continue to be considered during development, construction, and operation of the Project. Although unlikely to occur, specific cases of documented excessive shadow flicker will be addressed. Additional mitigation options the Project may consider include visual screening such as trees, awnings, curtains or blinds, adjusting the operation and orientation of the turbine during flicker periods, and education about how to minimize perceived flicker by turning on lights and using a different room for a short period of time.

8.6 Public Services and Infrastructure

The Project is located in a lightly populated, rural/farming area in southwest Minnesota. Public services to farmsteads and rural residences within the Project Area include transportation/roadways, electric and telephone. The nearest cities to the Project Area are the City of Lismore located immediately adjacent to the southwestern Project Area boundary and the City of Wilmont located immediately adjacent to the southern boundary of the Project Area (**Map 10**). The cities provide sanitary sewer, water, electric, natural gas, and phone services to its residents. Additionally, the cities have their own fire departments and are routinely patrolled by the Noble County Sheriff’s Office. Emergency response is provided by the County’s Road Patrolmen, the Lismore or Wilmont Fire Departments, and the Sanford Worthington Medical Center. No active railroad lines are in the vicinity of the Project Area.

The Project is expected to have minimal effect on existing public services and infrastructure of the area. Construction and operation of the Project will be in accordance with associated Federal, state and local permits and laws, as well as industry construction and operation standards and best practices. The Project is designed to have manageable temporary effects on the existing infrastructure during Project construction and operation. Because only minor impacts are expected, extensive mitigation measures are not anticipated. The following sections describe specific impacts that may occur to public services and infrastructure and how they will be mitigated.

8.6.1 Traffic and Roads

Traffic

Existing roadway infrastructure in and around the Project Area consists of county and township roads that generally follow section lines, with private unpaved farmstead driveways and farming access roads. Various County State Aid Highways ("CSAH") and County Roads ("CR") provide access to, or are located in, the Project Area. The CSAHs and Interstate Trunk Highways ("ISTH") are two-lane paved roads. The remaining roads within the Project Area are two-lane gravel roads. The topography of the area allows for the creation of a road network providing good access to most locations within the Project Area. Ample access from surrounding roadways will reduce the need for extensive access roads and allow existing primarily agricultural uses to continue relatively unaltered.

Interstate Trunk Highway 90 is located approximately 7.5 miles south of the Project Area. MNTH 91 runs north/south east of the City of Lismore. CSAH 15 runs north/south in the center of the Project Area (Edwards Avenue). CSAH 13 extends north/south east of the City of Wilmont (Hesselroth Avenue). CSAH 25 adjoins the southern point of CSAH 13 east of the City of Wilmont and extends southeast for approximately 1 mile before reaching the Project Area boundary. CSAH 16 (160th St) runs east/west 1 mile north of the southern boundary of the Project Area. CSAH 18 (130th St) extends east/west approximately in the center of the Project Area. CSAH 9 (McCall Avenue) runs north/south along the southeast Project Area border.

Existing traffic volumes on the area's Federal, state, and county roads and highways are documented in **Table 8.6.1** and on **Map 10**. Roads Annual Average Daily Traffic (AADT) are calculated for specific segments of the road, with several roads having multiple segments within the Project Area. Of the roads within or adjacent to the Project Area, a segment of MNTH 91 has the highest AADT count at 1,350 vehicles per day. For purposes of comparison, the functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day. Other roadways in the vicinity of the Project have AADTs ranging from 1,300 to as few as 30 cars per day in the center of the Project Area.

Table 8.6.1: Existing Daily Traffic Levels

Road	Number of Road Segments in Project	AADT (Range over Segments)	Total Miles within Project

Table 8.6.1: Existing Daily Traffic Levels			
Road	**Number of Road Segments in Project**	**AADT (Range over Segments)**	**Total Miles within Project**
MNTH 91	2	1,200-1,350	4.5 Miles
CSAH 9 (McCall Ave)	2	360-465	<1 Mile
CSAH 13 (Hesselroth Ave)	2	225-350	5 Miles
CSAH 15 (Edwards Ave)	3	200-320	7 Miles
CSAH 16 (160th St)	6	170-1,300	10.5 Miles
CSAH 18 (140th St)	2	120-185	8.5 Miles
CSAH 25	1	1,250	2 Miles
CSAH 31 (Grain St)	1	135	<1 Mile
CR 63 (Knauf Ave)	3	205-630	1 Mile
CR 66 (140th St)	1	30	1 Mile
CR 69 (150th St)	1	50	1.5 Miles
CR 70 (110th St)	2	120-200	1 Mile
CR 71 (1st St)	1	45	4.5 Miles
CR 72 (1st St)	2	45-70	1.5 Miles
CR 88 (1St St)	1	75	<1 Mile
MNTH 91	1	65	<1 Mile
CSAH 9 (McCall Ave)	1	35	<1 Mile

Source: MnDOT 2011-2015 Traffic Volumes

Maximum construction traffic is not expected to exceed 200 additional vehicle trips per day, and the functional capacity of a two-lane paved rural highway is in excess of 5,000 vehicles per day. Because the area roadways have AADTs currently well below capacity, the addition of 200 vehicle trips on a temporary basis would be perceptible, but similar to seasonal traffic increases such as observed during autumn crop harvest. Once Project construction is completed, maintenance crews will periodically drive through the Project Area to monitor and maintain the wind turbines. Project operation, maintenance and repair activities are not expected to adversely impact normal traffic in the Project Area. Traffic control measures and coordination with local authorities will be implemented to ensure public health and safety is protected with respect to the Project.

Roads

Transportation of equipment and materials associated with the construction of wind farms involves oversized and/or overweight loads and road use that is not consistent with normal traffic in the Project Area. Designated haul roads will be reviewed with the local authority having jurisdiction over the haul roads and road use agreements will be executed where required. Road use agreements will be used to identify suitable travel routes, traffic control measures, methods for evaluating, monitoring and restoring roads, and mitigation measures to ensure roads used for oversize/overweight loads are properly identified, monitored and stabilized. Construction related impacts are further described in Section 10.1

Prior to construction, Nobles 2 will coordinate with the applicable local and state entities to ensure that the weights being introduced to area roads are acceptable. Nobles 2 will work with the Cities of Lismore and Wilmont; Nobles and Murray County, Leota, Wilmont, Bloom, Summit Lake, Larkin and Lismore Townships, and Minnesota Department of Transportation ("MnDOT"), as necessary, regarding roadway concerns, right-of-way work (if any), and setbacks during construction of the Project. Nobles 2 will also work closely with the landowners in the placement of access roads to minimize land-use disruptions during construction and operation of the Project to the extent possible.

On March 18, 2016, the Applicant sent letters to MnDOT, the Nobles and Murray County Highway Departments, and the various Townships for comments on the Project. Nobles County responded that the Project would require permits for installations or modification of road approaches, overweight and over-dimension loads to transport equipment and materials over the County Highway System. In addition, roadway maintenance and repair, county ditch repair and movement of cranes over highways would also be involved. MnDOT District 7 responded that Trunk Highway 91 would be resurfaced and two box culverts replaced in the fall of 2018 or summer of 2019, which could impact delivery of wind turbine components. MnDOT also commented that work must be completed outside of MnDOT right-of-way, turbines should be set back far enough to prevent any piece from landing on the trunk highway, and work in MnDOT right-of-way would require a permit from MnDOT. It is expected that additional coordination with Nobles County and MnDOT will be required. Authorities having jurisdiction over any work performed within a public right-of-way may require permitting for temporary or permanent access including but not limited to placement or modification of utilities, temporary widening of field entrances, and location and construction of new access driveways.

8.6.2 Telecommunications

Telephone

Telephone service in the area is provided to farmsteads, rural residences and businesses by Centurytel, Lismore Cooperative Telephone Company, and other local telephone companies. Construction and operation of the proposed Project is not expected to impact telephone service to the Project Area. Prior to construction, a utility locate service will be contacted to locate underground facilities so they can be avoided. Nobles 2 will coordinate collector line placement with local telecommunications providers and avoid installing collection lines parallel to or in close proximity to existing copper telephone lines if concerns exist regarding the possibility of magnetic field interaction and telephone circuit noise. Nobles 2 will work closely with local telephone service providers to ensure that, if transmission lines are installed by Nobles 2, they are installed in a manner that is compatible with telephone communication systems in the Project Area. At this time, no impacts are anticipated to telephone service.

Project construction and operation will be designed to avoid adverse impacts to telephone, television, internet, or cellular phone service. To the extent Project facilities are installed in proximity to existing telephone lines or communication equipment, Nobles 2 will closely coordinate with the applicable service providers to avoid interference with such facilities. Should inadvertent impacts to these systems arise, Nobles 2 will work to remedy service interruptions on a case-by-case basis.

Microwave Beam Paths

Comsearch completed an evaluation of licensed non-federal government microwave beam paths in the vicinity of the Project Area and determined that 40 microwave beam paths intersect the Project Area. Comsearch calculated the Fresnel Zones, which is an area of signal swath which proposed turbines should avoid. The microwave paths are shown on Figure 2 and the Fresnel Zones are depicted on Figure 3 in the Comsearch Licensed Microwave Report (**Appendix E**). The Comsearch study concludes that as long as the turbines (including blade radius) are sited outside of the identified Fresnel zones, there should be no impact to microwave beam paths by the Project.

AM/FM Radio

Comsearch evaluated degradation to the operational coverage of AM and FM radio broadcast stations located in the Project vicinity and identified four records for AM stations within 30 kilometers (18.6 miles) of the Project Area. The closest station to the Project Area is KWOA at 7.3 kilometers (4.5 miles). Comsearch determined that there are 10 records for FM stations within a 30 kilometer (18.6 mile) radius of the Project Area, representing 9 licensed and operational stations of which one is a translator station. All of the FM stations are outside of the Project Area with the closest station antenna being located 5.1 kilometers (3.2 miles) from the Project. A listing of the nearest AM and FM stations are provided in the attached AM and FM Radio Report (**Appendix E**).

The potential for interference with AM broadcast coverage attributable to wind farms is only anticipated when broadcast stations with directive antennas are within 1.9 miles or 10 wavelengths of turbine towers and broadcast stations with non-directive antennas are within 1 wavelength. Figure 2 of the Comsearch report shows the location of the AM transmitter antennas with respect to the Project Area. Because the nearest AM station transmitter is 4.5 miles from the Project Area, no interference with AM broadcast stations is expected.

FM stations are usually not at risk to interference from wind turbines, especially when the turbines are in the far field region of the radiating FM antenna. All of the identified FM stations are outside of the Project Area and at least 3.2 miles from the Project Area. Consequently, no impact to FM broadcasts is expected.

Fixed Land Mobile Stations

Fixed land mobile stations can provide critical telecommunication services such as emergency response, public safety, and local government communications. Land mobile sites are typically unaffected by the presence of wind turbines, and a change in coverage of fixed land mobile stations associated with wind turbine installation is not expected. The frequencies of operation for these services have characteristics that allow the signal to propagate through wind turbines. As a result, change in their coverage associated with wind turbine installation is not expected. In the unlikely event a land mobile licensee believes their coverage has been compromised by the presence of the Project, there are options to improve signal coverage through optimization of a nearby base station or adding a repeater site. Utility towers, meteorological towers or even the turbine towers within the Project Area can serve as the platform for a land mobile base station or repeater sites.

Television

Comsearch analyzed the off-air television stations for which service could potentially be affected by the Project. Off-air stations are television broadcasters that transmit signals, which can be received directly on a television receiver from terrestrially located broadcast facilities. Comsearch compiled all off-air television stations within 150 kilometers (93.2 miles) of the Project Area; however, the TV stations that are most likely to provide off-air coverage to the Project Area will be those stations at a distance of 75 kilometers (46.6 miles) or less. The stations within 75 kilometers (46.6 miles) or less are listed in the attached Off-Air TV Analysis report **(Appendix E**). There are 54 station records within 75 kilometers (46.6 miles) of the Project Area. Of these 54 records, only 32 are currently licensed and operating. Eight of the stations are full power stations and 22 are low power. Twelve are low-power stations or translators. Translator stations receive signals from distant broadcasters and retransmit the signal to a local audience.

Seven of the full power stations (KCMN, KELO-TV, KSFY-TV, KDLT-TV, KTTW, KWSD, and KCSD-TV) may have their reception disrupted. The affected areas would primarily be within 10.2 miles of the Project that have clear line of site to a wind turbine, but not to the station. Degradation of reception would be the result of multipath interference causing signal scattering as TV signals are reflected by the turbines. Two low-power stations (K22HJ-D and K43LX-D) may also be disrupted in the same manner.

Modern digital TV receivers, when used in combination with a direction antenna reduces the likelihood that signal scattering from wind farms will cause interference to digital TV reception. TV cable service, (where available) and direct satellite broadcast are believed to be the dominant delivery mode of TV service to the Project Area, and these services will be unaffected by the presence of the Project. These modes of TV service may be offered to those residents who can demonstrate that their off-air TV reception has been materially disrupted by the presence of the wind turbines after they are installed.

Nobles 2 recognizes that some impacts to TV service within the Project Area may occur. The Applicant is committed to operating the Project in a manner that does not adversely impact television reception. Should issues arise following construction of the Project, Nobles 2 will work with the affected residents in a timely manner to determine the cause of the interference and establish acceptable reception.

8.6.3 Other Local Services

Oil and Natural Gas Pipelines

No oil and natural gas pipelines are mapped within or near the Project Area. Consequently, impacts to identified pipelines are not expected and therefore no mitigation measures have been proposed.

Electrical Services

There are currently three utility transmission lines within the Project Area. Xcel has a 115 kV line running north/south in the western portion of the Project Area and a 115kV transmission line extending north/south along Erickson Avenue through the center of the Project Area. ITC Midwest LLC has a 24 kV transmission line that runs from Lismore to Wilmont and then east to exit the Project Area. An additional segment of the ITC Midwest LLC 24 kV line intersects the Project in the very northeast corner of the Project Area. The transmission lines are shown on **Map 8**.

Limited and short-term impacts to the electrical service may be experienced where coordinated, short-term outages occur when high clearance construction equipment needs to cross areas with overhead distribution and/or transmission lines. Outages associated with the Project’s transmission interconnection construction may also be required. Nobles 2 will work closely with local service providers to ensure outages are planned and coordinated with local residents and other impacted users.

Water Supply and Sanitary Service

The Project Area has limited public infrastructure services. Homes and farmsteads typically utilize on-site water wells or water service from Lincoln-Pipestone Rural Water. Septic systems typically provide individual household sanitary needs.

Construction and operation of the proposed Project will not affect the water supply or sanitary service. Nobles 2 will share information with Lincoln-Pipestone Rural Water to avoid impacts to their water distribution system, utilizing crossing agreements where needed. No installation or abandonment of water supply wells is anticipated for the Project. In the event that water supply wells are abandoned or installed, or environmental boreholes are drilled, Nobles 2 will do so in accordance with applicable Minnesota law and Minnesota Department of Health (MDH) requirements.

It is not anticipated that the Project will require the appropriation of surface water or permanent dewatering. Temporary dewatering may be required during construction for specific turbine foundations and/or electrical trenches. Water use during construction may occur to provide dust control and water for concrete mixes and other construction purposes. If temporary dewatering is required during construction activities, discharge of dewatering fluid will be conducted under the National Pollutant Discharge Elimination System ("NPDES") permit program and addressed by the Project's Storm Water Pollution Prevention Plan ("SWPPP"), as required.

8.6.4 Potential Impacts

Limited and short-term impacts to electrical service are possible when construction equipment needs to cross overhead distribution or transmission lines. No additional impacts to local services are anticipated.

8.6.5 Mitigation Measures

Nobles 2 will work with local service providers to limit electrical outages. Coordination with impacted users will be conducted to lessen negative impacts.

8.7 Cultural and Archaeological Resources

8.7.1 Description of Resources

The proposed Project Area is located in the Southwest Riverine (1) and Prairie Lake South (2s) Archaeological Regions of Minnesota (Anfinson 1990). Archaeological properties related to American Indian occupation and activities are usually found along lakes and streams, or by former large permanent bodies of water on prominent topographic features (i.e. uplands or terraces).

In February 2016, Westwood, on behalf of Nobles 2, conducted a Phase Ia cultural resources literature review of records at the Minnesota State Historic Preservation Office ("SHPO") and Office of the State Archaeologist ("OSA") for the Project Area and a one-mile buffer surrounding the Project Area. The background literature search identified 10 previously inventoried archaeological sites located within one mile of the proposed Project Area. Three of the previously recorded archaeological sites are located within the defined Project Area. None of these sites have been listed or determined as eligible for listing on the National Register of Historic Places ("NRHP"), although it is possible that not all of the sites have yet been evaluated. A summary of the previously inventoried archaeological sites is provided in **Table 8.7.1a** and shown on **Map 11**.

Table 8.7.1a: Previously Recorded Archaeological Sites

Site Number	Site Name	Site Type	Location	Project/Buffer

Table 8.7.1a: Previously Recorded Archaeological Sites				
Site Number	**Site Name**	**Site Type**	**Location**	**Project/Buffer**
21LNO0046	None	Single Artifact	T103N, R42W, Sec. 3	Project Area
21LNO0047	Kroontje	Single Artifact	T104N, R43W, Sec. 28	Buffer
21LNO0049	None	Single Artifact	T103N, R42W, Sec. 7	Buffer
21LNO0055	Fenton Wind Farm - 010	Single Artifact	T104N, R42W, Sec. 7	Buffer
21LNO0056	None	Lithic Scatter	T104N, R42W, Sec. 4	Buffer
21LNO0057	None	Single Artifact	T104N, R42W, Sec. 31	Project Area
21NO0058	None	Artifact Scatter	T104N, R43W, Sec. 25	Project Area
21NO0059	None	Single Artifact	T103N, R43W, Sec. 11	Buffer
21NOi	None	Earthworks	T104N, R43W, Sec. 33	Buffer
21NOj	None	Earthworks	T103N, R42W, Sec. 12	Buffer

Key: Site Number = site designation applied by State Archaeologist; Site Name = name given to site; Site Type = defined site use type; Location = amended legal description of recorded property; Project/Buffer = location of site within defined project area (Project) or within a one-mile buffer (Buffer).

The Phase Ia review (**Appendix F**) identified 22 previously inventoried historic architectural resources located within one mile of the proposed Project Area. Eight of the historic architectural resources are located within the defined Project Area. One of the resources within the Project Area, the Church of St. Kilian, is listed in the NRHP. The remaining resources have not been determined eligible for listing in the NRHP, although it is possible that not all of the resources have yet been evaluated. The Lismore Water Tower (Inventory Number NO-LSC-006), located outside of, but adjacent to, the Project Area, is certified as eligible for listing on the NRHP. A summary of the identified historic architectural resources is provided in **Table 8.7.1b**. NRHP listed or eligible structures are shown on **Map 11**.

Table 8.7.1b: Previously Recorded Historic/Architectural Resources			
SHPO Number	**Description**	**Location**	**Project/Buffer**
NO-SLT-025	Farmstead	T103N, R41W, Sec. 8	Buffer
NO-DEW-001	Farmstead	T104N, R41W, Sec. 6	Project Area
NO-LRK-002	Bridge No. L3351	T103N, R42W, Sec. 5	Project Area
NO-LRK-020	Farmstead	T103N, R42W, Sec. 1	Buffer
NO-LSC-001	Lismore Firehall	T103N, R43W, Sec. 1	Buffer
NO-LSC-002	Catholic Church	T103N, R43W, Sec. 1	Buffer
NO-LSC-003	Grain Elevator	T104N, R43W, Sec. 1	Buffer
NO-LSC-004	Commercial Building/ Lismore Café (moved)	T103N, R43W, Sec. 1	Buffer
NO-LSC-006	Lismore Water Tower	T103N, R43W, Sec. 1	Buffer
NO-LSC-005	Chicago, Rock Island and Pacific RR grade – Lismore Twp. Segment	T103N, R43W, Sec. 10	Buffer

Table 8.7.1b: Previously Recorded Historic/Architectural Resources			
SHPO Number	Description	Location	Project/Buffer
NO-SLT-001	Farmstead	T103N, R41W, Sec. 4	Buffer
NO-SLT-005	Farmstead	T103N, R41W, Sec. 6	Project Area
NO-SLT-006	Farmstead	T103N, R41W, Sec. 9	Buffer
NO-SLT-007	Farmstead	T103N, R41W, Sec. 9	Buffer
NO-SLT-026	Farmstead	T103N, R41W, Sec. 9	Buffer
NO-SLT-027	Farmstead	T103N, R41W, Sec. 5	Project Area
NO-SLT-028	Farmstead	T103N, R41W, Sec. 6	Project Area
NO-SLT-029	Farmstead	T103N, R41W, Sec. 5	Project Area
NO-SLT-030	Farmstead	T103N, R41W, Sec. 7	Buffer
NO-SLT-031	Farmstead	T103N, R41W, Sec. 8	Buffer
NO-SLT-046	Farmstead	T103N, R41W, Sec. 5	Project Area
NO-WIL-001	Church of St. Kilian (Catholic)	T104N, R42W, Sec. 27	Project Area

Key: SHPO Number = inventory number for recorded property in SHPO files; Description = name of historic structure or description of type of structure; Location = amended legal description of recorded property; Project Area / Buffer = denotes if listed site is within the defined Project Area or within the one-mile buffer.

8.7.2 Potential Impacts

While the Applicant will attempt to avoid archeological sites, the proposed construction activities for the Project may have the potential to impact such sites or to add to the visual impacts on cultural resources in the region of the Project Area. In the event that an impact would occur, the Applicant will determine the nature of the impact and consult with the SHPO on whether or not the resource is eligible for listing in the NRHP.

The one NRHP listed architectural property located within the Project Area, the Church of St. Kilian, will be avoided by direct physical Project impacts.

