SITE PERMIT APPLICATION

Shell Rock Wind Farm

Freeborn County, Minnesota
March 15, 2011

Prepared For:

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200 South Sixth Street, Suite 300
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Application to the Minnesota Public Utilities Commission Site Permit for a Large Wind Energy Conversion System

Shell Rock Wind Farm

Freeborn County, Minnesota

MPUC Docket Number: IP6858/WS-11-195

Prepared for:

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200 South Sixth Street, Suite 300
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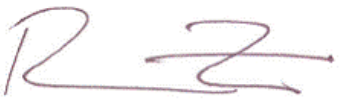
Project Number: 20101239

March 15, 2011

Project Name:	Shell Rock Wind Farm	
Project Location:	Freeborn County:	T102N, R22W, Sections 7-9, 16-21, 28-30 (Pickerel Lake Township)

Applicant: Shell Rock Wind Farm, LLC

Authorized Representative: Mr. Bruce Freeman, Senior Project Executive

Signature: 

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DEFINITIONS

AADT	Average Annual Daily Traffic
AEP	Annual Energy Production
Aggregate Surface	Road cover used for proposed access roads
ANSI	American National Standards Institute
APE	Area of Potential Effects
ASTM	American Society for Testing and Materials
BMPs	Best Management Practices; prevents soil erosion and sedimentation
BOP	Balance of Plant
BWSR	Board of Water and Soil Resources
Capacity	The capability of a system, circuit, or device for storing electronic charge
C-BED	Community-Based Energy Development
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.
COD	Commercial Operation Date
Commission or PUC	Minnesota Public Utilities Commission
CON	Certificate of Need
CRP	Conservation Reserve Program
dBA	A-weighted decibel
Distribution	Relatively low-voltage lines that deliver electricity to the retail customer's home or business
DOE	United States Department of Energy
EBH	Environmental Bore Hole
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	Electric and Magnetic Field
EPC	Engineering, procurement, and construction
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Environmental Site Assessment
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Maps
FPPA	Farmland Protection Policy Act
ft	foot/feet
GE	General Electric
Gearbox	An assembly of parts including the speed-changing gears and the propeller shaft by which the power is transmitted from an automobile engine to a live axle; the speed-changing gears in such an assembly

Generator	A machine by which mechanical energy is changed into electrical energy
GSU	Generator Step Up
Geotechnical	A science that deals with the application of geology to engineering
Hub	The central component of the wind turbine which connects the rotors to the generator.
Interconnection	Location of project connection to the power grid.
kV	kilovolt
kW	kilowatt
LGIA	Large Generator Interconnection Agreement
LGU	Local Government Unit
MAPP	Mid-Continent Area Power Pool
MCBS	Minnesota County Biological Survey
MW	megawatt
m	meter
m/s	meters-per-second
micrositing	The process in which the wind resources, potential environmentally sensitive areas, soil conditions, and other site factors, as identified by local, state and federal agencies, are evaluated to locate wind turbines and associated facilities.
MISO	Midwest Independent Transmission System Operator
mph	miles-per-hour
Nacelle	A streamlined enclosure (as for an engine), which houses the gearbox, generator, brake, cooling system and other electrical and mechanical systems
NESC	National Electric Safety Code
NHIS	Natural Heritage Inventory System
NLCD	National Land Cover Dataset
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O & M Facility	Operations and maintenance facility
PII	Potential Impact Index
Pitch	The action or a manner of pitching; especially an up-and-down movement
POI	Point of Interconnection
PPA	Power Purchase Agreement
Project, the	Shell Rock Wind Farm
PTC	Production Tax Credit
MCBS	Minnesota County Biological Survey
MPCU, PUC or Commission	Minnesota Public Utilities Commission
RECs	Recognized Environmental Conditions

Resistance	The opposition offered by a body or substance to the passage through it of a steady electric current
Rotor	The rotor consists of three blades mounted to a rotor hub
RD	Rotor Diameter: Diameter of the rotor from the tip of a single blade to the tip of the opposite blade
ROW	Right-of-Way
rpm	revolutions-per-minute
SCADA	Supervisory Control and Data Acquisitions (communications technology)
SHPO	Minnesota State Historic Preservation Office
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	An assembly of parts including the speed-changing gears and the propeller shaft by which the power is transmitted from an automobile engine to a live axle; the speed-changing gears in such an assembly
USACE	US Army Corps of Engineers
USFWS	US Fish and Wildlife Service
WCA	Wetland Conservation Act
WCFZ	Worst Case Fresnel Zone
WMD	Wetland Management District
WPA	Waterfowl Protection Area
WRRS	Wildlife Response Reporting System
Yaw	To deviate erratically from a course (as when struck by a heavy sea); especially to move from side to side: to turn by angular motion about the vertical axis

1.0 APPLICANT INFORMATION

Shell Rock Wind Farm, LLC (Applicant, or Shell Rock Wind), a wholly owned subsidiary of Minnesota Municipal Power Agency (MMPA), submits this Site Permit Application (Application) to the Minnesota Public Utilities Commission (MPUC) for a site permit to construct and operate the Project. The Project will be a 44 megawatt (MW) wind farm consisting of up to 29 wind turbine generators in the 1.5 to 1.8 megawatt range. Shell Rock Wind Farm will be located in Freeborn County in southeastern Minnesota, approximately 3.0 miles west of Albert Lea.