On March 18, 2016, Westwood, on behalf of Nobles 2, sent the Minnesota SHPO a letter informing them of the Project and requesting comments. On April 20, 2016, SHPO commented with a letter that recommended a Phase Ia archaeological assessment followed by a Phase I archaeological survey if recommended by the Phase Ia assessment. Consistent with the SHPO comments, a Phase Ia archaeological assessment was completed in 2016. An updated Phase Ia report will be compiled and submitted to SHPO. The Applicant intends to have a Phase I archeological survey completed prior to Project construction.

8.7.3 Mitigation Measures

Nobles 2 will attempt to avoid impacts to identified archeological and historic resources to the extent possible. If archaeological or historic resources are found during cultural resource investigations or during construction, the integrity and significance of such resources will be addressed in terms of the site's potential eligibility to the NRHP. In addition, an assessment of the Project's potential impacts upon the resource will be undertaken. If such resources are found to be eligible for the NRHP, adverse effects to the resource will be avoided by adjustment of the Project layout when possible. If avoidance is not possible, appropriate mitigative measures will need to be developed in consultation with Minnesota SHPO, the State Archaeologist, and consulting applicable American Indian communities, if any. While avoidance would be a preferred action, mitigation for Project-related impacts on NRHP-eligible archaeological and historic resources may include additional documentation through data recovery.

Should previously unknown archaeological resources or human remains be inadvertently encountered during Project construction and/or operation, the discoveries will be reported to the SHPO. With regard to a discovery of human remains, procedures would be followed to ensure that the appropriate authorities would become involved quickly and in accordance with local and state guidelines.

8.8 Recreational Resources

8.8.1 Description of Resources

Information from the USFWS, MNDNR, and Nobles County was reviewed to identify recreational resources within and near the Project Area. According to the MNDNR, Nobles County offers the following recreational opportunities: hiking, biking, boating, fishing, hunting, camping, snowmobiling, cross country skiing, horseback riding, state parks and nature viewing. **Map 5** depicts the locations of area parks, WMAs, SNAs, WPAs, and National Wildlife Refuges (NWRs) within and near the Project Area.

There are no Federal, county, or city parks in or near the Project Area boundary. Blue Mounds State Park is a popular recreation area approximately nine miles west of the Project Area. One snowmobile trail was identified within the Project Area (Frosty Riders Snowmobile Trail) and three other snowmobile trails are located outside of the Project Area but within ten miles (Beaver Creek Trail, Hiawatha Snow Blazers Trail and Buffalo Ridge Trail). No other recreational trails were identified within the Project Area.

Minnesota WMAs are managed to provide wildlife habitat, improve wildlife production, and provide public hunting and trapping opportunities. These MNDNR lands were acquired and developed primarily with hunting license fees. WMAs are closed to all-terrain vehicles and horses because of potential detrimental effects on wildlife habitat. There are four WMAs within the Project Area, including the Einck, County Line, and Groth South and Groth North Unit WMAs. Numerous WMA’s are located within ten miles of the Project Area and are summarized in **Table 8.8.1a**.

Table 8.8.1a: Wildlife Management Areas within 10 Miles of the Project Area

Name and Type	Nearest To	Acres	Distance from Project Area Boundary (Miles)
Avoca WMA	Avoca	60.4	8.12
Badger WMA	Iona	403.0	4.50

Table 8.8.1a: Wildlife Management Areas within 10 Miles of the Project Area			
Name and Type	**Nearest To**	**Acres**	**Distance from Project Area Boundary (Miles)**
Bluebird Prairie WMA	Rushmore	77.5	5.01
Carlson WMA	Hadley	26.1	8.54
Champepedan WMA	Lismore	81.3	1.25
Christensen WMA	Iona	123.7	5.29
Cleanwater WMA	Iona	34.8	0.51
Dierenfield WMA	Chandler	55.7	4.01
Eagle Lake WMA	Kinbrae	51.3	9.51
Fenmont WMA	Iona	275.8	0.00(adjacent and outside Project Area)
Fulda WMA	Fulda	157.1	5.68
Gallinago WMA	Chandler	138.6	2.74
Haberman WMA	Fulda	95.8	8.24
Henry Vos WMA	Iona	139.9	5.99
Herlein-Boote WMA	Worthington	561.1	5.62
Humphery WMA	Chandler	82.5	5.33
Mcgee WMA	Avoca	43.3	6.73
Melchior WMA	Iona	54.4	3.31
Pheasant Run WMA	Fulda	31.6	3.30
Rock River WMA	Luverne	2.1	9.95
Salt & Pepper WMA	Chandler	1.5	9.95
Schoeberl WMA	Iona	149.7	2.12
Schweigert WMA	Fulda	219.0	6.99
Shirley's Slough WMA	Iona	50.7	3.52
Stable Banks WMA	Fulda	48.1	1.97
Swessinger WMA	Wilmont	713.0	0.00 (adjacent and within Project Area exception)
Tennessen WMA	Iona	22.6	4.49
Wajer WMA	Iona	81.2	6.00
Wirock WMA	Iona	122.0	3.24
Chandler WMA	Chandler	370.4	6.29
Chandler WMA	Chandler	38.7	7.93
County Line WMA	Iona	164.6	0.50
H.C. Southwick WMA	Slayton	24.0	7.00
H.C. Southwick WMA	Slayton	544.9	7.24
Lambert Prairie WMA	Worthington	3.6	9.56
Lambert Prairie WMA	Worthington	82.3	9.26

Table 8.8.1a: Wildlife Management Areas within 10 Miles of the Project Area			
Name and Type	**Nearest To**	**Acres**	**Distance from Project Area Boundary (Miles)**
Lone Tree WMA	Fulda	319.2	4.31
Lone Tree WMA	Fulda	163.9	4.92
Scheuring WMA	Iona	36.7	0.12
Scheuring WMA	Iona	22.1	0.06
West Graham WMA	Kinbrae	300.3	8.66
West Graham WMA	Kinbrae	203.6	9.37
Windy Acres WMA	Leota	159	0.00 (adjacent and outside Project Area)

SNAs are areas designated to protect rare and endangered species habitat, unique plant communities, and significant geologic features that possess exceptional scientific or educational values. The closest SNA to the Project Area is Lundblad Prairie SNA, which is approximately 5.5 miles north of the Project in Murray County near Badger Lake.

WPAs are managed to protect breeding, forage, shelter, and migratory habitat for waterfowl or wading birds such as ducks, geese, herons, and egrets. WPAs provide opportunities for viewing wildlife and intact ecosystems. One WPA, the Bloom WPA, is surrounded by Project Area but is excluded from the Project Area Boundary. Five additional WPAs are located within 10 miles of the Project Area and are summarized in **Table 8.8.1b**.

Table 8.8.1b: Waterfowl Production Areas within Ten Miles of the Project Area		
Name and Type	**Acres**	**Distance from Project Boundary**
Big Slough WPA	811.9	6.79
Bloom WPA	159.1	0.00
Graham Lake WPA	248.4	8.08
Iona WPA	80.7	3.25
Jack Creek WPA	123.1	8.02

NWRs are protected areas managed by the USFWS to provide habitat for various plants and animals. No NWRs are within the Project Area. The Northern Tallgrass Prairie NWR is located thirteen miles west of the Project Area.

8.8.2 Potential Impacts

The Project has been designed in a way that will avoid direct impacts to recreational resources. No turbines have been sited within public lands. The closest Project turbines to Federally-owned land is one located 0.42-miles southwest of the Bloom WPA and a second 0.54-miles to the northwest of the WPA. The nearest turbine location relative to state-owned WMAs is 0.25 miles (Swessinger WMA).

As non-participating parcels, the Project provides public lands with a 5 RD (680 meters) setback for turbines along the prevailing wind direction and 3 RD (408 meters) setback on the non-prevailing wind direction. Recreational resources within the Project Area include approximately 8 miles of the Frosty Riders Snowmobile Trail, which will be afforded a minimum 300-foot setback from the trail right-of-way.

Potential impacts to recreational resources within and around the Project Area are anticipated to be visual in nature by altering the viewshed from those public lands and recreational trails within and around the Project Area. Section 8.4 further discusses visual impacts and proposed mitigation measures.

8.8.3 Mitigation Measures

Because all of the public lands identified within the Project Area are provided a minimum setback of 1,339 feet (e.g., 3 RD x 5 RD from non-participating land) from Project infrastructure, and a minimum setback of 300 feet from snowmobile trail right-of-ways, no direct impacts to recreational resources are anticipated. As such, mitigation measures are not proposed at this time.

8.9 Public Health and Safety

8.9.1 Electromagnetic Fields and Stray Voltage

Electromagnetic fields (“EMF”) are a combination of electric and magnetic fields of energy that surround any electrical device that is plugged in and turned on. Electromagnetic radiation consists of waves of electric and magnetic energy moving together through space. EMF arise from the movement of electrical charge on a conductor such as transmission lines, power collection (feeder) lines, substation transformers, house wiring, and electrical appliances. The intensity of the electric portion of EMF is related to the potential, or voltage, of the charge on a conductor, and the intensity of the magnetic portion of the EMF is related to the flow of charge, or current, through a conductor. EMFs are found near power lines and other electronic devices such as smart meters. Electric and magnetic fields become weaker as you move further away from them. The fields from power lines and electrical devices have a much lower frequency than other types of EMF, such as microwaves or radio waves. EMF from power lines is considered to be extremely low frequency (USEPA 2014).

Extensive research has been conducted by the National Institute of Environmental Health Sciences (NIEHS 1999). In 2002 NIEHS prepared a booklet that summarized worldwide EMF health research studies conducted after 1999 (NIEHS 2002). The NIEHS determined that since 1995, the two major U.S. reports concerning the impact of EMF exposure on human health both concluded that “limited evidence exists for an association between EMF exposure and increased leukemia risk, but when all the scientific evidence is considered, the link between EMF exposure and cancer is weak."

While there is no conclusive research evidence that EMFs pose a significant health impact from power lines and wind turbines, the turbines will be installed beyond the minimum allowable distances from existing, occupied residences, where EMF is expected to be at background levels unrelated to wind farm proximity. EMFs from underground electrical collection and feeder lines dissipates very quickly and relatively close to the source because they are installed below ground to a depth of approximately 48 inches, and are heavily insulated and shielded. Consequently, the electrical fields that emanate from buried lines and transformers are generally considered negligible, and magnetic fields often decrease significantly within approximately 3 feet of stronger EMF sources (such as transmission lines and transformers) (NIOSH 2011).

Stray voltage is a natural phenomenon that is the result of low levels of electrical current flowing between two points that are not directly connected. Electrical systems, including farm systems and utility distribution systems, must be adequately grounded to ensure continuous safety and reliability and to minimize this current flow. Potential effects from stray voltage can result from a person or animal coming in contact with neutral-to-earth voltage. Stray voltage does not cause electrocution and is not related to ground current, EMF, or earth currents.

8.9.1.1 Potential Impacts

Based upon current research regarding EMFs and the separation distances being maintained between transformers, turbines and collector lines from public access and occupied homes, EMF's associated with the Project are not expected to have an impact on public health and safety. Additionally, no impacts from stray voltage are anticipated.

8.9.1.2 Mitigation Measures

Due to the low risk of health impacts, associated mitigation measures are not proposed at this time.

8.9.2 Aviation

There are no registered airports or heliports located within the Project Area. Airports within ten miles of the Project Area include Slayton Municipal (9.4 miles to the north), Ramerth (8.3 miles to the east), and Worthington Municipal (9.2 mile to the southeast). The wind turbines will be the tallest structures of the proposed Project and will exceed 200 feet; therefore, notification will be made to the FAA and requirements imposed by the FAA will be followed.

In agricultural areas such as this, crop dusting is used to spray a variety of treatment chemicals over large crop areas. Crop dusting is performed by either small maneuverable aircraft or helicopters flying low over the ground. Crop-dusting operations are generally conducted during daylight hours and usually by local pilots with knowledge of the area. This, coupled with the visible nature of the towers, is intended to facilitate safe coordination with local air traffic.

8.9.2.1 Potential Impacts

No adverse impacts to aviation are anticipated as a result of construction or operation of the Project. Nobles 2 will coordinate with the FAA to submit the proposed turbines for an aeronautical study to make a determination of whether there is a hazard to air navigation associated with the Project. Another potential impact is the increased potential for conflict with crop-dusting aircraft in active croplands.

8.9.2.2 Mitigation Measures

There are no mitigation measures proposed at this time. Project planning, construction, and operation will be coordinated with the FAA, local airports and state air traffic agencies to ensure public safety is not negatively impacted by the Project. The Applicant will follow FAA guidelines for marking towers and implement the necessary safety lighting. Notification of construction and operation of the Project will be sent to the FAA and steps will be taken to ensure compliance with FAA requirements. Permanent meteorological towers will have FAA mandated lighting consistent with the turbines. Temporary meteorological towers will have supporting guy wires which will be marked with colored sleeves for increased visibility. Nobles 2 will also work with local landowners on coordinating crop dusting activities to reduce risk to local pilots.

8.9.3 Safety and Security

Nobles County has its own emergency management programs. According to the county's on-line resources, Nobles County Office of Emergency Management administers a county-wide emergency management program in those areas of the county that do not have a local emergency management organization. In addition, the department coordinates the activities of those local jurisdictions that do have emergency management organizations. The Nobles County Sheriff's Department provides a full range of law enforcement services for all unincorporated areas of Nobles County and works closely with county, local and state law enforcement, and cooperatively with neighboring jurisdictions to enhance homeland security and better prepare for and respond to incidents ranging from tornadoes to terrorism.

As with any large construction project, some risk of worker or public injury exists during construction. However, Nobles 2 and its construction representatives and workers will prepare and implement site specific safety work plans, training, and specifications in accordance with applicable worker safety requirements during construction and operation of the Project. Nobles 2 will also control public access to the Project during construction and operation. Access control measures will be implemented to protect against unauthorized access and exposure to possible hazards.

Nobles 2 will provide required information and work with the County to develop procedures for response to emergencies, natural hazards, hazardous materials incidents, manmade problems (e.g. fire, etc.) and related incidents concerning the Project. Nobles 2 will also work with the County Emergency Management Office for assignment of 911 addresses for coordination of emergency response.

8.9.3.1 Potential Impacts

No impact to the safety and security of local residents is expected.

8.9.3.2 Mitigation Measures

While no impact to the security of local residents is expected as a result of construction or operation of the Project, Nobles 2 will use the following security measures to reduce the possibility of property damage or personal injury at the Project Area:

1) Towers will follow PUC and Nobles County setback requirements, as applicable.

2) Project turbines will be registered with the Nobles County emergency management office to develop appropriate procedures for emergency responses related to the Project.

3) Contractors will be trained to use proper construction and maintenance methods to promote and protect workers and public health and safety.

4) Nobles 2 and its contractors will use temporary and permanent safety fencing, warning signs, and locks and other access control features on equipment and wind power facilities during construction and operation of the Project.

5) Nobles 2 will conduct regular operation, maintenance and inspections during the life of the Project to minimize and address potential equipment failures.

6) Seasonal vegetation control and snow removal will be implemented as necessary around the Project facilities to reduce risk of fire and provide access for emergency responders.

8.10 Hazardous Materials

8.10.1 Description of Resources

The land within the Project Area is primarily rural and used for agriculture. Potential hazardous materials within the Project Area would be associated with agricultural use of the land, which includes use of petroleum products (diesel fuel, gasoline, natural gas, heating oil, lubricants, and maintenance chemicals), pesticides and herbicides. Older farmsteads may also contain lead-based paint, asbestos-containing building materials (e.g. shingles and siding), and polychlorinated biphenyls (“PCBs”) in electrical transformers. Unmarked farmstead waste dumps which may contain various types of wastes are also commonly found in rural settings.

The MPCA "What's In My Neighborhood?" database (MPCA 2017) of known and potential sources of soil and ground water contamination was consulted for the Project Area. The database revealed the following activities within the Project Area:

- 3 construction stormwater permits
- 1 petroleum remediation, contaminated soil treatment facility
- 95 feedlots
- 1 site assessment
- 1 solid waste site
- 2 petroleum remediation, leak sites
- 1 underground tank
- 1 above ground tank
- 2 multiple activities

During construction, vehicles and equipment will use gasoline, diesel and other petroleum products. During operations, the Project is not expected to generate significant amounts of hazardous waste or materials. The wind turbines will use gear box oil (synthetic or mineral depending on application), hydraulic fluid, and gear grease. Materials used for operating the Project will be handled and maintained by qualified operations and maintenance personnel and brought to the Project Area as needed. These wastes will be managed and, if disposal is necessary, disposed of in compliance with the requirements of applicable laws and regulations.

Prior to construction of the Project, the Applicant will conduct an American Society for Testing and Materials ("ASTM") conforming Phase I Environmental Site Assessment ("ESA") within the Area of Potential Effect ("APE") of the Project to determine the presence of Recognized Environmental Conditions ("RECs") not already identified from MPCA information.

8.10.2 Potential Impacts

Possible impacts associated with the introduction of hazardous materials into the environment might occur during routine turbine maintenance activities. Minimal amounts of hydraulic oil, lube oil, grease and, possibly, cleaning solvents will likely be used on the Project to maintain the wind turbines.

8.10.3 Mitigation Measures

Hydraulic oils and lubricants used within the wind turbines will be contained within the turbine nacelle, or brought to the Project Area as needed. Potential hazardous materials will be properly managed, stored and used in compliance with local, state and federal guidelines for their use by trained technicians. If any wastes, fluids, or pollutants are generated during any phase of the operation of the Project, they will be handled, processed, treated, stored, and disposed of in accordance with Minnesota Rule Chapter 7045 using certified waste handlers.

Fuels and lubricants for vehicles and maintenance equipment may be stored at the O&M building during Project operation. Transformer oil will be contained within the electric transformers, and fluid levels will be monitored during scheduled maintenance at each turbine and transformer location. Small amounts of hydraulic oil, lube oil, grease, and cleaning solvents may be used on-site and either stored in a nacelle, or brought to the Project Area as needed by the operations and maintenance contractor. When fluids and lubricants are replaced, the waste products will be handled and disposed of according to local, state and federal regulations by trained technicians through an approved waste management firm.

The Applicant will conduct a Phase I ESA prior to construction to locate and avoid hazardous waste sites not already identified from MPCA information.

Nobles 2 Wind has prepared a turbine layout that avoids farmsteads and other occupied buildings by a minimum setback distance of at least 1,600 feet, thereby avoiding potential encounters with existing hazardous materials and unmarked waste dumps. Consequently, impacts associated with hazardous materials are not expected.

8.11 Land-Based Economies

8.11.1 Agriculture

Land cover in the Project Area is primarily agricultural as shown in the Land Cover Map (**Map 12**). In 2012, over 92 percent of the land in Nobles County (roughly 380,579 acres) was used for agriculture by approximately 995 farms (USDA, 2012 Census Report). Major crops grown in Nobles County include: corn for grain, soybeans, corn for silage, forage-land (hay) and oats for grain. Predominant livestock raised in the county includes hogs and pigs, broilers and other meat-type chickens, cattle and calves, turkeys, and sheep and lambs. Nobles County ranks in the top 9 counties in the State for production of corn for silage, 11th for soybeans, 17th for corn for grain, 5th for hogs and pigs and cattle and calves, and 6th for broilers and other meat-type chickens. Drain tiles and storm water management structures related to farming operations are located throughout the Project Area.

As shown on **Map 13**, 59.3 percent of the farmland within the Project Area is classified as prime farmland, 34.4 percent is prime farmland when drained, and 3.0 percent is classified as farmland of statewide importance. The remaining 3.2 percent of the Project Area is classified as neither prime farmland nor farmland of statewide importance.

Large-scale animal production has been a growing component of the agricultural industry in recent years, and feedlots used for the confined feeding, breeding or holding of animals are a common practice for animal production. The MPCA is the state agency charged with regulating animal feedlots in Minnesota. However, Nobles County administers the MPCA's feedlot program and has recently prepared and submitted to the MPCA the required Feedlot Program Delegation Agreement Work Plan for the period January 1, 2016- December 31, 2017. There are currently 432 registered feedlots in Nobles County (MPCA FY2016 County Program Base Grant Award Schedule). Approximately 95 feedlots exist within the Project Area according to the MPCA's "What's In My Neighborhood" map search tool (MPCA 2017).

8.11.1.1 Potential Impacts

To the extent possible, Nobles 2 has and will continue to design the Project and locate wind turbines, access roads and associated facilities to avoid or minimize temporary and permanent impacts to agricultural land. Turbine and facility siting will include discussions with landowners to identify features on their property, including drain tiles that should be avoided. In some instances, agricultural practices will be impacted by requiring new maneuvering routes for agricultural equipment around the turbine structures.

Some livestock operations and pasture land may be temporarily disrupted during the installation of the wind turbines and associated infrastructure. Nobles 2 will coordinate closely with landowners about work being performed on their property, and contractors will ensure fenced pasture land remains secure. Aside from the specific areas where wind turbines, roads, and infrastructure are physically located, the remaining portions of the property will be available for agriculture, grazing and use by livestock. The Project will have little, if any, long-term effects on the ability of the land to be agriculturally productive.

The only land that will be taken permanently out of crop production will be those areas encumbered by turbines, access roads, and supporting above-ground infrastructure. Additional farmland may be temporarily impacted for use during construction as staging and access areas. Soil compaction will occur and is considered a temporary impact. **Table 8.11.1.1** summarizes the potential permanent impact to agricultural land within the Project Area from sited turbines and access roads utilizing the V136 turbine which is considered the worst case scenario of the potential turbine options.

Table 8.11.1.1: Potential Permanent Impacts to Agricultural Lands[1]

Turbine Model	Prime Farmland (Acres)	Farmland of Statewide Importance (Acres)	Non-Prime Farmland (Acres)	Prime Farmland if Drained (Acres)	Prime Farmland if Protected from Flooding[2] (Acres)
V136	78.6	2.0	0.1	34.5	0.4

[1]Table 8.11.1 represents potential permanent impacts to agricultural lands from sited turbines and access roads. Additional, minor impacts may occur from accessory structures.

[2] Prime farmland if protected from flooding or not frequently flooded during the growing season.

8.11.1.2 Mitigation Measures

To minimize compaction impacts resulting from Project construction, the equipment used is designed with wide tires and tracks to distribute weight over a larger area and reduce the overall level of soil compaction. Once construction is complete, Nobles 2 will assess disturbed areas and determine whether excessive soil compaction has occurred in conjunction with the affected landowners and local officials. In areas where excessive soil compaction has occurred from Project activities, Nobles 2 will work with the landowner and establish appropriate corrective action measures (e.g. tilling, chiseling, or other methods). Sites used for temporary storage, material staging, and access areas typically experience a higher degree of soil compaction, which will likely require deep ripping and de-compaction prior to resumption of agricultural use.

To the extent practicable, staging areas will be placed in previously disturbed locations to minimize the impact to agricultural production. While significant impacts to drain tiles and other existing facilities due to Project construction and operation are not anticipated, Nobles 2 will promptly repair or replace drain tile that may be impacted by the Project. Prior to beginning site work, Nobles 2 will coordinate with landowners to identify and locate drain tiles and other drainage structures present in the work area.

Overall, impacts to agriculture as a result of the Project are anticipated to be short-term and minimal, and are not expected to significantly alter crop production. Once the Project is completed, Nobles 2 will restore disturbed areas as close as practicable to their original condition. Post construction restoration will largely depend upon the amount of disturbance occurring on the site and the soil types at each location.

While in operation, it may occasionally be necessary for Nobles 2 to complete repairs or clear vegetation around a turbine or facility, which could result in additional temporary impacts to agricultural operations. These interruptions are expected to be infrequent and short term and landowners will be compensated in accordance with the terms of their agreements with Nobles 2.

8.11.2 Forestry

There are no significant forestry resources within the Project Area, as only 0.6 percent of the Project Area is forested (**Map 12**). According to Nobles County Land Use and Cover mapping developed by the Land Management Information Center (“LMIC”) for the period between 1988 and 1990, deciduous woodland makes up only 1.1 percent of land cover within Nobles County. Most of the remaining forested areas in the County are associated with farmsteads, which typically contain woodlots and shelterbelts. Nobles County, therefore, does not represent an economically important source for forestry products.

Desktop evaluations of more recent aerial photography and incidental observations during pre-construction surveys conducted for the Project confirm that forested areas are scarce within the Project Area. As previously mentioned, forested areas (mixed forest and evergreen forest) comprise less than one-percent of the Project Area. Most wooded areas consist of shelter belts or small woodlands surrounding active farmsteads and residences, or wooded hillslopes along drainages and streams.

8.11.2.1 Potential Impacts

Only negligible, if any, impacts to forestry resources are anticipated. Forested areas near farmsteads and waterbodies will be avoided by the proposed Project to the degree practicable. While significant tree removal is not anticipated, some trees and limbs may need to be removed to install Project infrastructure and to ensure reliable operation. Nobles 2 will coordinate with affected landowners as appropriate for replacement of trees lost on private property as a result of the Project.

8.11.2.2 Mitigation Measures

No significant impact to forest resources are anticipated; therefore, no associated mitigation measures are proposed.

8.11.3 Mining

Mining resources within Nobles County include crushed rock, sand, and gravel, which are extracted primarily for the purpose of building roads. Based on a review of aggregate resource mapping from a number of available sources including MnDOT interactive aggregate source information system map, there are three inactive gravel pits located within the Project Area (**Map 14**). Several active and inactive gravel pits and two commercial aggregate mines are located south and west of the Project Area.

8.11.3.1 Potential Impacts

No impacts to mining resources or operations are anticipated; however, some of the identified aggregate resources may be used for access road construction and, if one is used by the contractor, a concrete batch plant. The Applicant will coordinate with the appropriate landowners prior to utilizing materials from these aggregate resource locations.

8.11.3.2 Mitigation

No significant impacts to mining resources are anticipated; therefore, no mitigation measures are proposed.

8.12 Tourism

Nobles County has many recreational opportunities available. Tourism is an important part of the Nobles County economy and the economies of local municipalities such as Wilmont, Lismore, and Worthington. Nobles County ranks 47 of 87 counties with annual traveler expenditures of approximately $27,632,132 (Minnesota Department of Revenue, 2014), which equates to about 718 tourism-related jobs in the county. Tourism in Nobles County centers around the multitude of outdoor recreational opportunities provided by resources such as Blue Mounds State Park for hiking, biking, camping, wildlife watching, rock climbing and winter hiking. The Nobles County Snowmobile Trail (**Map 5**) is a 144-mile long trail that runs through the Project Area and connects with neighboring cities. Buffalo Ridge Trail is an 85-mile long trail located within 3 miles of the Project Area boundary that connects to Blue Mounds State Park. Nobles County is also home to numerous WMAs and several WPAs which provide a significant tourism attraction for outdoor activities for anglers and hunters (**Map 5**).

Local town festivals and county fairs are other important tourism attractions. The City of Worthington hosts a number of annual events including festivals such as the Windsurfing Regatta and Music Festival, International Festival, Nobles County Fair, Old Fashioned 4th of July, Winterfest, Cruisin' Downtown, and Kind Turkey Day.

8.12.1 Potential Impacts

Because Project facilities will be located on private lands, no direct impacts to recreational facilities, public lands, or other tourism-related activities are anticipated. Proposed setbacks from recreational trails, public roads, and non-leased properties (including public lands) will minimize any indirect impacts. The Project is not anticipated to have a significant effect on area tourism.

8.12.2 Mitigation Measures

Because no significant impacts are anticipated, no mitigation other than the application of appropriate turbine setbacks is proposed.

8.13 Local Economies

According to Minnesota's Quarterly Census of Employment and Wages ("QCEW"), the main industries in Nobles County includes manufacturing; trade, transportation and utilities; education and health services. In Nobles County, manufacturing is a particularly strong facet of the local economy (Minnesota Department of Employment and Economic Development 2015).

8.13.1 Potential Impacts

The Project is expected to positively affect the local economy by adding temporary and permanent jobs, and by increasing the County's tax base from production tax payments. Up to 230 temporary construction jobs and approximately 15 full-time operations jobs, plus additional seasonal and support staff, are expected to be added as a result of the Project.

The communities near the Project are also expected to receive a positive economic benefit. Construction is anticipated to stimulate some local industries and is not expected to have any negative impacts to the local industries as a whole. Short-term impacts to the socioeconomic resources of the area are expected to be minor. It is anticipated that some land will be removed from production for the length of the easement agreements. Participating landowners with fully executed agreements within the Project Area will be compensated for their participation in the Project. There is no indication that any minority or low-income population is concentrated within the Project Area or that the wind turbines will be placed in an area occupied by a minority group.

To the extent possible, Nobles 2 plans to use local contractors and suppliers for portions of the construction. Wages and salaries paid to contractors and workers in Nobles County will contribute to the overall personal income of the region. Additional personal income will be generated for residents in the County and State by circulation and recirculation of dollars Nobles 2 pays for business expenditures and for State and local taxes. Equipment, fuel, operating supplies, and other product and service expenses will benefit businesses in the County and the State. Participating landowners with fully executed agreements within the Project Area will receive payments annually for the life of the Project, which should also strengthen the local economy. As described in other area wind farm site permit applications, the development of wind energy in this part of Minnesota has been important in diversifying, supporting and strengthening the personal income and property tax base of southwestern Minnesota. In addition to creating jobs and personal income, the Project will pay an energy production tax to the local units of government estimated to be between $1.1 million and $1.3 million annually.

8.13.2 Mitigation Measures

Impacts to regional socioeconomics as a result of the proposed Project will be primarily positive due to an influx in wages and expenditures at local businesses during construction and an increase in the county's tax base from the construction and operation of the Project. In addition, the easement payments to landowners will offset potential financial losses associated with removing land from agricultural production. Because no negative impacts are anticipated, no mitigative measures are proposed.

8.14 Topography

8.14.1 General Description

Topography within the Project Area is generally undulating, consisting of rolling hills, stream networks, a few lakes, and numerous wetlands **(Map 15)**. The elevation of the Project Area ranges from a high of approximately 1,812 feet in the west to a low of approximately 1,560 feet above mean sea level ("AMSL") in the east.

According to the MNDNR Ecological Classification System, the Project Area is located primarily in the Coteau Moraines subsection of the (251Bb) North-central Glaciated Plains section, of the Prairie Parkland province (MNDNR 2016). The far west portion of the Project Area extends into the Inner Coteau subsection (251Bc) of the Prairie Parkland province. The Coteau Moraines sub-section is located on an elevated glacial landform that stretches across southwestern Minnesota, southeast South Dakota, and northwest Iowa and is divided into two distinct parts; the middle and outer Coteau. The landform is the product of thick deposits of pre-Wisconsin age glacial till (600-800 feet thick). The Coteau Moraines is a mixture of rolling moraine ridges through its center, and around its edges characterized by a series of end moraines and escarpments. Few large lakes and drainage networks are found throughout the Coteau Moraines.

Karst areas in Minnesota are generally limited to southeast Minnesota and Pine County in east-central Minnesota (MnGeo 2016). There are no mapped karst areas or caves within the Project Area.

8.14.2 Potential Impacts

Potential impacts to topographic and physiographic resources from the proposed Project are limited primarily to visual changes to the local landscape. Excavation for the construction of turbine pads, access roads, underground and overhead electric collection and communication systems, and other project facilities would create some topographic changes. These changes to the topographic character of the area would be minor but long-term. The primary impact of these topographic changes would be on visual resources. Visual impacts are described in Section 8.4.

The site has good access from the existing roadway network across the Project Area, which will reduce the overall length of new access roads needed for the Project. Significant impacts to existing topography are not anticipated because steep slopes (greater than 10 percent) only comprise a small percentage of the Project Area. Grading within steep slope areas will be avoided to the degree practicable. Minimizing cut and fill requirements will reduce erosion potential, as well as decrease overall construction costs. Layout and siting of access roads has been and will continue to be completed in a manner that will tie into the existing road network, where practicable, to reduce unnecessary grading.

8.14.3 Mitigation Measures

Construction Best Management Practices ("BMPs") will be implemented surrounding graded areas in accordance with State standards, the MPCA *Stormwater Best Management Practices Manual*, and the approved SWPPP for the Project. Based on recommended and required mitigation measures, and avoidance of areas with slopes > 10 percent, there would be no adverse impact on topographic resources as a result of construction and operation of the proposed Project.

8.15 Soils

8.15.1 General Description

According to the Minnesota Geological Society, soil material within the Project Area is comprised primarily of silty glacial sediments. Sand and gravel are found along streams. The region is dominated by loamy, well-drained soils with thick, dark surface horizons including Mollisols, Aquolls, and Udols. Two soil associations are mapped across the majority of the Project Area (**Map 14**). These include the Everly-Sac-Rushmore association and the Webster-Clarion-Nicollet association. Smaller sections of the Project Area are mapped within the Webster-Nicollet association. The Everly-Sac-Rushmore association is described as well and poorly-drained nearly level to strongly sloping clay loam and silty clay loam soils located on glacial till and loess uplands. The Webster-Clarion-Nicollet association is described as poorly to well-drained, level to rolling clay loam and loam soils located on glacial till uplands.

As with most of the soils in southern and western Minnesota, soils within the Project Area have a combination of physical and chemical characteristics of Prime Farmland, or Farmland of Statewide Importance, as determined by the USDA NRCS (**Map 13**). As previously discussed in Section 8.11.1, approximately 59.3 percent (25,227 acres) of the Project Area is classified as Prime Farmland, 34.4 percent (14,645 acres) Prime Farmland if Drained, and 3 percent (1,290 acres) as Farmland of Statewide Importance. Soils excluded from these classifications are generally highly erodible soils on steep slopes or are hydric soils associated with streams or wetlands.

8.15.2 Potential Impacts

Construction and operation of the proposed Project would result in minor short- and long-term impacts to soils within the Project Area. Soil impacts could result from vegetation clearing, excavation, salvage, stockpiling, and redistribution of soils during construction and reclamation activities associated with turbine pads, access roads, underground and overhead electric collection and communication systems, and other proposed facilities.

Approximately 70 of the proposed 74 turbines would be located within Prime Farmland categories. Initial project assumptions are that turbine sites (crane pad and foundation) would occupy up to 0.75 acre per turbine (64 total acres), access roads approximately 40 acres, the substation approximately 4 acres, and the O&M facility would occupy up to 4 acres. Therefore, it is anticipated that the combined total areas of permanent disturbance to soils within the Project Area would not exceed 116 acres. Because approximately 70 of the proposed 74 turbines would be located within Prime Farmland categories, it is anticipated that up to 79 acres of Prime Farmland and 2 acres of Farmland of Statewide Importance could be impacted by construction and operation of the Proposed Project. A complete summary of potential farmland impact is provided in **Table 8.11.1**.

8.15.3 Mitigation Measures

The potential for construction-related soil erosion will be minimized by siting turbines and access roads so as to avoid highly erodible soils on steep slopes. Avoiding steep topography will also reduce the size of cut and fill areas. Erosion control measures would also be implemented during construction to avoid or minimize soil erosion and off-site deposition. Erosion and sedimentation would be reduced through the use of BMPs including, but not limited to; mulching, hydroseeding, erosion control blankets, silt fence installation, jute matting, revegetation, and/or interim reclamation. Nobles 2 will work with landowners in the Project Area to site turbines and access roads so as to minimize impacts to high quality farmland to the extent practicable; however, overall impacts to agriculture as a result of the Project are anticipated to be short term, minimal and are not expected to significantly alter crop production. Additionally, the landowners will be compensated for lost production in accordance with the terms of their lease agreements with Nobles 2.

8.16 Geologic and Groundwater Resources

8.16.1 General Description

The bedrock in the Project Area and surrounding region consist largely of Precambrian age rocks composed of granite, granodioritic gneiss and overlain in some areas by the Sioux Quartzite. These are overlain by Cretaceous age strata composed of mudstone, siltstone, and sandstone. Eight hundred feet of glacial till and outwash of the Bemis Moraine overlies the Precambrian and Cretaceous age rocks and forms the quaternary geology of the Project Area and surrounding region.

The principal aquifers in the Project Area and surrounding region are in the Cretaceous age sandstones. Ground water supplies are sometimes obtained from weathered and fractured zones in the Sioux Quartzite. More commonly ground water is obtained from Cretaceous age sandstone and the buried glacial outwash sand and gravel deposits.

8.16.2 Potential Impacts

Construction and operation of the proposed Project is not expected to impact groundwater within the region, and construction of the proposed turbine foundations is unlikely to affect local water supply from many of the small isolated deposits of sand and gravel in the till. According to the Minnesota Department of Health's County Well Index online database, (Minnesota Department of Health - Division of Environmental Health 2016), well depths vary widely, with most being in excess of 100 feet in depth. Geotechnical testing will occur at turbine locations prior to final design and construction.

Municipal water supplies are expected to be used for mixing concrete needed for turbine foundations because use of untested, non-potable water from wells does not meet ASTM standards.

A new water supply well may be required for the O&M Building. Water usage from the new well is expected to be similar to the average household volume of less than five gallons per minute. Potential water-related needs will be minimal and can be accommodated locally, thus no impacts to geologic and groundwater resources are expected from construction and operation of the proposed Project.

8.16.3 Mitigation Measures

No impacts to geologic and groundwater resources are expected from construction and operation of the proposed Project, therefore, no specific mitigation is proposed. If identified wells require abandonment, they will be capped in accordance with Minnesota regulations.

8.17 Surface Water and Floodplain Resources

Water resources and land cover mapping suggest that less than 6 percent of the total Project Area is wetland or other water resources.

8.17.1 Wetlands

According to National Wetlands Inventory ("NWI") spatial data, some 922 wetlands were identified within the Project Area, comprising 2,242 acres, or approximately 5.3 percent of the Project Area (**Map 16**). The majority of the wetlands were classified as Freshwater Emergent Wetland (73 percent) and Riverine (20 percent), and the remaining 7 percent classified as Freshwater Pond and Freshwater Forested/Shrub Wetland.

Table 8.17.1: NWI Wetlands within the Project Area

Wetland Type	Number in Project Area	Total Area (Acres)	Percent of Project Area
Freshwater Emergent Wetland	677	2,023	4.8
Riverine	185	160	0.4
Freshwater Pond	48	45	0.1
Freshwater Forested/Shrub Wetland	12	14	< 0.1
Total	**922**	**2,242**	**5.3**

8.17.2 Lake, Streams, and Ditches

There are also 109 acres of MNDNR Public Water Inventory ("PWI") Lakes and Wetlands within the Project Area, including portions of three unnamed public water wetlands; Penning Marsh, Willow Lake, and Groth Marsh **(Table 8.17.2)**. Several additional lakes and wetlands are mapped within 10 miles of the Project Area, including Boote-Herlein and Sieverding Marshes, Corabelle Lake, North and South Badger Lakes, First and Second Fulda Lakes, Okabena Lake, Tripp Slough, Ocheda and Maroney Lakes, West and East Graham, Fury Marsh, Kinabrae Slough, Big Slough, and Chandler Marsh. The National Hydrography Dataset ("NHD") also mapped several waterbodies within the Project, most of which correspond with mapped PWI and NWI water features.

Intermittent and perennial MNDNR PWI watercourses traverse approximately 50 linear miles within the Project Area and include Jack Creek, Kanaranzi Creek, Judicial Ditch 8, and several unnamed watercourses. NHD mapping indicates an additional 46 miles of intermittent watercourses and ditches, many of which are tributaries to the mapped PWI watercourses. In addition, based on NHD and PWI data, approximately 18 miles of the mapped watercourses within the Project Area are identified as ditches.

Lakes and wetland complexes mapped within the Project Area that are surrounded by conservation lands or native habitat are more likely to support migrating birds and bats. However, generally more appealing aquatic habitat for birds and bats is offered outside the Project Area near the Des Moines River, Chanarambie Creek, and near some of the larger lakes and marshes in the surrounding area such as Big Slough and Badger Lake.

Table 8.17.2: Mapped PWI Lakes, Wetlands, and Watercourses within the Project Area

PWI Name	Type	Area/Length within Project
Groth Marsh	Public Water Basin	33.0 acres
Jack Creek	Public Water Watercourse	9.3 miles
Kanaranzi Creek	Public Water Watercourse	4.5 miles
Penning Marsh	Public Water Wetland	16.7 acres
Unnamed Wetlands (2)	Public Water Wetland	21.2 acres
Unnamed Stream	Public Ditch/Altered Natural Watercourse	< 0.01 mile
Unnamed Streams (10)	Public Water Watercourse	36.0 miles
Willow Lake	Public Water Basin	38.3 acres

8.17.3 Designated Wildlife Lakes and Special Waters

There are no MNDNR-designated Wildlife Lakes, Sensitive Lakeshores, Migratory Waterfowl Feeding and Resting Areas, or any State Wild, Scenic, or Recreation Rivers, within the Project Area or 1-mile buffer. There are also no outstanding resource value waters, sensitive lakeshore, or trout streams or lakes within the Project Area.

Of the mapped streams and ditches within the Project Area, Jack Creek (North Branch) is listed as impaired for turbidity by the MPCA.

Champepadan Creek located northwest of the Project Area, is a state-wide area of importance for the state-listed threatened Blanding’s turtle and plains topminnow. In addition, Champepadan Creek and Kanaranzi Creek are federally designated critical habitat for the Topeka Shiner.

8.17.4 FEMA Floodplains

There are three general areas within the Project Area associated with Federal Emergency Management Agency (FEMA) mapped floodplains (**Map 16**). Floodplains are mapped along Kanaranzi Creek and unnamed tributaries in the west and southwest part of the Project, Jack Creek in the southeast portion of the Project Area, and two unnamed streams in the northeast portion of the Project Area.

8.17.5 Calcareous Fens

There are no calcareous fens located within the Project Area, however; two calcareous fens are mapped within 10 miles west of the Project Area boundary. Calcareous fens are a rare wetland type found in Minnesota and are very calcium-rich environments due to their relationship with a groundwater discharge high in bicarbonates. As a result, the species that grow and utilize fens as habitat (i.e., calciphiles) are very specialized and are unlikely to migrate from the fens into the Project (MNDNR 2015).

8.17.6 Heron Lake Watershed District Restoration Sites

A comment letter from the MNDNR indicated the presence of Heron Lake Watershed District ("HLWD") restoration sites within the Project Area (April 2016). After communication with Catherine Wegehaupt and Jan Voit from the HLWD, it is unlikely that there are any HLWD restoration projects within the Project Area, although they are present outside of the Project Area boundary. The Bloom Terrace LCCMR Project is located within the Project Area (S20, T104, R41), and consists of a terracing project within agricultural land. No Project infrastructure is proposed in this area.

8.17.7 Potential Impacts and Mitigation Measures

Optimal turbine locations are those which are topographically elevated from their surroundings. Ideally, turbines are to be located on elevated uplands where they are not expected to affect streams or surface water bodies. Wetland impacts related to similar projects are typically associated with the construction of access roads. Impacts for road crossings typically require a small amount of fill for placement of culverts and road base materials. Temporary crossing widths would be between 40 and 45 feet to allow for construction cranes. Crossings would be reduced in width following construction to approximately 16 feet. Collector lines are generally installed by trenching and only result in temporary impacts to wetlands. It may be possible to directionally bore some collector lines beneath wetland areas and watercourse crossings, which would avoid even temporary impacts to jurisdictional waters and wetlands.