Consistent with the PUC objectives, Shell Rock Wind is committed to optimizing the wind resource for the Shell Rock Wind Farm. Decisions with respect to equipment selection, site layout, and spacing are designed to make the most efficient use of land and wind resources. Shell Rock Wind has evaluated the site to optimize wind resources, transmission interconnection opportunities and economic factors while avoiding and minimizing impacts to human and environmental resources. Impacts which are taken into consideration to ensure responsible siting of Shell Rock Wind Farm include avoiding proximity to aviation facilities, wildlife habitats, environmentally sensitive areas, sound and shadow propagation, community impact and minimizing disturbance to agricultural land.

Avant Energy, Inc., as the Agent for the MMPA, will oversee and administer all aspects of project execution including, but not limited to, design, solicitation and award of construction contracts, construction, construction monitoring and oversight, third party quality assurance, and final commissioning and acceptance. Major equipment procurement including Turbine Supply Agreements will be held directly by the MMPA. Agreements for design engineering, construction and other project service providers will be between MMPA and those respective parties. Avant Energy, Inc., as Agent for the MMPA, will manage those Agreements and all other aspects of the project. Contracts for design, construction, third party oversight and monitoring will be bid and awarded in phases to pre-qualified providers. The pre-qualification process is currently underway.

The project as currently planned will be operated by the MMPA with vendor contracts for equipment maintenance and service. Avant Energy, Inc. will serve as the Agent overseeing operation and maintenance of the facilities.

MMPA provides electricity to 11 Minnesota member communities. The Agency is owned by member cities, and is governed by a board of directors. The member cities include Anoka, Arlington, Brownton, Buffalo, Chaska, East Grand Forks, Le Sueur, North St. Paul, Olivia, Shakopee, and Winthrop. MMPA communities vary in size and location throughout the state of Minnesota. Each MMPA member is a municipality owned electric utility, and owns the electric distribution system. Together, the 11 members provide electricity to over 57,000 households and businesses. MMPA generates electricity from plants and also purchases electricity from other generators and from the Midwest Independent System Operator (MISO).

Through MMPA membership, each community has a voice in making important decisions affecting their community's energy future. Members benefit from MMPA's collective strength in producing, buying and selling electrical power. The MMPA supports its members in helping customers conserve energy and by working to control electricity prices. MMPA strives to provide reliable, affordable, and sustainable energy to its communities.

MMPA is committed to the development of sustainable energy projects and practices including efficient energy use and generation from sustainable resources to reduce customers' bills, improve the environment and help mitigate global warming. Nearly 11% of MMPA's current energy supply is from sustainable resources. With projects currently under development, MMPA expects to meet all the deadlines of the Minnesota renewable energy standard including 25% from renewables in 2025.

One of those sustainable projects is the Oak Glen Wind Farm. This 44 MW project, located in Steele County, recently received site permit approval from the Minnesota Public Utilities Commission. The Oak Glen Wind Farm is expected to be operational in 2011. In addition to the Oak Glen Wind Farm, MMPA developed the ambitious Hometown WindPower program. This project, completed in 2010, located turbines within each of the MMPA member communities and at MMPA's Faribault Energy Park. By locating power generation within the community where the electricity will be used, the economic and environmental benefits are kept local.

The MMPA has also created their own energy education program to encourage wind energy education in community schools and to encourage community involvement. The program is an extension of the MMPA's Hometown WindPower program (MMPA 2010; WPA 2010).

2.0 CERTIFICATE OF NEED

A Certificate of Need (CON) is not required for the Project because it is a 44 MW wind farm and not a "large energy facility", as defined by Minnesota Statute § 216B.2421, subd. 2(1)[1] and Minnesota Statute § 216B.243.

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.

[1] Under Minn. Stat. § 216B.2421, subd. 2(1), a "large energy facility" is defined as any electric power generating plant or combination of plants at a single site with a combined capacity of 50,000 kilowatts or more and transmission lines directly associated with the plant that are necessary to interconnect the plant to the transmission system.

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 information necessary to comply with these criteria and Minnesota Rules Chapter 7854.

The Wind Siting Rules (Minnesota Rules Chapter 7854) govern the content and treatment of 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.