The Project Area is served by a regular grid network of county and township roads, which will provide flexibility in the avoidance of water resources during the design process. Also, given the isolated nature of the wetlands found within the Project Area, impacts to most wetlands should be avoidable. As fieldwork is planned, wetland review and delineation will be coordinated with layouts for final turbine siting, access road alignments and collector line routing, especially where wetland delineation may be required for those wetlands and stream crossings that cannot be avoided, or are in close proximity to proposed structures. It is the goal of Nobles 2 to avoid and minimize wetland impacts to the degree practicable in the context of the Project.

If some wetlands are determined to be unavoidable, wetland delineations will be completed, proposed temporary and permanent impacts will be quantified for the Project, and a wetland replacement plan will be submitted for review by the U.S. Army Corps of Engineers ("USACE"), the Nobles Soil and Water Conservation District ("SWCD"), and BWSR. As the Local Government Unit ("LGU"), the Nobles SWCD is responsible for administering the Minnesota Wetland Conservation Act ("WCA") in this area, and the St. Paul District of the USACE administers Section 404 of the Federal Clean Water Act ("CWA"). Wetland impacts will be minimized in accordance with sequencing and replacement requirements of the WCA and Section 404 of the CWA. Mitigation will be necessary if the area impacted exceeds the minimum thresholds (e.g. the maximum amount of wetland fill permitted without necessitating replacement). If replacement is necessary, wetland replacement will be provided in accordance with applicable state and federal requirements.

The MPCA administers the NPDES permit program in Minnesota and regulates construction activities that disturb more than one acre of land. As part of its NPDES permit application, a SWPPP will identify erosion and sedimentation control measures to prevent adverse water quality impacts to streams and wetlands during and after construction. Measures included in the SWPPP should be sufficient to ensure that streams and surface waters in the Project Area do not incur adverse construction-related stormwater impacts. No surface water or floodplain mitigation is anticipated at this time, as Nobles 2 is planning on avoiding impacts to non-wetland surface waters through design.

The Nobles Local Water Management Plan (2009) highlights existing and potential water issues and sets specific actions to achieve goals for sound hydrological management of water resources in the County. Nobles County developed a unified comprehensive water resources management plan for the entire county incorporating the Nobles SWCD comprehensive plan and watershed district plans for the Kanaranzi-Little Rock Watershed District ("KLRWD") and Okabena-Ocheda Watershed District ("O-OWD"). HLWD was not a formal member of the plan, but collaborates regularly on water planning with Nobles County.

Priority concerns for the County include surface water quality, ground water and public water supply, drainage management, and storm water retention. Nobles 2 is committed to addressing these priority concerns as they apply to the Project. **Table 8.17.7** provides a summary of the priority concerns that apply to the Project and describes how Nobles 2 will address each one.

Table 8.17.7: Priority Water Concerns for Nobles County

Concern	Description	Project Specifics
Improve surface water quality	Prevent further degradation of stream and lake water quality, with a priority for shoreland, TMDL-listed waters, and unsewered communities.	BMPs will be implemented to manage erosion and sedimentation during construction and will adhere to setbacks and BMP requirements for impaired waters.
Drainage management	Restore natural flow in the drainage system, manage stormwater retention and flooding and sensitive habitats.	Project will avoid public waters and adhere to setbacks. Impacts to water resources will be avoided to the extent practicable.
Public water supply	Assure long-term quality and quantity of public water supplies, wellhead protection, protection of critical lands, and provisions for urban and rural water supply systems.	No impacts to groundwater are anticipated. Project will not impact wellhead protection areas or affect public access to water supply as none are located within the Project Area.

8.18 Vegetation

8.18.1 Description of Resources

According to the Ecological Classification System of Minnesota, the Project Area is located in the Coteau Moraines subsection of the Prairie Parkland Province (MNDNR 2005). Pre-settlement vegetation in the Project Area and the surrounding consisted primarily of tallgrass prairie interspersed with scattered areas of wet prairie and woodland found along stream and river margins.

Land cover within the Project Area is mapped and described using data and descriptions from the National Land Cover Database ("NLCD") created by the Multi-Resolution Land Characteristics ("MRLC") Consortium (Homer *et al.* 2015). The data is based on a 16-class land cover classification scheme that has been applied consistently across the United States at a spatial resolution of 30 meters and is created through a decision-tree classification of circa 2011 Landsat satellite data. In this effort, a total of eight land cover types are recognized and mapped within the Project Area (**Table 8-18.1**) (**Map 12**). Approximately 89 percent of the Project Area is cultivated cropland, consisting primarily of corn and soybeans and the remaining land cover types are composed of disturbed/developed land, grassland, wetland, forest, deciduous scrub, and pastureland. For the most part, pasture and grassland areas are fragmented across the Project Area. Forested areas appear limited to areas along stream corridors, near lentic water features, and around homesteads.

Table 8.18.1: Project Area Land Cover

Land Cover Type	Total Area (Acres)	Percent of Project Area
Cultivated Crops	37,697	88.6
Disturbed/Developed	2,348	5.5
Grassland	1,536	3.6
Wetlands	595	1.4
Forest	261	0.6
Shrub/Scrub	58	0.1
Hay/Pasture	26	0.1
Open Water	6	< 0.1
TOTAL	**42,527**	**100.0**

Native Plant Communities

The MNDNR native plant communities are aggregates of native plants that form recognizable habitat units. Ecological condition ranks of native plant communities fall on a continuum from A to D, where A represents communities of the highest ecological integrity and D represents those with the lowest. A ranking of NR indicates no ranking has been assigned. Conditions of C and D indicate the communities have fair to poor ecological integrity and have been significantly altered and degraded by human activity or invasive species (MNDNR 2014). For example, dry hill prairies assigned ranks of C or D will be dominated by exotic grasses and native graminoids more tolerant of disturbance such as grama (*Bouteloua* spp.) and smooth brome (*Bromus inermis).*

There are two primary types of MNDNR native plant communities mapped within the Project Area, accounting for approximately 32 total acres **(Table 8.18.2)**. These plant communities are located along the northwest edge of the Project Area and in the southeast corner of the Project Area (**Map 16**). MNDNR native plant communities mapped within the Project Area include southern dry hill prairie and prairie wetland complex. These communities have fair to poor ecological integrity and have been significantly altered and degraded by human activity or invasive species (MNDNR 2014). The communities mapped within the Project Area were assigned ecological condition ranks of C, D, or NR **(Table 8.18.2)**. The MNDNR also applies a conservation status rank to native plant communities (i.e., common to critically impaired) that reflects their relative rarity and endangerment in Minnesota. The prairie native plant communities within the Project Area have an imperiled status rank.

Table 8.18.2: MNDNR Native Plant Communities within the Project Area		
Native Plant Community Type	**Condition Rank**	**Records**
Dry Hill Prairie (Southern)	C, D, NR	7
Prairie Wetland Complex	NR	2
Total	**--**	**9**

Although not in the Project Area, there is a large native plant community complex approximately 6.5 miles northwest of the Project Area associated with Chanarambie Creek. This complex includes several types of plant communities and contains communities with condition rankings of A and B. An additional complex is located north of the Project Area associated with Badger Lake and Lime Creek and similarly contains several records of high integrity communities.

Native Prairie

The Project Area is located in what was once the largest tract of grassland in the world, however; native prairies and grasslands have been severely reduced from agricultural conversion, urban development, and improper grazing techniques. Based on MNDNR data there are no railroad right-of-way prairies in the Project Area. In addition, land cover mapping indicates that grassland and pasture areas account for less than four percent of the Project Area and are highly fragmented across the Project.

As noted, native plant community data documents the presence of native prairie remnants within the Project Area. As such, there is the potential for additional native prairie remnants to exist within the Project Area. To date, a desktop evaluation of potential native prairie areas has been conducted for the Project Area in accordance with the MNDNR guidance for identifying native prairie remnants. Historical aerial photographs were consulted in identifying potential prairie areas to determine if parcels had been cultivated in the past. Field surveys of identified potential native prairie areas will be conducted in the future as part of Project siting and planning.

Minnesota Biological Survey Sites of Biodiversity Significance

Minnesota Biological Survey ("MBS") sites of biodiversity significance ("SBS") represent areas with varying levels of native biodiversity that may contain high quality native plant communities, rare animals, and/or animal aggregations. A biodiversity significance rank is assigned based on the number of rare species, the quality of the native plant communities, size of the site, and context within the landscape. Sites characterized as "below" lack occurrences of rare natural features and rare species but offer conservation value at the local level. Sites considered "moderate" can contain rare features and species but are likely disturbed.

There are approximately 956 acres of SBSs located within the Project Area, of which 818 acres (86 percent) are classified as "below the minimum biodiversity significance threshold" and 133 acres (14 percent) are classified as "moderate biodiversity significance" (**Table 8.18.3**). The SBS sites within the Project Area encompass mapped MNDNR native plant communities, which are located primarily along stream corridors, and buffer lake and wetland complexes (**Map 16**).

Table 8.18.3: MBS Sites of Biodiversity Significance in the Project Area

Biodiversity Significance	No. of Sites	Acres
MBS site below minimum biodiversity significance threshold	17	818
MCBS site with moderate biodiversity significance	6	133
MCBS site with High biodiversity significance	1	5
Total	**24**	**956**

In addition, one site rated as "high" is located adjacent to the northwest boundary of the Project Area. Additional MBS sites of biodiversity significance rated as "high" and "outstanding" are located within 10-miles to the northwest and north of the Project Area, respectively and encompass the native plant communities associated with Chanarambie Creek, Badger Lake, and Lime Creek.

Based on the ecological significance of moderately and highly ranked MBS sites, the MNDNR recommends avoidance of these areas within the Project Area. In addition, the MNDNR recommends avoidance of any "below" ranked MBS sites that contain native prairie.

8.18.2 Potential Impacts and Mitigation Measures

Construction and operation of the proposed Nobles 2 Project would result in direct and indirect impacts to vegetation communities within the Project Area. Direct effects to vegetation would occur from disturbance or removal of vegetation at the wind turbine generator pad sites, along access roads, and in association with the 34.5-kV underground electrical collection system.

Vegetation would be removed as a result of surface disturbing activities associated with blading, grading, vehicular traffic, and trenching. Construction would result in the disturbance of approximately 115 acres of vegetation **(Table 18.18.4)**. This includes approximately 111 acres of cultivated crops, 3 acres of disturbed/developed, 1ess than 1 acre of grassland, and 1 acre of wetland.

Table 8.18.4: Land Cover Impacts	
Land Cover Type	**Total Area Impacted (Acres)**
Cultivated Crops	111.1
Disturbed/Developed	2.7
Grassland	0.7
Wetlands	1.0
TOTAL	**115.5**

Areas adjacent to the proposed wind turbine generator pad sites, access roads, and underground electrical collection system would experience temporary disturbance associated with equipment access, materials, stockpile locations, and workspace requirements. Indirect impacts would include the increased potential for soil compaction, establishment and spread of noxious weeds, and an increased potential for wind and water erosion of disturbed surfaces prior to reclamation.

It is expected that over 96 percent of all direct and indirect impacts to vegetation would be minor in extent and limited to cultivated cropland. To the extent practicable, direct and indirect impacts to natural vegetation communities will be avoided and minimized. Proposed turbine locations will be sited primarily on agricultural lands and access roads will be sited and connected to public roads while avoiding woodlands, shrub land, grasslands, and water resources to the extent practicable. Similarly, it is anticipated that collection lines can be also be sited to avoid such resources. Further, implementation of the recommended and required mitigation measures for vegetation would further act to avoid or minimize the potential for affecting sensitive natural communities and reduce the impact to a less than significant level.

In order to minimize impacts to natural vegetation communities, Nobles 2 has incorporated the following mitigation measures into the siting, construction, operations and decommissioning phases of the proposed Project.

1) Project siting minimized impacts to native habitats to the maximum extent practicable;

   a. Turbines were sited in agricultural fields to minimize impacts to grassland, forest, wetland and other native vegetation communities.

   b. For the proposed turbine layout, all native prairie will be avoided to the maximum extent practicable.

2) Creation of new roads will be minimized to the maximum extent practicable and to accommodate landowner preferences;

   a. Existing roads or farm lanes will be utilized to the extent practical

   b. Approximately 24 miles of new service roads will be created to connect wind turbines to existing access roads.

   c. The permanent footprint of new access roads will be 16 feet in width to minimize disturbance to surrounding vegetation.

3) Clearing and construction practices will reduce soil disturbance and allow for the reestablishment of natural vegetation;

   a. All construction equipment will be restricted to designated travel areas to minimize ground disturbance.

   b. Vegetation removal will be limited to the minimum area needed to construct the proposed Project and will be restricted in environmentally sensitive areas. During construction, travel and equipment staging will be restricted to designated access roads and work areas to minimize disturbance to nearby vegetation. The extent of these areas will be shown on the construction plans and clearly demarcated in the field with stakes, flagging, or fencing.

   c. Construction clearing for storage yards, staging areas, or temporary roads not needed for long-term operation of the Project will be allowed to revegetate after commissioning of the Project.

   d. If installed turbines require substantial maintenance involving large cranes or other heavy equipment, the same measures used during construction to limit clearing of vegetation and disturbance of soil will be used.

4) BMPs will be used to avoid the introduction and spread of invasive species;

   a. Construction vehicles and equipment that arrive from other areas will be regularly cleaned.

   b. Following construction, depending on seed availability and landowner preferences, non-agricultural areas will be re-seeded and stabilized using native seed to restore natural habitat. Re-seeding will be consistent with State requirements to avoid the introduction of invasive plant species.

5) Decommissioning activities will avoid additional site disturbances and removal of native vegetation to the extent practicable.

6) Foundations will be removed to a depth of 4 feet below the surrounding grade and covered with soil to allow for reestablishment of native plants or crops or as otherwise prescribed by conditions specified in the Site Permit.

7) If topsoil is removed during decommissioning, it will be stockpiled and used as topsoil for replanting. Once decommissioning activities are complete, topsoil will be restored, reseeded, and stabilized.

8) Erosion and sediment control measures will be implemented in all disturbance areas where potential for erosion exists, consistent with storm water management objectives and requirements.

8.19 Wildlife Resources

8.19.1 Pre-Construction Assessment and Siting

Nobles 2 has followed the suggested tiered approach as outlined in the USFWS Wind Energy Guidelines ("WEG") by documenting preliminary site evaluation (Tier 1) and characterization (Tier 2), pre-construction field studies and impact prediction (Tier 3), and post-construction monitoring studies and impact assessment (Tiers 4 and 5). Tier 1 and 2 analyses were conducted for the Project Area to screen for potential broad-based environmental and site development issues and to guide site design. To that end, a Site Characterization Study ("SCS") and a Work Plan for 2016 Pre-Construction Avian and Bat Surveys was prepared and shared with the USFWS, MNDNR, and Department of Commerce – Energy Environmental Review and Analysis ("DOC-EERA") as part of early agency coordination efforts. The SCS has been incorporated into the Bird and Bat Conservation Strategy ("BBCS") and this Application. The BBCS is included in **Appendix G**. Tier 3 field studies served to inform the Project proponents and regulatory agencies regarding avian and bat species present within and adjacent to the Project Area boundary.

Correspondence with state and federal agencies, including the MNDNR, USFWS, and DOC-EERA was initiated in January 2016 for information specific to the Project regarding sensitive resources and potential impacts. On February 29, 2016, Nobles 2 met with representatives of the USFWS, MNDNR, and DOC-EERA to discuss results of the SCS prepared for the Project. Formal request for comment letters were sent by Nobles 2 to the MNDNR and USFWS on March 18, 2016. Comments received both during the February 29, 2016 meeting and within formal comment letters expressed an initial indication that the MNDNR and USFWS would generally characterize the Project site as minimal risk for avian species, but because of the overall size of the originally proposed

Project, MNDNR believed there to be a basis for designating the Project as a moderate risk to bat species. However, since that time, the Project's generating capacity has been reduced from its initially planned 300 MW nameplate capacity, the overall size of the Project Area has been reduced by more than 30,000 acres, and turbine siting has taken into consideration the avoidance of potential bat habitat. Moreover, the use of turbines with a larger nameplate capacity than that which was originally proposed when the Project was first presented to the agencies will serve to reduce the overall impacts of the Project on avian and bat species. As such, Nobles 2 believes that the overall risk of the Project to avian and bat species is demonstrably low.

Tier 3 pre-construction field studies were conducted to evaluate the Project's potential to result in adverse impacts to biological resources, including passerine birds, raptors, bats, and natural communities. The specific investigations that have been conducted are outlined below and include one year of multiple field surveys in accordance with the USFWS WEG (USFWS 2012), USFWS Eagle Conservation Plan Guidance ("ECPG") (USFWS 2013), and Avian and Bat Survey Protocols for Large Wind Energy Conversion Systems in Minnesota (Mixon *et al*. 2014).

Pre-construction avian surveys were initiated in mid-January 2016, and were completed in late-March 2017, for one full year of avian use data collection. In addition, acoustic bat surveys were initiated in mid-May 2016 and completed in November 2016. Data collected from these studies were used to identify species or species groups that may be at risk from Project development and may provide additional information for micro-siting wind facilities to minimize impacts to birds and bats. The baseline studies conducted for the proposed Project consisted of general avian point count surveys, eagle point count surveys, ground-based raptor nest surveys, and acoustic bat surveys (**Table 18.19.1**).

Table 8.19.1: Pre-Construction Survey Efforts for the Nobles 2 Project

Study	Taxa	Dates Conducted	Type of Survey
General avian point count surveys	All birds	January 15 – November 15, 2016	Variable circular-plot point counts
Eagle point count surveys	Bald eagles	February 4, 2016 – January 19, 2017	Fixed circular-plot point counts
Ground-based raptor nest surveys	Eagles and other raptors	March 16-18 and 28, 2016 and March 25-27, 2017	Driving existing roads
Acoustic bat surveys	All bats	May 17 – November 1, 2016	Passive acoustic bat monitoring

The geographic coverage of each study may differ due to changes in the anticipated turbine layout at the time when the studies were initiated. Detailed descriptions of survey methods, results, and discussion can be found in the *2016- 2017 Annual Pre-construction Avian Survey Report* (Westwood 2017) and *2016 Annual Pre-construction Acoustic Bat Survey Report* (Westwood and Zotz 2017).

8.19.2 Description of Resources

Wildlife Habitat. In the Project Area, almost all native vegetation has been replaced by agricultural and residential development. Historically, the Project Area and surrounding region contained a variety of natural communities and habitat that supported numerous wildlife species. With the expansion of settlement throughout the Great Plains, much of the original habitat within the region has been converted to agricultural development and other uses. This loss of habitat has resulted in the elimination of many historical wildlife populations and/or the reduction of population sizes of many species. In this context, small isolated areas of grassland, woodland areas found along shelter belts and stream and river margins, the weedy edges of fields, as well as poorly maintained fields within agricultural areas comprise the majority of wildlife habitats.

General Wildlife. Most of the wildlife species inhabiting the Project Area include those typically found in heavily disturbed habitats. These species are typically opportunistic and are able to utilize ruderal, urban or agricultural habitats. According to the general distribution of wildlife in the region and their habitat preferences a variety of common and widespread species have the potential to occur in the Project Area at some time during the year.

Mammals. A variety of medium to large-sized mammals are likely to be found in the Project Area, particularly in the less disturbed non-agricultural areas. These include the white-tailed deer (*Odocoileus virginianus*), red fox (*Vulpes fulva*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and coyote (*Canis latrans*). Other small-sized mammal species that are regionally common and likely to be found in the Project Area include the eastern cottontail (*Sylviligus floridanus*), northern pocket gopher (*Thomomys talpoides*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), Richardson’s ground squirrel (*S. richardsonii*), western harvest mouse (*Reithrodontomys megalotis*), and prairie deer mouse (*Peromyscus maniculatus bairdii*).

Seven bat species are potentially present within Nobles County, Minnesota based on distributional records (IUCN 2016; MNDNR 2016a; USGS-GAP 2013). Based on the results of acoustic bat surveys conducted for the Project Area, it was determined that six of the seven bat species are present within the Project Area. These include the little brown bat (*Myotis lucifugus*), big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), hoary bat (*Lasiurus cinereus*), eastern red bat (*L. borealis*), and tri-colored bat (*Perimyotis subflavus*). Three of these species (tree bats—silver haired bat, hoary bat, and eastern red bat) are migratory and commonly roost in trees and shrubs throughout the year. The other three species typically hibernate during the winter in caves and summer roost in trees, shrubs, caves, and buildings. In addition, three of these species (big brown bat, little brown bat, and tri-colored bat) are listed as Species of Special Concern by the MNDNR. The most commonly recorded species were the big brown bat and hoary bat which comprised 24 percent and 16 percent of the total bat passes, respectively.

Birds. According to the eBird online checklist data for year round bird observations in Minnesota (eBird 2016), some 193 bird species occur within Nobles County either as residents or as migrants/transients. A total of 16,895 birds representing 106 species and 10 species groups were identified during the 2016-2017 general avian point count surveys. Some of the species observed were recorded throughout the year, while others use the Study Area for only one or two seasons. The most commonly observed birds during the annual survey effort were the red-winged blackbird (*Agelaius phoeniceus*) (16.6 percent of all birds observed), horned lark (*Eremophila alpestris*) (13.7 percent), common grackle (*Quiscalus quiscula*) (13.0 percent), brown-headed cowbird (Molothrus ater) (5.6 percent), Canada goose (*Branta canadensis*) (5.2 percent), and European starling (*Sturnus vulgaris*) (5.2 percent). The remaining 103 species comprised 40.6 percent of the total number of birds observed.

Reptiles and Amphibians. Reptile and amphibian species in the Project Area may be limited due to the lack of abundance of high quality wetlands; however, Blanding's Turtles (*Emydoidea blandingii*), a state-listed threatened species, are known to occur in Nobles County and may have the potential to be present within the Project Area. Common upland snakes in the area include common garter snake (*Thamnophis sirtalis*), smooth green snake (*Ophedrys vernalis*), and plains garter snake (*Thamnophis radix*). Turtle species likely found in the Project Area include painted turtles (*Chrysemys picta*) and snapping turtles (*Chelydra serptina*). Species of amphibians such as the western chorus frog (*Pseudacris triseriata*), American toad (*Bufo americanus*), Great Plains toad (*Anaxyrus cognatus*), northern leopard frog (*Rana pipiens*), and the tiger salamander (*Ambystoma tigrinum*) may utilize the habitat along drainage ditches and streams in the Project Area.

8.19.3 Potential Impacts

Construction and operation of the proposed Project would result in direct and indirect impacts to wildlife and wildlife habitat. The principal impacts to terrestrial wildlife likely to be associated with construction and operation of the Project include: (1) the loss of certain wildlife habitat due to construction activities such as earth-moving at the turbine pad sites and associated access roads; (2) habitat fragmentation; (3) direct mortality or injury due to collisions with turbines, meteorological towers, and/or transmission lines; (4) vehicle-related mortality, and (5) displacement of some wildlife species. The magnitude of impacts to wildlife and wildlife habitat would depend on a number of factors including the type and duration of disturbance, the species of wildlife present, time of year, and implementation of recommended and required mitigation measures.

Direct disturbance to wildlife habitat includes activities such as ground surface grading and excavation, tree and shrub removal, and/or scraping of road surfaces that disturbs surface and subsurface soils. Each of these activities could effectively remove and/or degrade existing habitat, thereby reducing its availability to local wildlife populations.

Permanent and temporary loss of habitat as a result of construction activities could affect some small mammal, reptile, and/or amphibian species with very limited home ranges and mobility. Although there is no way to accurately quantify these effects, the impact is likely to be moderate in the short term and be reduced over time as reclaimed areas produce suitable habitats. Most of these wildlife species would be common and widely distributed throughout the Project Area and the loss of some individuals as a result of habitat removal would have a negligible impact on populations of these species throughout the region.

Indirect effects due to displacement of wildlife also could occur as a result of construction activities associated with the proposed Project. In response to the increase in human activity (e.g., equipment operation, vehicular traffic, and noise), wildlife may avoid or move away from the sources of disturbance to other habitats. This avoidance or displacement could result in underutilization of the physically unaltered habitats adjoining the disturbances. The net result would be that the value of habitat near the disturbances would be decreased and previous distributional patterns would be altered. The habitats would not support the same level of use by wildlife as before the onset of the disturbance. Additionally, some wildlife could be displaced to other habitats leading to some degree of overuse and degradation to those habitats.

Collision risk may be introduced to avian and bat species that migrate, breed, or winter within the proposed Project Area, and at least some degree of avian and bat mortality from collisions with turbines would be an unavoidable consequence of the operation of the proposed Project. Collisions may occur with resident birds and bats foraging and flying within the Project Area or with migrant birds and bats seasonally moving through the area.

Birds. Bird risk within the Project Area is likely highest during the spring and fall migration seasons, as has been observed at most wind energy facilities (NWCC 2010). Passerines, both resident and migrant, are likely at highest risk in the Project Area, as this avian group represents the majority (75 percent) of mortalities at wind turbines nationwide (Johnson *et al.* 2007; Strickland and Morrison 2008) and was by far the most frequently observed species group during both winter and spring avian point count surveys within the Project Area. It is estimated that less than 0.01 percent of migrant songbirds that pass over wind farms are killed, based on radar data and mortality monitoring (Erickson 2007), and no studies to date indicate or suggest a level of fatality that rises to a level of concern, relative to population-level impacts. Night-migrating passerines may be at a higher risk, as this group has accounted for over 50 percent of avian fatalities at certain sites, but no particular species or group of species has been identified as incurring in greater numbers of fatalities (Erickson *et al.* 2002).

Locally breeding songbirds and other passerines may experience lower mortality rates than migrants because many of these species tend to fly below the rotor swept area ("RSA") during the breeding season. However, some breeding songbird species have behaviors that increase their risk of collisions with turbines. Birds taking off at dusk or landing at dawn, or birds traveling in low cloud or fog conditions, for example, are likely at the greatest risk of collision (Kerlinger 1995).

Collision risk is likely to be much lower for other non-raptor bird groups in the Project Area. While waterfowl were the second highest species group observed during pre-construction avian surveys, waterfowl are considered to have low risk for turbine-related fatalities either due to demonstrated avoidance behavior and/or few documented fatalities at other wind energy facilities. Research has demonstrated that waterfowl rarely collide with wind turbines (Kingsley and Whittam 2007; Gehring 2011). The only sites experiencing regular waterfowl fatalities have been those located on the shores of large, open expanses of water (Erickson *et al.* 2002).

The remaining non-raptor species groups detected during winter surveys have low risk for turbine collisions within the Project Area to a combination of relatively low mean use rates, infrequent flight within the height of the RSA, and/or few to no records of fatalities at other wind facilities with publicly available results of mortality studies.

Despite the observation that most avian fatalities at wind farms are passerines, raptor fatality (including eagles) historically has received the most attention. Raptor fatality at newer wind projects has been low relative to older-generation wind farms, although there is substantial regional variation in raptor fatality rates (Erickson *et al.* 2002; Johnson *et al.* 2002; Kerns and Kerlinger 2004; Jain *et al.* 2007). Raptors constitute approximately 6 percent of reported bird fatalities, but generally have a smaller percentage of birds observed using wind farms during pre-construction surveys (Strickland *et al.* 2011).

High raptor use (greater than 2.0 birds/20 min) has been associated with high raptor mortality at wind farms (Strickland *et al.* 2011). Conversely, raptor mortality appears to be low when raptor use is low (less than 1.0 birds/20 min; Strickland *et al.* 2011), which is the case for winter, spring, summer, and fall raptor use within the Study Area. Mean raptor use within the Project Area for the all the surveys seasons was low (range of 0.096 – 0.373 birds/20 min), suggesting that raptor fatality will be low as well.

Bats. In the acoustic bat study for the proposed Project, the primary bat species detected were the hoary and silver-haired bat. Documented bat fatalities of these and other common bat species at previously developed wind farms have been associated almost exclusively with operating turbines.

Bat fatality at previously developed wind farms has been associated primarily with dispersing and migrating bats. Three species of long-distance migratory bats (hoary bat, eastern red bat, and silver-haired bat) compose the majority of fatalities, and hoary bats alone compose about half of all documented fatalities in North America (Kunz *et al.* 2007). Although the majority of documented bat fatalities at existing wind projects is related to long-distance migratory species, some mortality among resident bat species is also associated with the spring and fall migration periods, and during the summer pup rearing period.

Based on data evaluated for the spring, summer, and fall survey periods, bat assemblage and use is expected to be comparable to that of other operational wind projects in the Midwest. Bat mortality documented for 27 post-construction studies at wind energy facilities in the Midwest is variable, with a mean mortality rate of 7.62 bat fatalities/MW/year. Bat fatalities ranged from a low of only 0.10 fatalities/MW/year at the Buffalo Ridge I Project in South Dakota, to a high of 30.61 fatalities/MW/year at the Cedar Ridge Project in Wisconsin. None of the bat mortalities observed at these facilities was known to consist of northern long-eared bats.

In Minnesota, there have been a number of publicly available studies on the impacts to bats from wind energy developments. These studies report fatality estimates ranging from 1 to 20 bats/MW/year (1 to 30 bats/turbine/year) throughout southern Minnesota with the highest fatality rates documented in southwestern Minnesota. The Lakefield Wind Project is the operating project with available post-construction fatality data nearest to the proposed Project (approximately 30 miles east in nearby Jackson County). During a fatality monitoring study conducted in 2012, an estimate of 19.87 bats/MW/year (29.80 bats/turbine/year) was observed with fatalities composed of 27 eastern red bats (48.21 percent), 13 hoary bats (23.21 percent), 13 little brown bats (23.21 percent), and 3 big brown bats (5.36 percent) (Westwood 2013).

8.19.4 Mitigation Measures

In order to minimize impacts to wildlife, Nobles 2 has incorporated the following mitigation measures into the siting, construction, operations and decommissioning phases of the proposed Project.

1) Maintenance activities will help to avoid the creation of foraging opportunities for raptors and/or scavengers or availability of materials that could be harmful to birds;

    a. Rock and brush piles that could create habitat for raptor prey will be removed from turbine areas.

    b. Food waste littering by construction/operations/maintenance staff will be prohibited.

    c. To avoid attracting wildlife to the construction site, contractors will provide appropriate trash collection receptacles throughout the Project Area to collect construction related waste materials, including garbage and refuse.

2) Maintenance of overhead utilities will minimize impacts to birds;

a. Bird flight diverters will be installed on all new overhead transmission lines, if any, to be built near sensitive habitat areas (i.e., streams, wetlands, or other water bodies) to minimize risks to waterfowl and other birds. The fiber optic and shield wire will be marked in these areas with bird diverters at intervals of 20 feet. Where two shield wires are required, the bird diverters will be placed at alternating intervals of 40 feet such that the over-all interval between bird diverters on both wires is 20 feet. The conductor wires will be attached to the poles via davit arms, brace post, or post mount insulators and arms, as needed, to meet local utility practice and rural utility specifications.

b. All conductor wire spacing and other features will follow the guidelines developed by the Avian Power Line Interaction Committee ("APLIC") working group guidelines as they are written at the time of installation.

3) All operations personnel will be trained to identify potential wildlife conflicts and the proper response. This training will include sensitivity to birds and other terrestrial wildlife. Nobles 2 will develop an incidental reporting process by which operations personnel document bird or bat casualties during routine maintenance work and at other times that they are within the Project Area.

4) Any observed road-kill or other carrion discovered in the Project Area during construction, maintenance and operational activities will be removed, pursuant to the terms of all applicable permits, to avoid attracting predators or scavengers such as bald eagles and other raptors.

5) Project personnel will be advised regarding speed limits on Project-owned roads (25 mph) to minimize wildlife mortality due to vehicle collisions.

6) A Wildlife Incident Reporting System ("WIRS") will be implemented at the start of operations and it will remain active for the life of the Project.

7) Nobles 2 will implement feathering of turbine blades when operating below the cut-in-speed, as specified by the wind turbine generator manufacturer, during the period beginning April 1 and ending October 31 of each year, from ½ hour before sunset to ½ hour after sunrise, through the life of the Project, to reduce mortality of birds and bats.

8) Nobles 2 will perform one year of post-construction avian and bat mortality monitoring to determine the overall bird and bat fatality rates from the Project; to evaluate the circumstances under which fatalities occur; and to determine whether the estimated mortality is lower, similar, or higher than the average mortality rates observed at other local, regional, and national wind projects.

9) Nobles 2 has prepared a BBCS which is structured around an adaptive management framework and includes detailed discussions of the above and other

provisions for avoiding, reducing, and, if warranted, mitigating for potential impacts to birds and bats (**Appendix G**). The BBCS is a living document throughout the life of the Project, during which Nobles 2 will work with USFWS and MNDNR to evaluate the findings of post-construction studies, formulate recommendations and definitions, and incorporate them into the BBCS on an iterative basis.

8.20 Special-Status Species

8.20.1 Description of Resources

The Project Area was evaluated for the presence of special-status species, their habitat, and the potential for the proposed Project to affect such species. Special-status species include those listed as threatened or endangered under the federal Endangered Species Act of 1973, as amended; those listed as threatened or endangered under Minnesota's Endangered Species Statute; species classified by the USFWS as Birds of Conservation Concern ("BCC"); and other species identified by the MNDNR as Special Concern Species.

A review of the MNDNR Natural Heritage Information System ("NHIS") database licensed to Westwood (LA763, May 2016 and LA 876, June 2017) and endangered and threatened species lists from the MNDNR and USFWS (MNDNR 2016, 2017; USFWS 2016, 2017) was conducted to identify special-status species known or likely to occur in the Project Area. In addition, formal NHIS data requests for the Project Area were submitted to the MNDNR on January 25th and March 15th, 2016, and again on June 6, 2017. Results from the MNDNR NHIS database review for the Project Area indicated four records of listed species in and within one mile of the Project Area (MNDNR 2016, ERDB 20160294) (**Appendix B**). NHIS results also noted the presence MBS Sites of Biodiversity Significance present within the Project Area that typically contain native prairie remnants and native plant communities. It should be noted that the absence of rare species records cannot be construed as lack of occurrence. Instead, it may mean the area has not been surveyed.

Review of the USFWS Information Planning and Conservation System ("IPaC") identified four federally listed threatened or endangered species as potentially occurring within the Project Area and surrounding region. These include the prairie bush-clover (*Lespedeza leptostachya*), Dakota skipper (*Hesperia dacotae*), Topeka shiner (*Notropis topeka*), and the northern long-eared bat (*Myotis septentrionalis*).

Based on information from both Federal and State sources, six special-status plant species and 32 special-status animal species were identified as potentially occurring within the Project Area and surrounding region. These species, including their status, general habitat requirements, and potential to occur within the Project Area are presented in **Table 8.20.1**. Of these, five animal species have a "moderate" potential to occur in the Project vicinity. The remaining species listed as "low" are not expected to occur on or adjacent to the Project due to specific habitat requirements not identified in the Project Area.

Table 8.20.1: Special-Status Plant and Animal Species with the Potential to Occur within the Project Area and Surrounding Region			
Common Name *(Scientific Name)*	**Status (Federal/State)**	**General Habitat Requirements**	**Potential for Occurrence**
Mammals			
Gray Wolf (*Canis lupus*)	FT/--	Habitat generalists – found in prairies, forests, mountains, etc.	Low
Least Weasel (*Mustela nivalis*)	--/SC	Meadows, grasslands, and shrubby areas, most population data comes from northwest corner of MN. Sensitive to agricultural changes to the environment.	Low
Northern Grasshopper Mouse (*Onychomys leucogaster*)	--/SC	Prairies and plains with limited vegetation, often displaced by human activity due to territorial nature.	Moderate
Western Harvest Mouse (*Reithrodontomys megalotis*)	--/SC	Grasslands and overgrown fields.	Moderate
Little Brown Bat *(Myotis lucifigus)*	--/SC	Day roosts in man-made structures, caves, and hollow trees. Hibernates in caves and mines. Susceptible to white-nose syndrome.	Present
Big Brown Bat *(Eptesicus fuscus)*	--/SC	Day roosts in man-made structures, caves, and hollow trees. Hibernates in caves and mines. Susceptible to white-nose syndrome.	Present
Tri-colored Bat *(Pipistrellus subflavus)*	--/SC	Hibernates in caves, mines, and tunnels. Roosts in tree branches and under bark. No maternal colonies known to exist in MN. Susceptible to white-nose syndrome.	Present
Northern Long-eared Bat (*Myotis septentrionalis*)	FT/SC	Hibernates in caves, mines, and manmade structures. Days roosts under tree bark in wooded areas; often around wetlands. Will also use abandoned structures. Night roosts in caves and mines. Susceptible to white-nose syndrome. No known hibernaculum or roost tree has been identified in Nobles or Murray County.	Low
Birds			
American White Pelican (*Pelecanus erythrorhynchos*)	--/SC	Lakes, marshes, salt bays. In breeding season mostly inland, nesting on isolated islands in lakes and feeding on shallow lakes, rivers, marshes. Feeding areas may be miles from nesting sites.	Present
Bald Eagle (*Haliaeetus leucocephalus*)	BGEPA/--	Lakes, rivers, and deep marshes; will forage in open grasslands. Nest in perched areas like large trees and cliffs.	Present
Burrowing Owl (*Athene cunicularia*)	--/SE	Grazed pastures, and mixed grass prairies, usually avoid intense agriculture. Uses rodent colonies for nesting burrows.	Low
Common Gallinule (*Gallinula galeata*)	--/SC	Cattail-bulrush marshes, sensitive to disturbance.	Low

Table 8.20.1: Special-Status Plant and Animal Species with the Potential to Occur within the Project Area and Surrounding Region			
Common Name *(Scientific Name)*	**Status (Federal/State)**	**General Habitat Requirements**	**Potential for Occurrence**
Forster's Tern (*Sterna forsteri*)	--/SC	Wetland complexes with open water and emergent areas. Nest on muskrat houses, sensitive to disturbance and chemical contamination.	Low
Franklin's Gull (*Leucophaeus pipixcan*)	--/SC	Prairies, inland marshes; in winter, coasts, ocean. Nests on prairie marshes where habitat is extensive and water is fairly deep; forages during summer and migration over agricultural fields, prairie, flooded pasture, marshes, estuaries.	Present
Loggerhead Shrike (*Lanius ludovicianus*)	--/SE	Upland grassland with small trees and shrubs, can be found in pastures, old fields, farmyards, and cemeteries.	Present
Purple Martin (*Progne subis*)	--/SC	Historically inhabited areas along forest edges and nested in woodpecker holes. They are now found nesting predominately in and near cities with nesting boxes and forage in pastures, parks, and other open spaces.	Present
Trumpeter Swan (*Cygnus buccinator*)	--/SC	Small ponds and lakes with extensive cattail and bulrush populations and a mixture of open water and emergent vegetation. Sensitive to disturbance and pollution.	Present
Wilson's Phalarope (*Phalaropus tricolor*)	--/ST	Wet prairie, fens, and sedge/grass dominated wetlands with mosaic of open water and short vegetation. Sensitive to degradation of water quality.	Present
Dickcissel (*Spiza americana*)	BCC/--	Alfalfa and other fields; meadows, prairies. Originally nested in native prairies and meadows. Today, many nest in fields of alfalfa, clover, timothy, or other crops.	Present
Red-headed Woodpecker (*Melanerpes erythrocephalus*)	BCC/--	Groves, farm country, orchards, shade trees in towns, large scattered trees. Avoids unbroken forest, favoring open country or at least clearings in the woods. Forest edges, orchards, open pine woods, groves of tall trees in open country are likely habitats.	Present
Solitary Sandpiper (*Tringa solitaria*)	BCC/--	Streamsides, wooded swamps and ponds, fresh marshes. In migration generally along shaded streams and ponds, riverbanks, narrow channels in marshes.	Present
Swainson's Hawk (*Buteo swainsoni*)	BCC/--	Plains, dry grassland, farmland, ranch country. Breeds most commonly on northern Great Plains, in prairie regions with scattered groves of trees for nest sites.	Present
Upland Sandpiper (*Bartramia longicauda*)	BCC/--	Grassy prairies, open meadows, fields. Favored nesting habitat is native grassland,	Present

Table 8.20.1: Special-Status Plant and Animal Species with the Potential to Occur within the Project Area and Surrounding Region

Common Name ***(Scientific Name)***	**Status (Federal/State)**	**General Habitat Requirements**	**Potential for Occurrence**
		with mixture of tall grass and broad-leafed weeds.	
Reptiles			
Blanding's Turtle (*Emydoidea blandingii*)	--/ST	Wetland complexes and adjacent sandy uplands, calm waters with abundant vegetation. Will also use shallow streams and oxbows, prairie marshes, and agricultural fields.	Moderate
Amphibians			
Blanchard's Cricket Frog (*Acris blanchardi*)	--/SE	Shallow lakes and wetlands, streams and rivers with emergent vegetation; pollution sensitive.	Low
Fish			
Plains Topminnow (*Fundulus sciadicus*)	--/ST	Spring-fed pools and backwaters of clear to moderately turbid waters with sand or rock bottoms and dense vegetation.	Moderate
Topeka Shiner (*Notropis Topeka*)	FE/SC	Prairie rivers and stream pools and oxbows with sand or gravel bottoms.	Moderate
Insects			
Dakota Skipper (*Hesperia dacotae*)	FT/SE	Dry to dry-mesic native prairie with mid-height grasses with some topographic variability.	Low
Iowa Skipper (*Atrytone arogos iowa*)	--/SC	Dry to dry-mesic native prairie with big and little bluestem.	Low
Phlox Moth (*Schinia indiana*)	--/SC	Native upland prairie with prairie phlox.	Low
Powershiek skipperling (*Oarisma powershiek*)	FE/SE	Wet to dry native prairie; sites with non-native grasses are unsuitable.	Low
Regal Fritillary (*Speyeria idalia*)	--/SC	Native upland and wet prairie. Feed only on violets, especially bird's-foot violet.	Low
Plants			
Prairie bush clover (*Lespedeza leptostachya*)	FT/ST	Mesic to dry-mesic native prairie with well-drained soils. Often found on N, NE, and NW facing slopes in concave areas of the mid-slope and areas used as pasture.	Low
Prairie Moonwort (*Botrychium campestre*)	--/SC	Dry, dry hill, dry bedrock bluff, and sand gravel prairies with predominantly native species.	Low
Rattlesnake-master (*Eryngium yuccifolium*)	--/SC	Habitat range is broad but in MN found almost exclusively in dry to moist prairies.	Low
Red Three-awn (*Aristida purpurea*)	--/SC	Dry and dry-mesic prairies with well-drained soils dominated by grasses. Commonly found on ridge crests and upper hillslopes and in areas degraded by grazing.	Low

Table 8.20.1: Special-Status Plant and Animal Species with the Potential to Occur within the Project Area and Surrounding Region			
Common Name ***(Scientific Name)***	**Status (Federal/State)**	**General Habitat Requirements**	**Potential for Occurrence**
Sullivant's Milkweed (*Asclepias sullivantii*)	--/ST	Remnant mesic tallgrass prairie; sensitive to pollution and disturbance.	Low
Western Prairie Fringed Orchid (*Platanthera praeclara*)	FT/--	Mesic to wet tallgrass prairies and meadows, also found in old fields and ditches. Depend on hawkmoth for pollination; thus they are uncommon in areas with insecticide use.	Low

FE = Federally Endangered, FT = Federally Threatened, BGEPA = Bald and Golden Eagle Protection Act, BCC = Bird of Conservation Concern, SE = State Endangered, ST = State Threatened, SC = State Species of Concern (Rare, but with no regulatory listing status).