4.0 PROJECT DESCRIPTION AND OVERVIEW

4.1 Project Location

The Project Area is located in Freeborn County in southeastern Minnesota, approximately 3.0 miles west of Albert Lea, Minnesota (**Maps 1a and 1b**), and immediately east of Conger. Table 1 below lists the Township, Range, and Sections in which the Project is located.

Table 1: Project Location

County	Township Name	Township	Range	Section
Freeborn	Pickerel Lake	102N	22W	7-9, 16-21, 28-30

Associated facilities will include wind turbines mounted on towers, underground and above ground electrical collection and communications lines which electrically connect the wind turbines to the Project Area substation, and access roads. The Project Area substation is where the electricity collected from the wind turbines interfaces with the utility transmission grid to become usable power for consumers and businesses. A permanent meteorological tower used to measure climatic data for predicting and optimizing the wind farms operation may also be included in the Project Area. Shell Rock Wind Farm is currently in the Definitive Planning Phase (DPP) of the MISO queue which is the process a generating facility undergoes to achieve an interconnection agreement with the transmission grid. The project intends to pursue an Interconnection Agreement with ITC Midwest, which is the transmission owner of the existing 69kV overhead transmission facilities that abut the planned location of the new project substation within the boundary of the overall Project Area. The physical Point of Interconnection is where the electricity generated by the wind farm enters the transmission grid and is further defined during the interconnection agreement process. That part of the project would be constructed and owned by the transmission owner and is expected to be in close proximity to the project substation (see Section 6.1). The project is planning to be in commercial operation by

December 31, 2012, and is expected to generate enough electricity to power 15,000 Minnesota homes per year.

4.2 Size of the Project Area in Acres

The Project is composed of approximately 7,433 acres (11.6 square miles) of mostly agricultural land. Shell Rock Wind Farm will site the equipment and facilities within the 7,433-acre Project Area as shown in **Map 2**. This will allow some siting flexibility in the event turbine locations currently identified prove to be unsuitable as project design evolves, and will provide sufficient room for buffers and setbacks required for avoidance of siting conflicts with infrastructure and natural resources.

4.3 Rated Capacity

The rated capacity of the Shell Rock Wind Farm is 44 megawatts (MW).

4.4 Number of Turbine Sites

The wind farm will consist of up to 29 wind turbine generators in the 1.5 to 1.8 megawatt range. While Shell Rock Wind Farm has not made a final selection of wind turbine generators for the project, this application evaluates the GE 1.5xle and the Vestas V90 1.8. No alternate turbines are currently proposed.

4.5 Meteorological Towers

Once the Project is constructed, the Applicant may install one permanent meteorological tower within the Project Area that will remain for the duration of the Project. The permanent meteorological tower will be free standing and made of galvanized steel, with medium dual-intensity day and night lights as required by the FAA. Additional details regard the permanent meteorological tower can be found in Section 6.3.2.

4.6 Percent of Wind Rights Secured

Shell Rock Wind Farm currently has agreements with landowners over approximately 6,593 acres of private land within the Project Area, or roughly 88%, which is sufficient to support this 44 MW Project (see Section 7 for more information on wind rights).

4.7 Ownership Statement

The MMPA currently has ownership over several other wind turbines and one LWECS currently under construction in Minnesota. The Hometown WindPower program, completed in 2010, located single turbines within each of their Minnesota member

communities and at MMPA's Faribault Energy Park. In addition, MMPA is currently in the process of constructing the Oak Glen Wind Farm. This 44 MW project, located in Steele County received site permit approval from the Minnesota Public Utilities Commission on August 2, 2010. The Oak Glen Wind Farm is expected it to be operational in 2011.

5.0 PROJECT DESIGN

5.1 Description of Project Layout

The project has been designed to site wind turbines and associated facilities on agricultural land (primarily row cropland). Approximately 92.5% of the Project Area is mapped as agricultural cropland. However, small 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 during the growing season. Estimated land cover impacts per type are provided in Section 8.18. Turbines 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. Preliminary site layouts are shown on **Maps 3a-1 and 3a-2** along with the preliminary project substation location and planned Point of Interconnection.

The Project has been designed to ensure consistency with setbacks and standards established by the Commission and previous PUC actions. This includes a wind access buffer of 5 RD in the prevailing wind direction and 3 RD in the non-prevailing wind direction; a noise setback meeting Minnesota Noise Standards, Minnesota Rules Chapter 7030; and a minimum 1,000-foot setback from homes. Project setbacks as they relate to the preliminary site layout for the two turbine models under consideration are provided on **Maps 3b-1 and 3b-2**, and are further discussed in Section 8.2.1.2.