Birds

A total of 521 individuals of 12 special-status avian species were identified during the winter, spring, summer, and fall general avian point count surveys (**Table 8.20.2**). The most numerous avian species were Franklin's gull (*Leucophaeus pipixcan*) (comprising 73.7 percent of all special-status birds observed) and dickcissel (11.9 percent). The remaining ten species comprised 14.4 percent of the total number of special-status birds observed (**Table 8.20.2**). The dickcissel was the most frequently observed special-status species (documented at least once in 4.6 percent of all surveys), followed by the red-headed woodpecker (*Melanerpes erythrocephalus*) (1.0 percent), Franklin's gull (0.9 percent), and upland sandpiper (*Bartramia longicauda*) (0.8 percent of all surveys) (**Table 8.20.2**).

No Federally listed species were observed during any of the general avian point count surveys. However, two bald eagles were observed flying within the Project Area during the fall general avian point count survey period. One of the special-status avian species, the loggerhead shrike (*Lanius ludovicianus*), is listed as a Minnesota State Endangered Species and one, the Wilson's phalarope (*Phalaropus tricolor*), is listed as a Minnesota State Threatened Species. Six of the special-status avian species; dickcissel, red-headed woodpecker, solitary sandpiper (*Tringa solitaria*), bald eagle, Swainson's hawk (*Buteo swainsoni*), and upland sandpiper are listed as USFWS BCC, while the remaining four species: American white pelican (*Pelecanus erythrorhynchos*), trumpeter swan (*Cygnus buccinator*), purple martin (*Progne subis*), and Franklin's gull are listed as Minnesota State Special Concern Species.

Table 8.20.2: Special-Status Avian Species Observed during Winter, Spring, Summer and Fall General Avian Point Count Surveys					
Species	**Number of Birds**	**Number of Occurrences**	**Mean Use (No. Birds/5 minutes)**	**Frequency (% of Surveys Detected)**	**Species Composition (%)**
Dickcissel [3]	62	50	0.065	4.58	11.90
American White Pelican [4]	13	3	0.014	0.31	2.50

Red-headed Woodpecker [3]	13	13	0.014	1.04	2.50
Trumpeter Swan [4]	12	2	0.012	0.21	2.30
Solitary Sandpiper [3]	9	4	0.009	0.42	1.73
Wilson's Pharalope [2]	5	3	0.005	0.31	0.96
Purple Martin [4]	1	1	0.001	0.10	0.19
Bald Eagle [3]	2	2	0.002	0.21	0.38
Loggerhead Shrike [1]	1	1	0.001	0.10	0.19
Swainson's Hawk [3]	4	3	0.004	0.31	0.77
Upland Sandpiper [3]	15	9	0.016	0.83	2.88
Franklin's Gull [4]	384	12	0.400	0.94	73.70
Total	**521**	**103**	**0.543**	**--**	**100.00**

[1]Minnesota State Endangered Species, [2]Minnesota State Threatened Species, [3]USFWS Bird of Conservation Concern, [4]Minnesota Special Concern Species

A total of five bald eagles were also observed during fall eagle point count surveys. All observations were of individuals in flight. These observations consisted of three adult eagles and two sub-adult eagles. All were observed within the Project Area for a combined total of 17 minutes, and four of the five were observed less than 200 meters in height from the ground surface. All of the eagle observations were generally located in the western half of the Project Area.

Bald eagles are also known to nest in the region, as a total of five nests were recorded during the 2016 and 2017 survey seasons. Three of the five nests identified during 2016 were active, while four of the five were identified as active during 2017. None of the nests identified during 2016 and 2017 were within or near the Project Area. The nearest active nest in 2016 was located approximately 9 miles to the northeast of the Project Area. Two of the active nests identified during 2017 were located within the 10-mile Survey Area, while the remaining two active nests were located outside the 10-mile Survey Area. Nest Nos. 37 and 38 were active in both 2016 and 2017, and Nest No. 34 was active in 2016 but not in 2017. Nest Nos. 35 and 36, which are fewer than two miles apart, were found with opposite and alternative active/inactive statuses between the 2016 and 2017 surveys (**Map 17 and 18**).

Bats

A total of three special-status bat species were identified during the 2016 acoustic bat survey effort; big brown bat, little brown bat, and tri-colored bat. All of these species are listed as Minnesota Species of Special Concern. The most numerous bat species was the big brown bat which was documented among 16 percent of total calls and nearly 99 percent among special-status bat species found in the study. Activity by this species was greatest from late July to late August 2016. The little brown bat was the next most common bat species documented among 0.15 percent of total calls and 0.92 percent among special-status bat species found in the study. The little brown bat was documented on 17 May 2016, 22 July 2016, 20 August 2016, and 23 August 2016. The tri-colored bat was documented among 0.07 percent of total calls and 0.46 percent among special-status bat species found in the study. The tri-colored bat was documented on 23 May 2016 and 30 August 2016. No federally listed bat species were observed during the 2016 acoustic survey effort.

Other Species

Several of the streams within the Project Area flow into the Kanarazi and Champepadan Creeks, which are important habitat for state and federally-listed species, including Blanding's turtles (*Emydoidea blandingii*), Topeka shiner (*Notropis topeka*), and plains topminnow (*Fundulus sciadicus*). Kanarazi Creek and Champepedan Creek are federally designated as critical habitat for the Topeka shiner. These species are adversely impacted by actions which alter stream hydrology or decrease water quality, including sedimentation, dredging and filling, stream dewatering, impoundment, eutrophication, channelization, and pollution/contamination.

8.20.2 Potential Impacts

In general, construction and operational impacts on special status plant and animal species and their habitats would be similar to those discussed in the preceding sections for vegetation communities (Section 8.18.2) and wildlife (Section 8.19.3). However, these impacts can be more severe for special status plant and animal species, if present, since the distribution and abundance of many of these species are limited in the Project Area and surrounding region. An adverse impact to special status species would be considered to have occurred if construction and/or operation of any component of the proposed Project were to cause substantial changes to the existing abundance, distribution, or habitat value for a special status plant or animal species.

The special-status bird species detected during spring grassland breeding bird surveys are considered to have a low risk for turbine collision at the Project due to a combination of relatively low mean use rates for most species, infrequent flight within the height of the RSA, and/or few to no records of fatalities at other wind facilities with publicly available results of mortality studies.

Risks to non-eagle raptors like the Swainson's hawk are expected to be low for the Project because topographic features that encourage risky behaviors like slope-soaring and kiting are limited and discontinuous in the Project Area (occurring mostly in the northwest portion of the Project Area). In addition, there are few documented mortalities resulting from operating wind energy facilities, even in areas with high Swainson's hawk use (Erickson *et al.* 2002). This could possibly be due to the fact that the species generally flies below the RSA, which is supported by the fact that few Swainson's hawks were observed within the RSA during general avian point count surveys.

While data on the collision risks of raptors at wind energy facilities are well documented, few data concerning the collision risk of bald eagle nesting near wind energy developments are currently available. In general, bald eagles have been rarely documented as casualties at wind energy facilities. As of 2012, six substantiated bald eagle fatalities or injuries were documented at wind energy facilities in the United States, and two were reported in Ontario, Canada (Allison 2012, Pagel *et al.* 2013). An additional bald eagle fatality was reported in fall 2015 at a wind farm in Mercer County, North Dakota, although the exact cause of the eagle's death is still undetermined (Thompson 2015).

While bald eagles do occur seasonally within the Project Area, their occurrence appeared to be somewhat sporadic and in low numbers. Mean eagle use within the Project Area was moderately low (0.001 eagles per hour), as a total of five bald eagles were observed, four of which were observed flying below 200 meters. While bald eagles nest within the region, the nesting density for the species is relatively low. The nearest occupied nest of bald eagles was nearly 9 miles from the Project Area. There is little foraging opportunity within and near the Project Area, particularly when compared to foraging habitat available elsewhere in the region. Therefore, the proposed Project is unlikely to be a strong attractant to migrating and resident bald eagles that may be foraging or nesting in the general region. Risks to bald eagles are expected to be low to moderate for the Project due to a combination of moderately low mean use rates; observed flight below 200 meters; lack of suitable trees for nesting, roosting and perching within the Project Area, and/or few to no records of fatalities at other wind facilities with publicly available results of mortality studies.

In the present study for the Project, special-status bat species detected included the little brown bat, big brown bat, and tricolored bat. While each of these species has been reported among fatalities at operating wind energy developments across the United States (Arnett and Baerwald 2013, Arnett *et al.* 2008), the Project has been sited and designed to be a relatively low-risk site for bats. The Project Area does not contain distinct topography, unique habitats or resources, or other features that could concentrate bats or bat activity. No indicators of high bat risk in the Project Area (e.g., impacts to roost trees or hibernaculum, high volume use as a migration corridor, etc.) were discovered during either the SCS (Tier 2 of the WEG) or the annual passive acoustic bat monitoring, which was conducted in accordance with Tier 3 of the WEG. Based on available data from operational wind projects in Minnesota and elsewhere in the Midwest, bat fatalities at the Project are expected to occur at a low frequency and be comparable with that of other Midwest wind energy facilities. Impacts are not expected to occur to a degree which would adversely affect populations.

With regard to other special-status species including Blanding's turtles, Topeka shiner, and plains topminnow, the Project is not expected to alter stream hydrology or decrease water quality. Erosion control measures will be implemented during construction to avoid or minimize soil erosion and off-site deposition. As part of its NPDES permit application, a SWPPP will identify erosion and sedimentation control measures to prevent adverse water quality impacts to streams and wetlands during and after construction. Measures included in the SWPPP will be sufficient to ensure that streams and surface waters in the Project Area do not incur adverse construction-related stormwater impacts. As such, measures implemented to prevent adverse water quality impacts to streams and wetlands during and after construction will also minimize the potential for impacts to these species.

MNDNR's fact sheet cites experiences of Blanding's turtle that include an increased risk for nesting females and hatchlings being killed while crossing roads between wetlands and nesting areas and individuals becoming entangled in nylon netting associated with erosion control material. In addition to movements associated with nesting, all ages and both sexes move between wetlands from April through November and are at risk of being killed or injured from vehicle strikes on area roadways.

8.20.3 Mitigation Measures

In order to minimize impacts to special-status bird and bat species, Nobles 2 will adopt the same mitigation measures as those discussed in the preceding sections for vegetation communities (Section 8.18.2), wildlife (Section 8.19.4) and the BBCS **(Appendix G)**.

Consistent with those MNDNR recommendations, mitigation measures implemented to protect Blanding's turtle include, but would not be limited to, the following:

1. A flyer with an illustration of a Blanding's turtle and pertinent Blanding's turtle facts will be given to all contractors working in the area.

2. Turtles which are in imminent danger will be moved, by hand, out of harm's way. Turtles which are not in imminent danger will be left undisturbed.

3. If erosion control mesh is used as an erosion control measures during Project construction, wildlife-friendly materials will be utilized to minimize potential impacts to Blanding's turtle and other wildlife.

9.0 SITE CHARACTERIZATION

9.1 Description of Resources

The Department of Energy's Wind Program and the National Renewable Energy Laboratory (NREL) published a wind resource map for Minnesota (October 2010). This wind resource map shows the predicted mean annual wind speeds at an 80 meter height. The wind resource across Southwestern Minnesota has been documented for more than 20 years by U.S. Department of Energy, Minnesota Department of Commerce and public utility companies. Extensive wind measurements have been taken and synthesized by various parties. This data suggest that the long-term mean annual 80 meter wind speeds across Nobles County in the area of interest for the proposed Project range from 7.5 to 8.5 meters per second (mps) (16.7 to 19.0 mph) (NREL 2010).

The longest-standing temporary meteorological tower for the Project (MET 0734, datum WGS84) is located at N43° 47' 47.34", W095° 51' 41.34" and is installed at an elevation of 551 meters (1,807 feet) AMSL. Meteorological tower 0734 has a total height of 195 feet or 60 meters. It is a guyed tower and is equipped with NRG anemometers and directional vanes. In addition to this guyed tower, a SoDAR, a remote sensing device that uses sound to measure wind speeds, was co-located at the site. It was installed in October 2014, and it operated for 18 months, until April 2016. The SoDAR is capable of measuring wind speeds up to 200 meters above ground level.

Nobles 2 has collected data from MET 0734 since October 23, 2014, at ten-minute intervals. It has engaged a wind resource consultant, Ron Nierenberg, to estimate the long-term wind resource at the Nobles 2 site for purposes of assessing the viability of wind energy generation. Based on measured data, the average annual wind speed at the site is 8.52 m/s at an 80-meter hub height (19.1 miles/hour at 262.5 feet).

Nobles 2 installed four additional 60m met towers at the site in 2016. Towers “2779” and “2780” have wind speed sensors at approximately 20m, 42m and 59m levels and temperature sensors at the bottom of the tower. Towers “0559” and “0560” have wind speed sensors at approximately 32m, 48m and 58m and temperature sensors at both the bottom and the top of the tower. All of these met towers are supplied by NRG Systems and considered industry standards.

In May of 2016 Nobles 2 installed a sixth met tower 100 meters in height which was supplied by Double-K Towers, Tower “0670”, which has wind speed sensors at approximately 40m, 60m, 80m, and 100m, and temperature sensors at 5m and 100m. All six towers continue to operate.

The climatological characteristics representative of the Project were gathered from data collected by the National Climatic Data Center (“NCDC”) at a number of weather stations and MERRA Re-Analysis nodes. The climatological temperature information indicates an annual daily average maximum temperature of 59°F, a minimum of 35°F, and an annual daily average temperature of 45.2°F. The average annual precipitation for the site is approximately 29.1 inches (High Plains Regional Climate Center (“HPRCC”)).

9.1.1 Interannual Variation

Figure 1 below shows modeled annual average wind speeds between 2005 and 2015. Annual average wind speeds range between approximately 8.1 m/s and 8.9 m/s during the time period. The Project’s wind resource consultant, Ron Nierenberg, developed site-specific annual wind speed averages by using the widely utilized Measure, Correlate, Predict (“MCP”) process, which correlates short term site specific measurements to historical long term general data and then uses that correlation to predict site specific long-term models by scaling historical long-term data to the two years of actual measured data from the site meteorological tower between October 2014 and July 31, 2016. The long-term data used is historical information available from the National Centers for Environmental Prediction / National Center for Atmospheric Research (“NCEP/NCAR”).

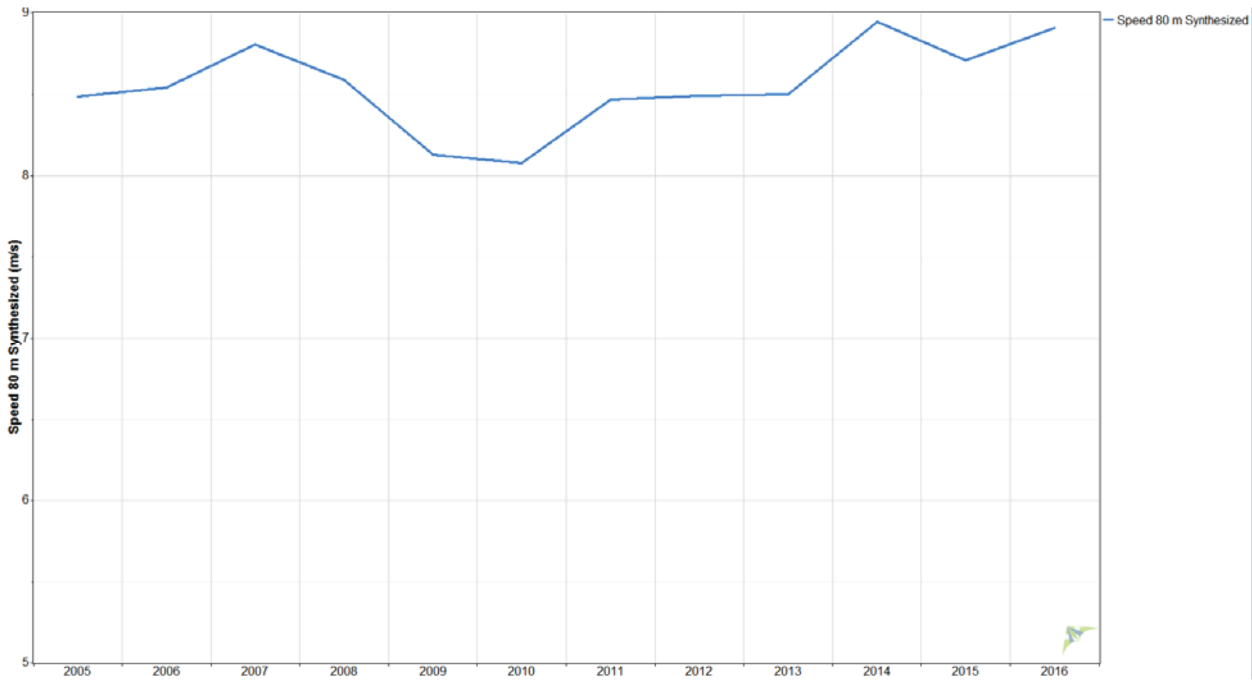

Figure 1. Graph of Annual Wind Speed Average Time Sequence

9.1.2 Seasonal Variation

Seasonal wind variations were studied using the Project meteorological tower and SoDAR wind data measured at 80 meters. The results of the studies are shown in **Figure 2.** The seasonal wind variations in the Project Area are relatively small. Wind speeds are generally the highest in spring, fall and winter months and decrease during the summer months. Locally collected data shows the predicted monthly average wind speeds for the site at a height of 80 meters (262.5 feet). Wind speeds are highest in April at 9.6 m/s (21.5 mph) and lowest in August at 6.9 m/s (15.5 mph).

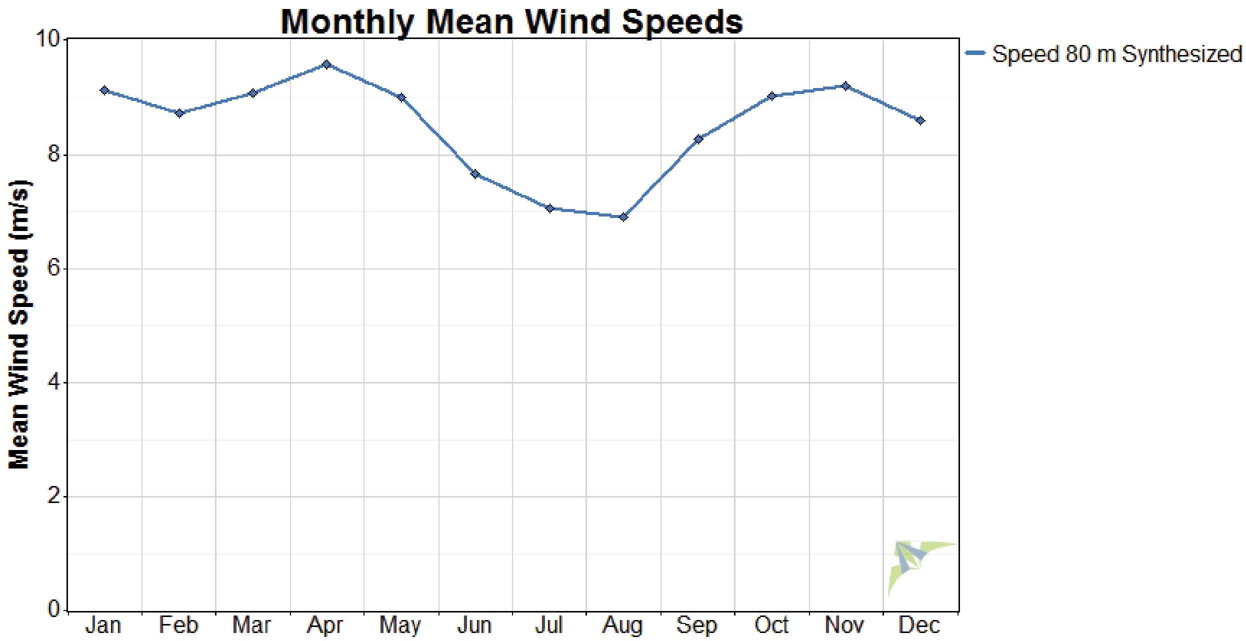

Figure 2. Predicted Monthly Wind Speeds at 80 Meters

9.1.3 Diurnal Conditions

As shown in **Figure 3**, the daily wind pattern at the Project site has an increase in wind speeds during the evening and overnight hours. Minimum winds occur in late morning. The presence of the nocturnal low level jet is also a common occurrence that drives low-level winds. During the spring and fall, the largest variations between wind speeds during the night and day occur, whereas there is generally less variation in the diurnal pattern during the winter months.

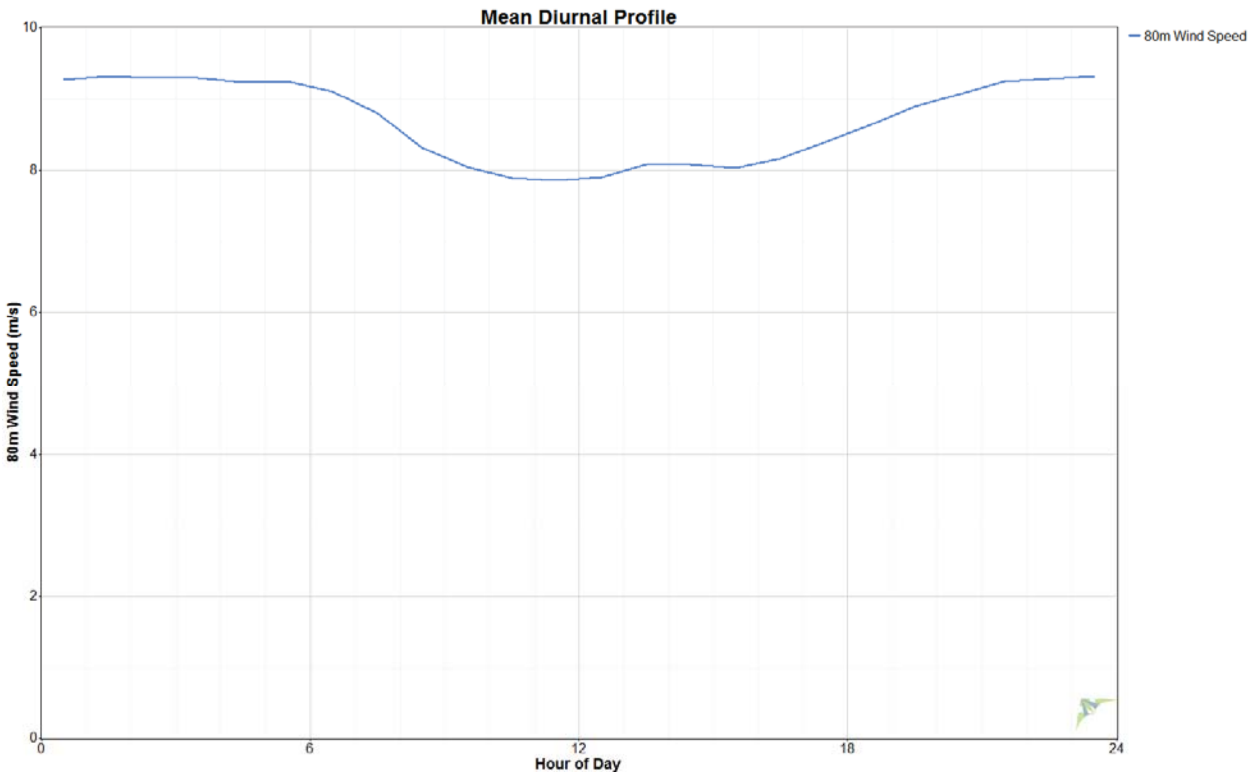

Figure 3. Diurnal Wind Speed Pattern at Nobles 2 Wind Farm

9.1.4 Atmospheric Stability

The stability of the atmosphere can be calculated when the temperatures at two levels are available. For the Project, temperature sensors at multiple heights were not available from the met tower data. Based on other regional atmospheric data, Nobles 2 expects the approximate atmospheric stability profile to be: Neutral (15 percent), Stable (70 percent), and Unstable (15 percent). These percentages were confirmed to be appropriate with the NOAA/ National Weather Service Station, Chanhassen, Minnesota.

9.1.5 Hub Height Turbulence

The turbulence intensity in the Project Area provides information on the variability within the wind flow. High turbulence intensity at a site could provide extra stress on turbines as wind passes through the swept area of the wind turbine blades. The turbulence intensity at the Project is on average 8.6 percent at 59 meters based upon measured wind data from the Project meteorological tower and is shown in **Figure 4** for a range of wind speeds. Overall, the turbulence intensity at this site is in the low to normal range of operating parameters for the wind turbines being considered.

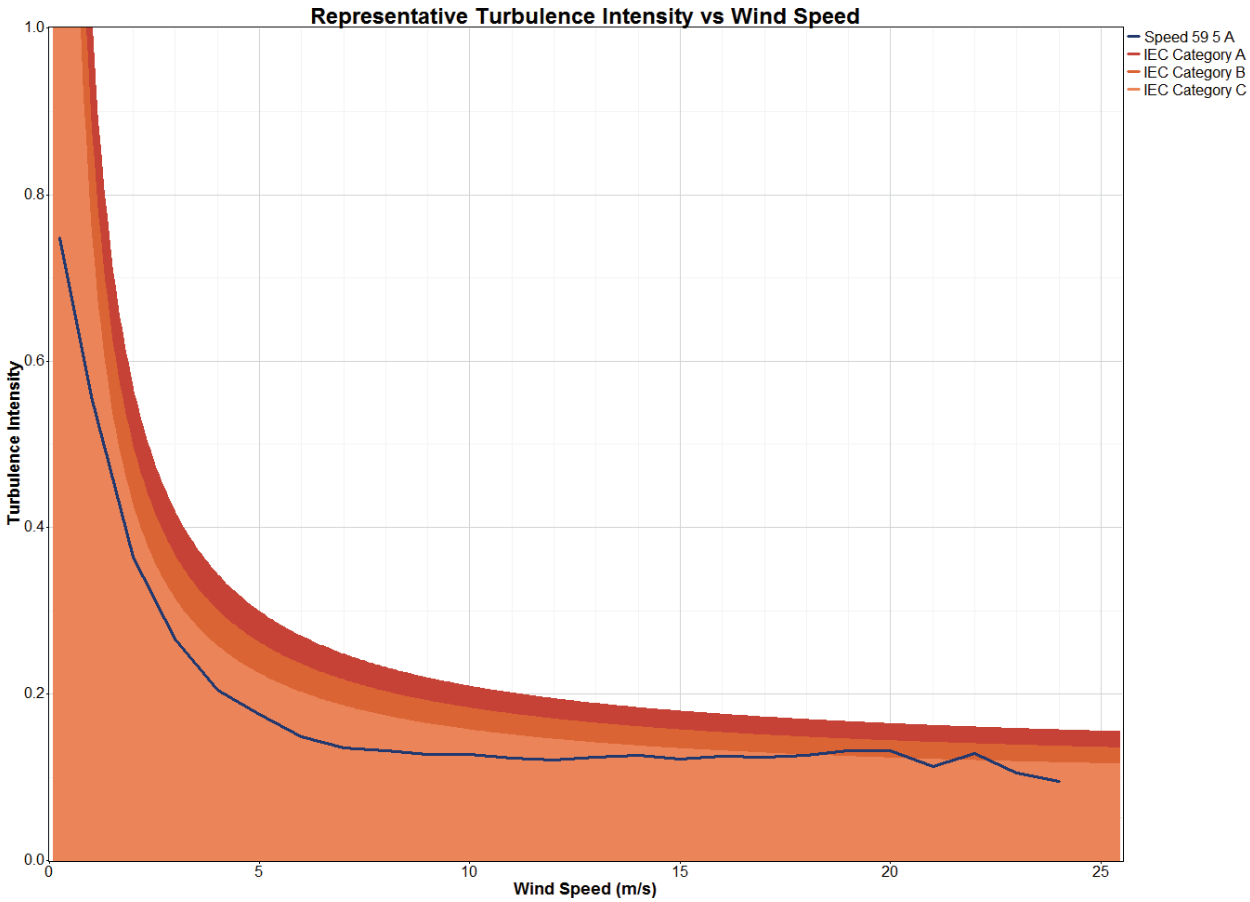

Figure 4. Turbulence Intensity (%) for a Range of Wind Speeds (m/s)

9.1.6 Extreme Wind Conditions

The extreme wind speeds for the Project were estimated by using the two years of measured wind data from the site meteorological tower and the SoDAR. The estimated 30-year maximum 10-minute average wind speed at the Project Area is 36.1 m/s (80.8 mph).

9.1.7 Wind Speed Frequency Distribution

Figure 5 provides the anticipated long-term annualized wind speed frequency distribution for the Project meteorological tower at 80 meters (262.5 feet).

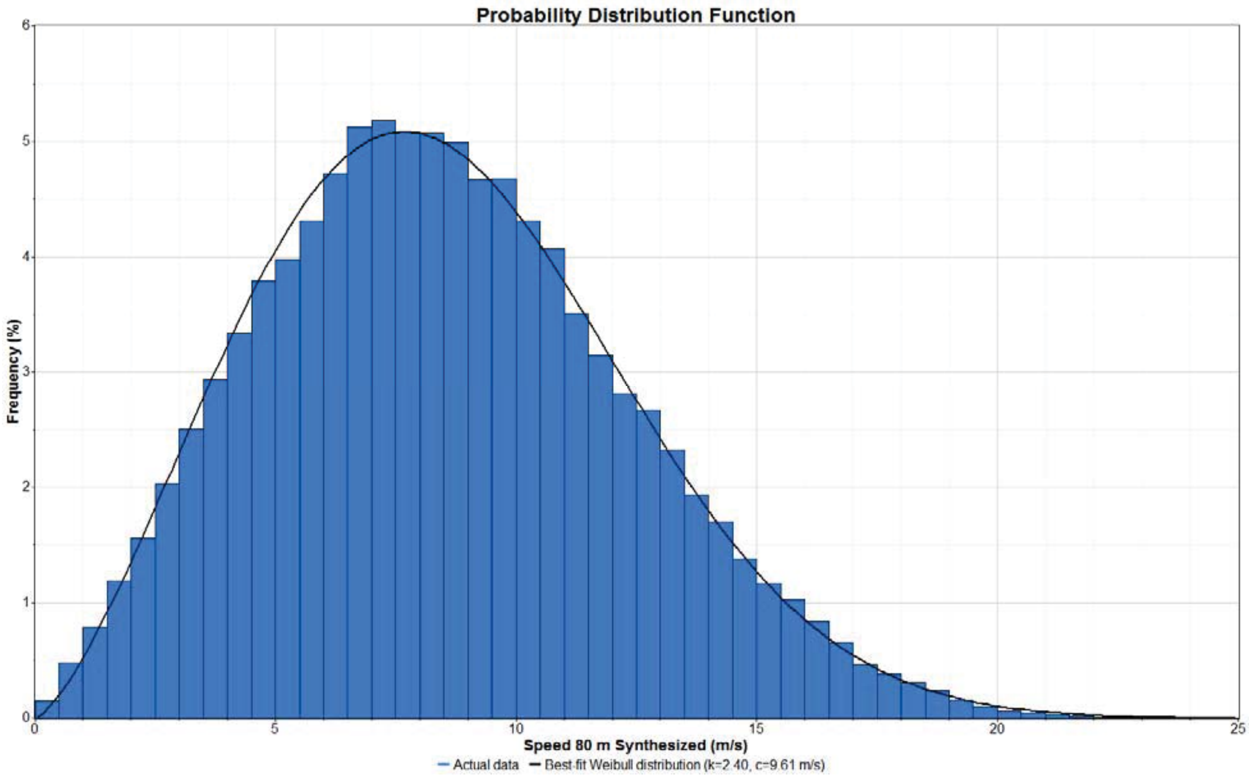

Figure 5. Annual Average Wind Speed Frequency Distribution at 80 meters.

9.1.8 Wind Variation with Height

Based upon data collected from the Project SoDAR from fall 2014 through spring 2016, the average wind shear ratio of 0.193 was derived from 40 m to 60 m above ground level ("AGL"). The estimated average wind speeds for MET 0734 at 80 meters AGL is 8.52 m/s during the 18-month data collection period. The wind turbine models being considered for use at the site are well suited for this level of wind shear and average wind speed. **Figure 6** shows a graph of the vertical wind shear profile.

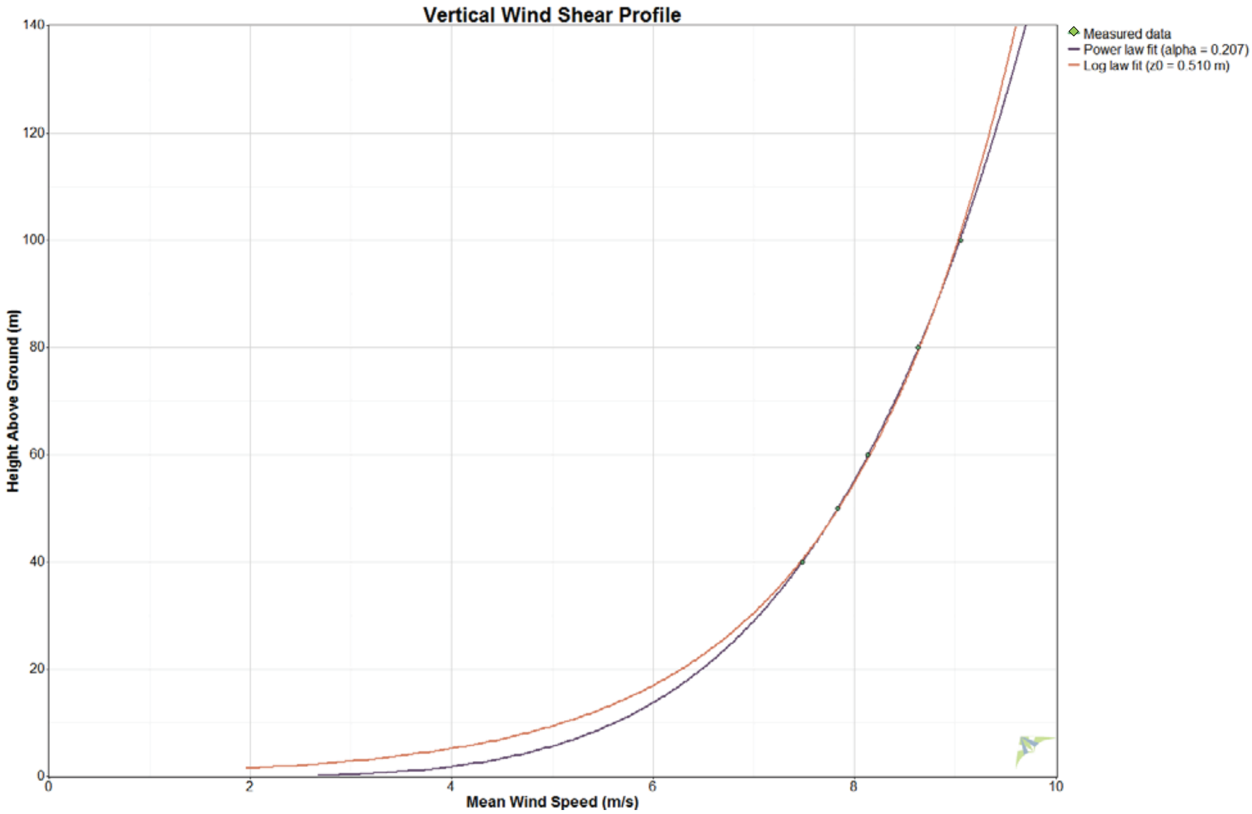

Figure 6. Vertical Wind Shear Profile.

9.1.9 Spatial Wind Variation

Due to the relatively uniform topography of the Project Area, significant variation in wind speed is not expected. The range of modeled wind speed is from 8.1 m/s (18.1 mph) to 8.9 m/s (19.9 mph). Land characteristics in the Project Area include farmland and narrow areas of increased vegetation along rivers and creeks. The area is generally void of significant mature tree growth. As a result, seasonal changes in deciduous vegetation have little impact on near-surface wind flow. This area does experience extensive periods of snow cover during the winter. A barren winter terrain has less impact on near-surface wind than the same terrain during the summer.

9.1.10 Wind Rose

A wind rose is a graphical representation that shows the various compass points and the frequency at which the wind has been measured in the Project Area with respect to direction. The measurements are collected from the Project meteorological towers and SoDAR. Winds at the Project site prevail from the northwest with occasional periods of south/southerly flow. Northwesterly flow dominates the winter months while southerly wind directions are common during the spring, summer, and fall months. **Figure 7a** shows the annual wind direction frequency (i.e. wind rose) for 2016 from three levels at site 0734 and is representative of the Project site. The wind rose shows that the prevailing winds blow from the south (summer months) and the northwest (winter).

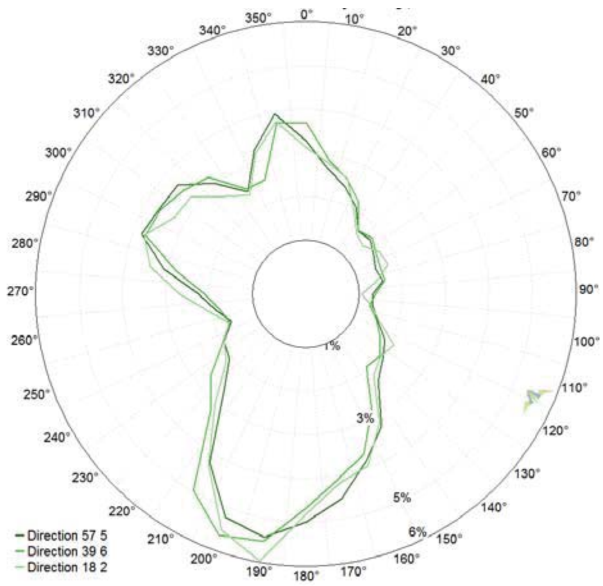

Figure 7a. Annual Long-Term Wind Speed and Direction Rose (58 m)

Figure 7b shows an annual wind energy rose for 2016 from the 58m level at site 0734 and shows the annual energy budget. About 30.4 percent of the annual energy budget comes from the south and south-southwest sectors. About 18 percent comes from the west-northwest and north-northwest sectors.

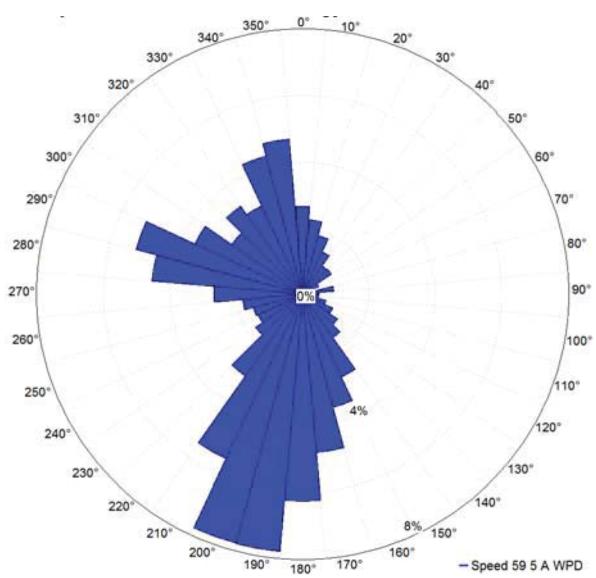

Figure 7b. Annual Long-Term Wind Energy Rose (58 m)

9.1.11 Other Meteorological Conditions

Minnesota has a continental-type climate characterized by frequent occurrences of continental polar air throughout the year, with occasional Arctic outbreaks during winter and occasional periods of prolonged heat during the summer, especially in southern Minnesota when warm air moves in from the Gulf of Mexico and southwestern United States. Pacific Ocean air masses moving across the western United States allow for mild and dry weather conditions during all seasons. While the climate within the Project Area is fairly uniform due to relatively little topographic relief and lack of large water bodies, extreme weather events, such as tornadoes, high thunderstorm winds, high winds and blizzard conditions, do occur and are discussed further in this section.

Specific, long-term climatological data does not exist for the Project Area. However, data from the HPRCC in Nobles County was used to represent average conditions at the site. On average, the warmest month of the year is July with an average maximum temperature of 82.8 °F, while the coldest month of the year is January with an average minimum temperature of 5.2 °F. The annual average precipitation at Worthington is 29.1 inches. Precipitation is highest during the summer months, with the wettest month being June with an average precipitation of 4.59 inches.

Extreme weather events in the Project Area have been recorded by the NCDC in the U.S. Storm Events Database for the period of time from January 1950 through July 2016. Extreme weather events during this period include tornadoes, hail, thunderstorm winds, high wind, winter storms, blizzards, extreme cold, heavy snow, excessive heat, dense fog, floods, and flash floods, among others. The NCDC recorded extreme weather events in Nobles County during this time period, including 35 tornadoes, 22 high wind events, 106 thunderstorm wind events, and 19 blizzards. Typically, such storms are local in extent, short in duration, and result in damage to relatively small geographic areas (NCDC).

9.2 Other Nearby Wind Turbines

The existing Nobles Wind Project (201 MW) is located less than one-mile south of the Project Area boundary, the existing Fenton Wind Project (205 MW) is located adjacent to the northwest Project Area boundary in Nobles County, and the existing Prairie Rose Wind Project (200 MW) in Rock County is located approximately 10 miles west of the Project Area.

10.0 PROJECT CONSTRUCTION

Nobles 2 will have overall project management responsibilities and will contract final balance of plant engineering, procurement and construction of the project though a qualified contractor. Nobles 2 expects to complete preliminary design to facilitate effective project permitting, cost estimating and contractor selection. Contracts are expected to be held for construction as well as third party testing and inspection services. The services of local contractors to assist in Project construction will be considered where possible. The construction contractor, or engineering procurement and construction (“EPC”) contractor, will control all construction related activities such as the installation of roads, concrete foundations, towers, turbines and blades, and electrical infrastructure, as well as the coordination of materials receiving, inventory, and distribution. A key role for the EPC contractor will be to assign an on-site construction manager. This construction manager will coordinate all aspects of the construction process as well as ongoing communication with local officials, citizens groups, landowners and the Nobles 2 Project Manager.

Several activities must be completed prior to the proposed commercial operation date. The majority of the activities relate to equipment ordering lead-time and design and construction of the facility. These activities will be undertaken by either the Nobles 2 project manager or the EPC contractor once hired. Below is a preliminary schedule of activities necessary for Project development by Nobles 2 and its EPC contractor.

Typical Nobles 2 Tasks:

- Order required equipment and materials including but not limited to: wind turbines, transformers, concrete, aggregate, rebar, and conductor;
- Conduct preliminary geotechnical soil borings;
- Complete facility acceptance testing; and
- Commence commercial production.