Freeborn County maintains a wind energy conversion systems (WECS) ordinance that applies to all WECS with a combined nameplate capacity of up to 25 megawatts. Since the County has delegation authority, County ordinances which exceed MPUC requirements would apply to this project pending demonstration by the Project with good cause to the Commission that the more restrictive standards would prevent the project from being sited. Shell Rock Wind does not anticipate conflicts with the current county ordinance, and has designed the project to meet or exceed setbacks required by the MPUC and Freeborn County (to the degree they are intended for, and applicable to, projects over 25MW in size). Section 8.2.1.2, demonstrates how the setbacks established by Shell Rock Wind compare to those setbacks required by the MPUC and Freeborn County.

While turbine procurement efforts have not been finalized, the preliminary layout in **Map 3a-1** depicts 29 GE 1.5 MW turbines and the preliminary layout in **Map 3a-2** utilizes 24 Vestas V90 1.8 MW turbines. Turbine locations are subject to adjustment based upon final turbine model selection, findings of Project preconstruction geotechnical and environmental surveys, micrositing and field constructability reviews. The procurement

efforts for the specific turbine models proposed have potential to influence the final location and placement of the generators within the Project Area.

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

Shell Rock Wind is currently considering up to 29 wind turbine generators in the 1.5 to 1.8 megawatt range. The GE 1.5 MW xle and Vestas V90 1.8 MW wind turbines have been used for preliminary layout and performance modeling. As previously noted, turbine procurement efforts are still being finalized among various models and manufacturers. All 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 various site conditions and wind speeds.

Shell Rock Wind Farm, LLC is currently in the process of final selection for turbine manufacturer and model. The criteria used in turbine selection are: 1) Overall performance and reliability, 2) turbine suitability for the Project's wind data, and 3) availability and cost of turbines.

The GE 1.5 MW xle and Vestas V90 wind turbines are used as representative turbines within the 1.5 to 1.8 MW range. The turbines under consideration have the same hub heights and a slight difference in rotor diameters (RDs). Table 2 shows the characteristics for both turbines.

Table 2: Wind Turbine Characteristics

Design Features	GE 1.5 MW xle Wind Turbine	Vestas V90 1.8 MW Wind Turbine
Nameplate Capacity	44 MW (29 units X 1.5 MW = 43.5 MW)	44 MW (24 units X 1.815 MW = 43.5 MW)
Hub Height	262.5 ft (80 m)	262.5 ft (80 m)
Total Height	397 ft (121 m)	410.1 ft (125 m)
Rotor Diameter	271 ft (82.5 m)	295.3 ft (90 m)
Design Life	Minimum of 20 years	Minimum of 20 years
Cut in Wind Speed	7.8 mph (3.5 m/s)	7.8 mph (3.5 m/s)
IEC Wind Class	IIB	IIA
Cut out Wind Speed	55.9 mph (25 m/s)	55.9 mph (25 m/s)
Rotor Speed	9 to 18 rpm (variable)	9.3 to 16.6 rpm

Table 2: Wind Turbine Characteristics		
Design Features	**GE 1.5 MW xle Wind Turbine**	**Vestas V90 1.8 MW Wind Turbine**
Sound at Turbine	104 dB(A)	103.5 dB(A)
Power Regulation	Each turbine will be equipped with GE's patented WindVAR Control capability (active blade pitch control) and Low Voltage Ride-Thru technology (LVRT) for demanding reliability standards.	Use of microprocessor pitch control system, OptiTip and the Vestas Converter Unity System (VCUS) to operate rotor at variable speed (RPM). Unit is also equipped with low voltage ride thru technology for demanding reliability standards
Generation	690 V per turbine	690 V per turbine
Tower	Multi-coated, conical tubular steel with safety ladder to the nacelle (Rest Platforms for each 10 m of tower height)	Multi-coated, conical tubular steel with safety ladder to the nacelle (rest platforms every 9 m for height of tower)
Nacelle bedplate	Cast Iron	2 part - Cast iron front part; girder structure rear part
Main Bearings	Dual bearing main shaft to reduce axial and radial loads on the gearbox	Spherical roller bearings
Supervisory Control and Data Acquisition (SCADA)	Each turbine is equipped with SCADA controller hardware, software and database storage capability.	Each turbine is equipped with SCADA controller hardware, software and database storage capability
FAA Lighting	Standard FAA lighting	Standard FAA lighting
Foundation	Per manufacturer specifications, foundation structural engineer design, and site conditions	Per manufacturer specifications, foundation structural engineer design and site conditions

Source: Manufacturer-supplied turbine data

A control panel inside the base of each turbine tower houses communication and electronic circuitry. Each turbine is equipped with a wind speed and direction sensor that communicates to the turbine's control system to signal when sufficient winds are present for operation. The development site will also include an automated SCADA system located at the project substations which provides local and remote supervision and control of key aspects of the projects 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, typically consist of three to four manufactured steel sections Welds are typically factory fabricated in automatically controlled welding machines and ultrasonically inspected during manufacturing per American National Standards Institute (ANSI) specifications. Surfaces are typically sandblasted and multi-layer coated for protection against corrosion. Access to the turbine is typically through a lockable steel door at the base of the tower. Platforms inside the tower are accessed by a ladder or lift within the tower and include attachments for fall arresting safety system to facilitate access to the interior and exterior of the nacelle.

5.3 Description of Electrical System

Construction of the Shell Rock Wind Farm will add up to 29 wind turbines with generator step-up transformers which are located either within the nacelle or are pad-mounted outside at the base of unit, depending upon the turbine manufacturers design. Energy from the turbines will be routed through both underground and above-ground electrical collection systems that will deliver power to the project substation. This power will be converted within the project substation from the typical 34.5 69 kilovolts (kV) collector line voltage to the transmission voltage of 69 kV. See Section 6.1 and 6.2 for a more detailed description of the proposed electrical system. The preliminary electrical collection layout for both turbine models is shown on **Maps 3a-1 and 3a-2**.

Shell Rock Wind will contract to have the 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 American National Standard Institute (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

6.1 Transmission and Project Substations

Shell Rock Wind Farm is currently in the Definitive Planning Phase (DPP) of the MISO queue which is the final phase of the Midwest Independent System Operator (MISO) process before Generator Interconnection Agreement negotiations begin. The project intends to pursue an Interconnection Agreement with ITC Midwest, which has existing 69kV overhead transmission facilities that abut the planned location of the new project substation within the boundary of the overall Project Area. The Point of Interconnection as further defined during the interconnection agreement process, would be constructed and owned by the transmission owner and is anticipated to be in close proximity to the project substation, as shown on **Maps 3a-1 and 3a-2**. Because the planned project substation is directly adjacent to the expected Point of Interconnection, construction of additional transmission lines for the project is not planned. The project substation will be located in the northeastern portion of the Project Area, on the north side of 200th Street between 690th Avenue and 700th Avenue.

Shell Rock Wind Farm will not require a Power Purchase Agreement (PPA) with a utility, and financing for the project is not contingent upon a PPA. The power will be for the sole

use of residential and business customers within the 11 Minnesota member communities of the MMPA. Excess power may be sold back to MISO.

6.2 Collector Lines and Feeder Lines

Power from each turbine will be fed down the tower from the generator through the power conditioning equipment and 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 either within each turbine nacelle or on a grade mounted pad outside the base of each tower. The electricity from each turbine GSU is connected to the project collection substation through the underground collection lines, and then to the Point of Interconnection (POI) on the power grid after stepping up the project substation output to the 69kV transmission voltage.

The collector lines coming into the substation will combine the electrical output of the wind turbines into two 34.5kV circuits and stepped up to the 69kV transmission voltage within the project substation. The total length of collector lines for the preliminary GE 1.5xle layout is approximately 12.1 miles, and collector length for the Vestas V90 1.8 preliminary layout is also approximately 12.1 miles. New transmission interconnection facilities will be constructed, owned, operated and maintained by the transmission owner (ITC Midwest), which will be specifically defined and located during the interconnection agreement process. The new interconnection facilities at the point of interconnection are expected to be sited in close proximity to the project substation since the existing ITC transmission lines are adjacent to the parcel where construction of the project substation is planned.

The project substation will be located in the northeastern portion of the Project Area, on the north side of 200th Street between 690th Avenue and 700th Avenue. The project will interconnect with the existing ITC Midwest overhead 69kV transmission line running along 200th Street. The existing ITC transmission lines are adjacent to the project substation parcel (**Maps 3a-1 and 3a-2**).

6.3 Other Associated Facilities

6.3.1 O & M Facility

There are presently no plans to construct a dedicated O&M facility in the Project Area. The project as currently planned will be operated by the MMPA with vendor contracts for equipment maintenance and service. Avant Energy, Inc. will serve as the Agent overseeing operation and maintenance of the facilities. Maintenance and service agreements may be negotiated as part of the Turbine Supply Agreement with manufacturers at the time of award or to other pre-qualified service providers. MMPA has experience with similar vendor-based agreements currently in place for the Oak Glen Wind Farm. The Faribault Energy Park, which is an MMPA-owned 261 MW combined-

cycle generation facility in southern Minnesota, operates under similar vendor-based agreements.

6.3.2 Permanent Meteorological Tower

The Applicant may install one permanent meteorological tower within the Project Area that will remain operational for the duration of the Project. The permanent meteorological tower will be free standing and made of galvanized steel, with medium dual-intensity day and night lights as required by the FAA. The preliminary location of the permanent meteorological tower is shown on **Maps 3a-1 and 3a-2**.

Met tower site selection is based upon coordination with the final locations of the wind turbines and for proper operation of wind assessment equipment, but will be placed no closer than 250 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.