Typical EPC Contractor Tasks:

- Finalize turbine micro-siting;
- Complete land survey to finalize exact locations of roadways and structures;
- Document and improve (as necessary) existing road sections of public access routes to the Project Area and turbine locations;
- Complete final geotechnical soil borings, testing, and analysis for proper foundation design and materials;
- Clear land for access roads, laydown yards and O&M facilities;
- Obtain necessary over-weight and over-size permits issued by MnDOT for turbine delivery;
- Construct culverts and drainage features to maintain drainage patterns;
- Complete construction of access roads;
- Design and construct the metering station adjacent to the interconnection switchyard;
- Design and construct the Project substation;
- Install security measures;
- Install tower foundations;
- Install underground collection lines for connecting turbine strings for delivery to collection and metering locations;
- Erect wind turbines (place tower sections and set nacelles and blades);

The permanently impacted area is considered to be only the land that will be used by the exposed portions of the turbine foundations, permanent access roads, O&M Building and the substation footprint. Less than 120 acres (or less than 0.5 percent) of the total Project Area are anticipated to be permanently impacted utilizing the proposed Vestas V136-3.6 MW turbine layout. The collector system will be underground and is not considered in the permanent impact calculation. Crane paths will be temporary and are also not considered in the permanent impact calculation.

10.1 Roads and Infrastructure

Area roadways will be accessed by a variety of small to large construction vehicles during Project construction. Once the Project is constructed, only small-to-medium sized vehicles will access local roadways to perform routine maintenance on turbines and associated facilities. Heavy equipment will occasionally return to the site if large turbine components need to be repaired or exchanged. The Applicant estimates that the Project will create an additional 150 to 200 trips per day on local roadways during peak construction when turbine components are delivered and foundations are being poured. It is anticipated that total trips per day will decrease substantially following turbine installation.

Because of the size of the equipment to be installed, and the turning radii of the delivery trucks, some local roadways may require upgrades to improve drivability and access. This typically includes widening select intersections to allow for the long delivery trucks to turn and upgrading road surfaces by grading or the addition of gravel. The degree to which existing roadways will require upgrading for the Project remains under evaluation by Nobles 2. All proposed upgrades will be coordinated through agreements in advance with County and Township authorities.

10.2 Access Roads

As discussed in section 6.3.3, permanent service roads will be built adjacent to the towers, allowing access both during and after construction. The permanent roads will measure approximately 16 feet wide. Service roads will be designed and constructed to adequately support the size and weight of maintenance vehicles and to withstand inclement weather. The Applicant will site these roads in consultation with local landowners and in accordance with applicable state and local requirements. The roads will consist of graded dirt, overlaid with geotechnical fabric (if needed) and covered with class-five gravel. Culverts will be place where needed to facilitate existing drainage patterns, and farm equipment will continue to have maneuverability along and over all access roads.

To facilitate crane movement and equipment delivery, additional roadway will be temporarily installed on either side of the permanent access roadway. The temporary roads will be approximately 40 to 45 feet wide. Some crane paths will be independent of other infrastructure and be prepared through surface preparation and compaction only. A temporary gravel crane pad will also be graded near the turbine location to support the weight and stabilizing outriggers of the construction cranes. These temporary pads are generally 40 by 100 feet in size. A roughly 400 X 400-foot component lay down area will be graded near the base of the turbine for assembly of blade and nacelle components.

Following construction, isolated crane paths, temporary crane pads and lay down areas will be restored and access roads will be returned to their permanent width of approximately 16 feet.

All local or state requirements will be followed where access roads join state or local roadways, including permits to work within the right-of-way.

Specific turbine locations will determine the amount of roadway that will be required for the Project. To the extent possible, the Applicant will design and site roads to minimize the length of road required for the Project.

In general, a 35-foot diameter work area centered on the base of each turbine, plus an adjacent crane pad of approximately 40 x 80 feet, will be needed after construction at each turbine site. During construction, a slightly larger temporary pad is needed at each turbine site to support crane work for erection. Work areas will be located to facilitate both construction (cranes) and subsequent operation and maintenance. Siting roads in areas with unstable soil will be avoided wherever possible

Turbine and rotor assembly areas, gravel crane pads, and component lay down areas extending from the access road to the turbine foundation will be constructed to specified grades and slopes with erosion and sedimentation control measures.

Temporary construction areas adjacent to the turbine pads, access roads and collection lines will be restored after construction is completed. The site will be graded to natural contours, and soils will be loosened and seeded if needed. Permanent access roads will be re-graded, filled, and dressed as needed after construction is completed.

10.3 Associated Facilities

10.3.1 Operation and Maintenance Building

An O&M Building will be constructed on the site for access and storage for project maintenance and operations. An O&M Building is typically less than 5,000 square feet and will have an adjacent parking lot of approximately 3,000 square feet. Nobles 2 anticipates that a new well will provide water service for the O&M Building and that an on-site septic system will provide for sanitary needs.

10.3.2 Laydown and Staging Areas

A secure laydown yard and staging area will be prepared where wind turbine components are temporarily stored, assembled, or processed as part of the wind turbine assembly operation. The area will be approximately 10 acres in size and may also house temporary construction offices and facilities. The laydown yard and staging area will be relatively flat, near the site access point, and central to the proposed turbine locations. The area will be a gravel pad and will have geotextile fabric placed in between the gravel and the soil on the site to increase the ease of site restoration.

10.3.3 Meteorological Towers

Nobles 2 proposes to install up to six permanent meteorological towers to comply with the requirements of its PPA, maintain the performance of the wind project, conform to grid integration requirements and validate wind turbine power curves. The location of these towers will be determined based on final land owner negotiations and turbine manufacturer recommendations.

10.4 Turbine Site Selection

Turbines sites were selected based on a number of factors including wind resource, topography, access, location of residential homes, required setbacks, avoidance of wetlands and water features, subsurface geology, and other natural resource risk factors.

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

10.4.1 Foundation Design

Turbine foundations will be designed by a licensed foundation structural/geotechnical engineer in accordance with manufacturer's specifications and code requirements based upon site specific soil conditions and applicable load criteria (e.g. inertia, mass and aerodynamic forces). The freestanding tubular wind turbine towers will likely be erected on reinforced concrete spread footing foundations. The bearing surface of the foundation will likely be at a depth of up to 12 feet, while the octagonal footprint of each foundation will be approximately 3,200 square feet. The tubular steel tower will be connected to the concrete foundation through a base plate and high strength anchor bolts embedded in the concrete foundation. The concrete turbine foundations will require approximately 600 cubic yards of excavation depending on soil requirements and turbine size. The Project intends to balance the site, whereby any excavated material is fully utilized as fill within the Project Area. Geotechnical data, turbine loads, and costs considerations will dictate the final design of the foundation at each site.

10.4.2 Tower

The towers are conical tubular steel. Hub height for the V136-3.6 MW turbines will be 82 meters (269 feet), and hub height for the V110-2.0 MW turbines will be 80 meters (262.5 feet). The turbine towers, where the nacelle is mounted, consist of three sections manufactured from certified steel plates. Welds are made in automatically controlled power welding machines and are ultrasonically inspected during manufacturing per ANSI specifications. All surfaces are sandblasted and multi-layer coated for protection against corrosion. Access to the turbine is through a lockable steel door at the base of the tower. Access to the nacelle is provided by a ladder connecting four internal platforms and equipped with a fall arresting safety system.

10.5 Post-Construction Cleanup and Site Restoration

During construction, additional areas will be temporarily impacted. Activities causing temporary impacts are associated with the widening of access roads for equipment transport, installation of turbine foundations, installation of underground electrical collector and communication cables, and for staging and support purposes. At the completion of construction activities, temporary access roads, crane pads, laydown yard(s) and O&M areas will be graded back to natural contours with soil de-compacted, loosened and seeded as needed with native seed mixes. New gravel roads that are to be kept for ongoing operation and maintenance access will be corrected of any deterioration from the construction process. Erosion control practices will be kept in operating condition until seeded areas are stabilized.

As described further in Section 10.10, Nobles 2 has a contractual obligation with landowners for remediation of the properties back to a condition comparable to that of the property prior to project installation. Nobles 2 is committed to cleaning up construction debris and restoring temporarily impacted areas to the extent practicable, and to the satisfaction of landowners, following turbine installation.

10.6 Operation and Maintenance of Project

Nobles 2 will oversee all operations, maintenance, management and service activities of the turbines and supporting facilities, will monitor the transmission interconnection facilities, and will ensure the appropriate O&M response to turbine outages. Nobles 2 will pursue contractual agreements with pre-qualified service providers for turbine service and maintenance. Balance of plant operations and maintenance will be provided by an affiliate of Nobles 2 or a qualified third party managed by Nobles 2 and its affiliates. Through this structure, the Project will have a full-time staff of technician, supervision, and management personnel. The turbine service and maintenance staff will be required to complete scheduled maintenance, non-scheduled repairs, daily checks, and resets. When site staff is not present, on call technicians will be available to perform repairs in a timely manner.

On-site service and maintenance activities include routine inspections, regular preventive maintenance on all turbines and related facilities, unscheduled maintenance and repair, and routine minor maintenance on the wind turbines, electrical power systems, and communications systems. With oversight from the balance of plant (“BOP”) O&M provider, the turbine service and maintenance contractor will assess the condition of oil levels and filters, see to the tightening of bolts, repair minor electrical issues, upgrade computer software as needed, and periodically test the SCADA and other monitoring systems. The BOP O&M provider will perform or manage the performance of civil maintenance, including Project structures, as well as access roads, drainage systems, and other facilities.

Wind turbine and transmission facility maintenance schedules and required outage duration are based on the equipment manufacturer’s recommendations and Nobles 2’s experience operating this type of facility. Wind turbine scheduled maintenance includes a first service inspection, which is performed one to three months after the turbines have been engaged. Following the first service inspection, turbines will be serviced bi-annually. To the extent possible, turbine maintenance will be performed during periods of low wind so as to not sacrifice energy production. Scheduled maintenance will be phased to minimize the number of turbines offline at any time. During turbine commissioning and initial commercial operation, turbines will be inspected on-site daily to see that they are operating properly. Following the "break-in" period after the initial commercial operation date, the turbines will be remotely monitored on a continuing basis with planned service and maintenance at routine intervals as recommended by the turbine manufacturer.

The turbine service and maintenance contractor will address both scheduled and unscheduled major maintenance on the wind farm, including repairs, replacement of parts and removal of failed parts. Technicians will be equipped with the necessary tools and instruments for routine service, repairs, and Project/site operational control. Turbine maintenance will be performed as an ongoing function during the life of the Project. Transformer and other substation maintenance will be accomplished on an annual basis and will be scheduled and performed during low or no wind periods. Components of the interconnection owned by the transmission owner will be maintained by the transmission owner in accordance with the interconnection agreement.

Other O&M activities include cooperation with the local governmental agencies dealing with environmental concerns, including the management of lubricants, solvents, and other hazardous materials, and the implementation of appropriate security methods. Project access roads will also be maintained to facilitate site access, including snow removal and re-grading as necessary.

Site Control and Data Acquisition (SCADA) System

The Project will include a computer-controlled communications system that permits automatic, independent operation and remote supervision of each turbine and the facility collectively, thus allowing the simultaneous control of the wind turbines. Each wind turbine will be programmed to operate autonomously and will make its own control "decisions" under normal conditions. The turbines will continuously communicate with a SCADA system that monitors operation and energy production. The SCADA system monitors the wind farm status and alerts operations personnel to operational conditions that require attention. The SCADA system collects and archives data on wind turbine generation, availability, alarms and communication error information, and meteorological and communications data. Performance data and parameters for each machine can also be viewed in real time, and machine status can be changed. Error messages from the SCADA system are sent to the turbine manufacturer's Operations Control Center ("OCC"). OCC staff will then evaluate the nature of the error message and make a determination of the correct procedure. Site technicians will be alerted if necessary. Design of the SCADA system is not yet finalized. Nobles 2 anticipates entering into contractual agreements with a third party turbine service and maintenance providers to provide off-site monitoring/operation, and on-site service and maintenance for the Project.

10.7 Costs

The total Project installed capital cost is currently estimated to be between **[TRADE SECRET DATE EXCISED],** including wind turbines, associated electrical and communications systems, and site facilities. The final installed capital cost of the Project is dependent on site conditions, including ease of access, geologic and hydrologic conditions, and turbine layout. The bulk of Project costs are attributed to the wind turbine equipment. Annual ongoing operating and maintenance costs are expected to average **[TRADE SECRET DATA EXCISED]**.

10.8 Schedule

Nobles 2 has an offtake agreement in the form of a PPA with Minnesota Power. In May of 2016, the Internal Revenue Service released updated guidance on the PTC, extending the safe harbor period up to four years. The Project is currently considering a third quarter 2018 construction start. The requirements in the Minnesota Power PPA as well as the PTC safe harbor timing considerations will determine and influence when construction begins for the Project and the Project completion date. Commercial operation is anticipated for the third or fourth quarter of 2019.

To accomplish this, Nobles 2 has acquired wind rights and easement agreements from landowners. Nobles 2 will continue land acquisition to re-sign any expiring leases between now and the start of construction, if necessary, and to finalize any leases and easements that are in continuing negotiations with landowners. Nobles 2 expects the Site Permit to be issued within approximately twelve months of this Application's acceptance. Nobles 2 will be responsible for undertaking all required environmental review and will obtain all project specific permits and licenses that are required following issuance of the LWECS Site Permit.

Equipment deliveries and site mobilization will be initiated upon the issuance of the Site Permit and meeting the conditions stipulated therein. The construction of the roads, turbine foundations, and electrical collection system would take approximately five months to complete. The turbine erection schedule will overlap the civil and electrical installations and take approximately three months to complete. The entire construction and commissioning of the Project should take 8 to 9 months.

10.9 Energy Projections

Nobles 2 has prepared energy projections based on data gathered from met towers located on site as well as long term correlations to other available data. It is estimated that the Project will have an annual average production of between approximately 930,000 and 1,100,000 MWh (megawatt hours), depending on turbine model and type used. The estimate net capacity factor is between approximately 42.5% and 47%. Energy projections will be further analyzed after the final design and layout of the wind project has been completed.

10.10 Decommissioning and Restoration

10.10.1 Anticipated Life of the Project

Nobles 2 anticipates the life of the Project to be 30 years with the potential for repowering the facility in the future. The lease agreements provide for the option to lease the land for up to 60 years.

10.10.2 Estimated Decommissioning Costs in Current Dollars

The exact dollar amount necessary to cover decommissioning costs has not been determined at this stage in the Project, but it will be calculated when final equipment decisions have been made. In all respects, adequate financial assurances will be provided beginning on the 15th anniversary of the Project's commercial operation date and pursuant to a Commission approved decommissioning plan to ensure the costs of decommissioning, net of the Project's salvage value, are adequately secured. An independent administrator will oversee the financial assurances on behalf of Nobles 2.

10.10.3 Method for Ensuring that Funds are Available for Decommissioning and Restoration

The independent administrator will report annually to Nobles 2 on the status of the decommissioning funds. Nobles 2 will establish a recurring reporting interval to provide the independent administrator with an updated budget for the cost of decommissioning the Project's facilities in current-year and in decommissioning-year dollars. The salvage value of the turbines and other components should ensure that sufficient funds will be available to pay for decommissioning and restoration costs.

10.10.4 Method for Updating that Funds are Available and Updating Decommissioning Costs

Nobles 2 and its affiliates will administer this Project with governance and good practice as they do their other generating assets and facilities. Beginning on the 15th anniversary of the Project's commercial operation date, the Applicant will provide adequate financial assurances to cover decommissioning costs in excess of the Project's salvage value.

The independent administrator will report annually to the Project on the status of decommissioning financial assurances. The Project will report every eight years to the independent administrator with an updated budget for the cost of decommissioning the plant, net of salvage value, in current-year and decommissioning-year dollars.

10.10.5 Anticipated Methods of Site Decommissioning and Restoration

Following termination of the landowner agreements, Nobles 2 will remove all of the remaining improvements on the property and reasonably restore the property to its approximate original condition prior to the installation of the improvements, all at Nobles 2's sole cost and expense. Landowner agreements include a license to enter the property to perform such removal and restoration. There are provisions within the landowner agreements that enable the agreements to be transferred and reassigned and requirements which identify the obligations and assignment of assets in the event of bankruptcy or default.

Such removal and restoration obligations shall be completed within twelve (12) months and in general accordance with the requirements of Minnesota Rules 7854.0500, subp. 13. Decommissioning will involve removal of all above-ground wind facilities including wind turbine nacelles, blades, towers, foundations, collection lines, roads, and other ancillary facilities. Nobles 2 shall remove footings, foundations and other structures down to a level of forty-eight (48) inches below grade and return the grade to a condition reasonably comparable to conditions prior to Nobles 2's installation of improvements on the property. All access roads will be removed unless the affected landowner provides written notice that the road or portions of the road can remain. Additionally, disturbed surfaces shall be graded, reseeded, and restored to a condition reasonably similar to the original condition.

Nobles 2 requests the right to re-evaluate decommissioning alternatives at the end of the LWECS Site Permit term and to update decommissioning costs. Nobles 2 requests the right to re-apply for a LWECS Site Permit and continue operation of the Project upon expiration of the original LWECS Site Permit. Nobles 2 may also decide to retrofit, repower or replace the turbines and power system with upgrades based on new or available technology to continue to operate the Project.

11.0 IDENTIFICATION OF OTHER POTENTIAL PERMITS

The Federal, state and local permits or approvals that have been identified as potentially being required for the construction and operation of the Project are provided in **Table 11.0**. Permits dependent on the final site layout will be applied for after receiving PUC approval, but prior to initiating the construction activity that requires further authorization, unless the permit or filing requires construction activity prior to application.

Table 11.0: Potential Permits and Approvals Required for Construction and Operation of the Proposed Facility

Agency Name		Name and Type of Permit/Approval
Federal	Federal Aviation Administration	Form 7460-1 Notice of Proposed Construction or Alteration (Determination of No Hazard)

Table 11.0: Potential Permits and Approvals Required for Construction and Operation of the Proposed Facility

Agency Name		Name and Type of Permit/Approval
		Notice of Actual Construction or Alteration (Form 7460-2)
	U.S. Army Corps of Engineers	Federal Clean Water Act Section 404 and Section 10 Permits; Wetland Delineation Approvals; Jurisdictional Determination.
	U.S. Fish and Wildlife Service	Review for compliance with Federal Endangered Species Act; Bald and Golden Eagle Protection Act
	Environmental Protection Agency ("EPA")/("MPCA")	Spill Prevention Control and Countermeasure ("SPCC") Plan
	Lead Federal Agency	Federal Section 106 Review
	National Historic Preservation Act	Cultural Field Survey
	U.S. Department of Agriculture	Conservation / Grassland / Wetland Easement and Reserve Program releases and consents
		FSA Mortgage Subordination & Associated Environmental Review
	Federal Communications Commission	Federally Licensed Microwave Study
		NTIA Communication Study
State of Minnesota	Minnesota Public Utilities Commission	Large Wind Energy Conversion System (LWECS) Site Permit
		Certificate of Need for LWECS
	Minnesota State Historic Preservation Office	Cultural and Historical resources review; State and National Register of Historic Sites review
	Minnesota Department of Natural Resources	General Permit for Water Appropriations, dewatering
		Native Prairie Protection Plan Review
		Public Waters Work Permit
		License to Cross Public Lands and Waters
	Minnesota Pollution Control Agency	Aboveground Storage Tank ("AST") Notification Form
		NPDES Permit for Construction Activities and Storm Water Pollution Prevention Plan (SWPPP)
		License for Very Small-Quantity Generator of Hazardous Waste
		Section 401 Water Quality Certification
	Minnesota Department of Health	Environmental Bore Hole ("EBH")
		Plumbing Plan Review

Table 11.0: Potential Permits and Approvals Required for Construction and Operation of the Proposed Facility		
Agency Name		**Name and Type of Permit/Approval**
		Water Well Permit
	Minnesota Department of Labor and Industry	Request for Electrical Inspection
	Minnesota Department of Transportation	Utility Access Permit
		Highway Access Permit
		Aviation clearance from Office of Aeronautics
		Oversize and Overweight Permit
Local Governments	Nobles County	Roadway Access Permit
		Drainage Permit
		Subsurface Sewage Treatment System Permit
		Working in the Right-of Way Permit
		Overweight/Over-Dimension Permit
		Utility Permit
	Nobles County Soil and Water Conservation District	Wetland Conservation Act Approval
	Townships	Right-of-way permits, crossing permits, road access permits, and driveway permits for access roads and electrical collect system, as needed.
MISO		Generator Interconnection Agreement

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AFFIDAVIT OF SERVICE

In the Matter of the Application of Nobles 2 Power Partners, LLC for a Certificate of Need for the up to 260 MW Nobles 2 Wind Project and Associated Facilities in Nobles County, Minnesota

Docket No. IP-6964/CN-17-597

STATE OF MINNESOTA)
) SS.
COUNTY OF HENNEPIN)

Breann L. Jurek, of the City of Coon Rapids, the County of Anoka, State of Minnesota, being duly sworn on oath, deposes and states that on the 13th day of October, 2017, she e-filed with the Minnesota Public Utilities Commission the following:

1. Public and Nonpublic versions of the Site Permit Application;
2. Maps to the Application
3. Appendix A to the Application;
4. Appendix B to the Application;
5. Appendices C through G to the Application; and
6. Affidavit of Service.

A copy has also been served in accordance with the attached service list of record.

Breann L. Jurek

Subscribed and sworn to before me
this 13th day of October, 2017

Notary Public

DEBRA J. KLEIST
NOTARY PUBLIC - MINNESOTA
My Commission Expires
January 31, 2020

62112456.1

Docket No. IP 6961/CN-17-597
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