6.3.3 Turbines Access Roads

Each turbine will be accessible by a low profile gravel road extending from the turbine base to a public road. The roads will be all weather gravel construction and 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 roadway. The temporary roads will be approximately 40 to 45 feet wide. The total preliminary length of permanent access roads for the GE xle 1.5MW turbine is approximately 7.5 miles with approximately 0.1 miles of temporary roads to support construction of the permanent meteorological tower. The total preliminary length of permanent access roads for the Vestas V90 1.8MW turbine is approximately 7.2 miles with approximately 0.1 miles of temporary roads to support construction of the permanent meteorological tower.

6.4 Associated Facilities Permitting

The Applicant will be responsible for undertaking all required environmental review and will obtain all permits and licenses required following issuance of the LWECS Site Permit. Shell Rock Wind Farm will apply to Freeborn County for building permits, individual addresses for the towers, as well as a Conditional Use Permit for the project substation.

7.0 WIND RIGHTS

Shell Rock Wind Farm, LLC is substantially complete with securing landowner agreements for wind rights and property easements necessary to support the Project and control of the Project Area. The overall area within the project boundary consists of approximately 7,433 acres. Shell Rock Wind Farm, LLC has executed and recorded landowner agreements for approximately 6,593 acres of private land within the Project Area which is roughly 88% of the land within the overall project boundary. Of the 6,593 acres under agreement, 765 acres are agreements for wind rights only, and not for construction of wind turbine sites. 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 a small number of non-participating parcels within the Project Area. Current participating and non-participating parcels and landowners are shown on **Map 2**. The secured easement agreements will ensure access for construction and operation of the Project and identifies landowner and Shell Rock Wind Farm, LLC obligations and responsibilities during the implementation and operation of the wind farm.

Wind rights and land easements will encompass the proposed wind farm Project and all associated facilities, including but not limited to wind and buffer easements, wind turbines and access roads.

8.0 ENVIRONMENTAL ANALYSIS

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

Shell Rock Wind Farm, LLC sent letters to various regulatory and governmental authorities to request review of the Project Area for applicable comments and concerns. 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**.

The Project location is rural with an agricultural-based economy. Corn, soybeans, vegetables, forage-land (hay) and sweet corn are the predominant crops in Freeborn County. The County also produces livestock including: hogs and pigs, turkeys, cattle and calves, and sheep and lambs. The landscape in the Project Area is gently undulating, as is most of Freeborn County. Some areas are slightly hilly and are part of two morainic belts that cross the county from north to south (USDA 1980). Typical landscape photographs of the Project Area are provided on **Map 4**.

8.1 Demographics

The Project is located in southeastern Minnesota in a rural/agricultural region within Freeborn County. The 2000 census population for Freeborn County was 32,584, and the U.S. Census 2005-2009 American Community Survey (ACS) population estimate was 31,211, resulting in a decrease of 4.3%. The estimated household size for Freeborn County based on the ACS data was 2.3 people, with 14,172 housing units.

The Project is further located in a portion of Pickerel Lake Township. According to American Community Survey Data, there are an estimated 570 individuals and 229 housing units in the township. With a land area of 34.8 square miles, the population density is roughly 16.4 people per square mile. There are 224 occupied housing units at an average density of 6.4 units per square mile. Data collected between 2005 and 2009 by the U.S. Census to support the American Community Survey (ACS) indicates that the average household size for Pickerel Lake Township is 2.54 people for that period of time. There are approximately 52 housing units within the site boundary with 38 of those having signed agreements to participate in the project. Consequently, there are approximately 132 people within the Project Area, of which approximately 97 have agreed to participate in the project, or 73.5%. With a total Project Area of 11.6 square miles, the density of people per square mile is approximately 11.4.

There are three population centers near the Project Area. The City of Alden is located approximately 2 miles northwest of the Project Area and has a population of approximately 614. The City of Conger, with a population of approximately 127, is located on the southwestern border of the Project Area. The largest population center is the City of Albert Lea with a population of approximately 17,402. The western extent of Albert Lea is situated approximately 3 miles east of the Project Area.

According to the 2002 U.S. Economic Census, the largest industries employing residents in Freeborn County are manufacturing, retail, and health care and social assistance, which make up nearly 60% of the workforce. Businesses nearest the Project Area in Conger are relatively few and include: metal fabrication equipment manufacturing, meat marketing, liquor sales, hardware & plumbing, banking, oil distributing, and inn keeping.

The estimated median household income for the period between 2005 and 2009 was $44,018. The per capita income for the Project Area township is higher than the overall county per capita income. In addition, the poverty level within the Project Area township is below that of the overall county. Table 3 summarizes some of the population and economic characteristics of the county and township in which the project is located. No impact to local demographics is expected.

Table 3: Population and Economic Characteristics			
Location	**Population**	**Per Capita Income**	**Families Below Poverty Line (%)**
Freeborn County	**31,211**	**$23,400**	**4.7%**
Pickerel Lake Township	570	$41,048	2.1%

Source: U.S. Census Bureau, 2005-2009 American Community Survey

8.2 Land Use

8.2.1 Local Zoning and Comprehensive Plans

Freeborn County has its own zoning and land development ordinances, including a WECS Ordinance for wind projects less than 25MW in total nameplate capacity. The county has assumed responsibility for permitting projects less than 25MW as described in Minnesota Rules Chapter 216F.08 and 216F.081. The County Zoning Ordinance Article 14 Wind Energy Conversion Systems is discussed further in Section 8.2.1.2.

According to Freeborn County Planning and Zoning, the Shell Rock Wind project is situated entirely within the Agricultural Zoning District (A) of Pickerel Lake Township as defined by the Freeborn County Zoning Ordinance. A copy of the Freeborn County Land Use Map is provided in **Appendix C**. The project will be designed to meet or exceed the minimum setback requirements identified by the local ordinance. Specific Freeborn County setback requirements are outlined in Section 8.2.1.2. The County will require a building permit and individual addresses for the towers, as well as Conditional Use Permit for the project substation. The County recently prepared a draft Development Agreement for wind energy facilities, which addresses issues including, but not limited to, road use and repair, public drainage system protection, concrete batch plants, gravel quarries, construction practices, work within right-of-ways, soil erosion prevention, and construction debris management. A development agreement will likely be required by the county prior to the start of construction.

8.2.1.1 Adopted Comprehensive Plans

Freeborn County has a Land Use Policy Plan that was adopted in April 1982, and a Comprehensive Water Plan approved in 2006. Table 4 provides an inventory of Land Use Plans for Local Governments within and adjacent to the Project Area. According to the Chair of Pickerel Lake Township, the township has no specific zoning requirements, but would require permits for work within township road rights-of-way for utility installation and site access.

Table 4: Comprehensive Plan Inventory for Local Government Units			
Local Government	**Plan Name**	**Year Adopted/Updated**	**Associated Development Plan(s)**
Freeborn County	Land Use Policy Plan	1982	Comprehensive Water Plan Zoning Ordinance
Pickerel Lake Township	NA	NA	NA
City of Albert Lea	Comprehensive Plan	2010	Stormwater Pollution Prevention Plan Zoning and Land Use Ordinance

8.2.1.2 County or Local Ordinances

The Freeborn County Zoning Ordinance, Article 14 Wind Energy Conversion Systems, addresses setback requirements for proposed wind farms. While many of the setback requirements are similar to those typically required by the MPUC, there are some that are more restrictive. The more restrictive components include: required setbacks to buried public drain tile and open public ditches, a 1.1 times WECS tower height setback to public roads, transmission lines and communication towers, a 1.0 times tower height setback to adjacent property lines (unless waived by the affected adjacent property owner), a 1,000-foot setback from the nearest residence, and ½-mile from municipalities (excluding Albert Lea). Applicants can apply for a waiver to allow towers to be as close as 1.1 times the tower height from municipalities.

The project will be designed to meet or exceed the minimum setback requirements identified by the local ordinance, to the degree they are intended for, and applicable to, commercial scale wind projects over 25MW in size. Table 5 compares the Shell Rock Wind Farm project design and setbacks with those required by the Freeborn County ordinance, and those subject to MPUC requirements.

Table 5: Shell Rock Wind Project Setback Comparison			
Resource	**MPUC**	**Freeborn County**	**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]	1.0 times the WECS tower height from property lines[2]	3 RD on east-west axis and 5 RD on north-south axis from non-participating property lines[1]; waivers for the 1.0 times the tower height from property lines are incorporated in the landowner easement agreements.
Residential	500 feet (152 meters)	1,000 feet (305	1,000 feet (305 meters) [3] and

Table 5: Shell Rock Wind Project Setback Comparison			
Resource	**MPUC**	**Freeborn County**	**Project Design**
Dwellings	and sufficient distance to meet state noise standard.	meters) or within ½ mile of any municipality excluding Albert Lea.	at least ½-mile from any municipality.
Public Rights-of-way	250 feet (76 meters)	1.1 times the WECS tower height from public roads, transmission lines, and communication towers[4]	1.1 times the WECS tower height from public roads, transmission lines, and communication towers[4]
Public Lands	3 RD east-west axis and 5 RD on northsouth[1]	None specified.	3 RD on east-west axis, and 5 RD on north-south axis[1]
Buried Public Drain Tile	None specified.	30 feet from the centerline of buried public drain tile.	30 feet from the centerline of buried public drain tile. Project is avoiding public drain tile within public right-of-way.
Wetlands, Streams and Ditches	Avoid public waters wetlands; no setback required.	50 feet from the top edge of an open public ditch.	Avoids public waters wetlands and provides at least 50 feet from the top edge of open public ditches.
Internal Turbine Spacing	3 RD on east-west axis and 5 RD on north south axis[1]	None specified.	3 RD on east-west axis and 5 RD on north-south axis[1]
Parks	Case by case basis	None specified.	No parks in or near Project Area.
State or Recreational Trails	Case by case basis	No setback required	At least 250 feet (76 meters) [5]
Native Prairies	Turbines and associated facilities shall not be placed in native prairies, unless approved in the native prairie protection plan	None specified.	No native prairie is known to exist in the Project Area. If identified, native prairie will be avoided.
Sand & Gravel Operations	Turbines and associated facilities shall not be placed in active sand and gravel	None specified.	Active sand and gravel operations have been avoided.

Table 5: Shell Rock Wind Project Setback Comparison			
Resource	**MPUC**	**Freeborn County**	**Project Design**
	operations, unless negotiated with landowner.		
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.	Project was moved further west to provide additional buffer from Albert Lea Municipal Airport and the Albert Lea Medical Center Heliport. The nearest airport is approximately 5.75 miles ENE.

[1]3 RD for GE 1.5xle turbine is 247.5 meters (812 feet); 5RD for GE 1.5xle turbine is 412.5 meters (1,353 feet); 3 RD for Vestas V90 turbine is 270 meters (886 feet); 5RD for GE 1.5xle turbine is 450 meters (1,476 feet);
[2] 1 times the total height = 397 feet for GE 1.5xle and 410.1 feet for the Vestas V90 1.8.
[3] Distance from occupied dwellings
[4] 1.1 times height = GE 1.5xle – 437 feet; Vestas V0 1.8 – 451 feet; from edge of public right-of-way
[5] 250 feet from edge of trail right-of-way

The USFWS typically recommends a minimum turbine setback distance of ½-mile to federally-owned Waterfowl Production Areas (WPAs). The nearest Shell Rock Wind turbine is located at least ½-mile south of the nearest WPA, which is the Iowa, Chicago, and Eastern WPA. The nearest state-owned Wetland Management Area is located at least one mile northwest of the project boundary (Bryson WMA).

8.2.1.3 Current and Future Zoning

The City of Albert Lea recently completed an update to its Comprehensive Plan in April 2010. The plan mentions the City's desire to "capitalize on the push for alternative energy sources such as wind energy" (City of Albert Lea Comprehensive Plan, Chapter 1, Page 7). The city has an Urban/Rural Expansion District that is defined in the Freeborn County Land Use Policy Plan and in past comprehensive plans for the City of Albert Lea. The purpose of this district is to define a separation between urban and rural land uses. The Growth Boundary (2008) provides direction for the extension of future urban services. A map from the city's comprehensive plan depicting the identified growth boundary is provided in **Appendix D**. Any growth outside of this boundary would require a comprehensive plan amendment. Part of the growth management strategy of the City is to "promote compact development that makes for more efficient delivery of infrastructure systems, uses less land resources, preserves farmland and helps keep edges close." (City of Albert Lea Comprehensive Plan 2010). The edge of the Albert Lea Growth Boundary is located approximately two miles east of the Shell Rock Wind Farm boundary along the western edge of Pickerel Lake.

According to the Land Use Plan, and county planning staff, the City of Conger does not have a designated expansion district. Urban fringe areas and districts only apply to the City of Albert Lea.

8.2.2 Conservation Easements

The USFWS, Freeborn County Soil and Water Conservation District (SWCD) and the Natural Resource Conservation Service (NRCS) offer conservation programs that encourage setting aside wetlands and grasslands for conservation purposes, or 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), Reinvest in Minnesota (RIM), Wetland Reserve Program (WRP), and the Environmental Quality Incentive Program (EQIP). 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. As shown on **Map 5**, there are approximately 9 separate areas within the project boundary that have been set aside under the Conservation Reserve Program.

As shown on **Maps 3b-1 and 3b-2**, the preliminary layouts avoid impacts to the 28.3 acres of Conservation Reserve Program land within the Project Area. CRP areas will be verified by evaluating current land lease agreements for participating landowners prior to construction. Shell Rock Wind plans to avoid CRP land as it continues to develop the project. However, if CRP lands are unavoidable, Shell Rock Wind will work collaboratively with the USDA NRCS, as well as the landowner, to remove the impacted portion of the parcel from the CRP program. No RIM easements exist within the Project Area, and the NRCS recently confirmed that there are currently no recorded Wetland Reserve Program (WRP) easements, or pending easements, in the Project Area. Additionally, there are no Native Prairie Bank easements in the Project Area or Freeborn County.

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 6 shows sound levels associated with some common sources and/or locations:

Table 6: Common Sound 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 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% of the time within an hour, called the $L_{50,}$ and below 55 dB(A) 90% of the time within an hour, called the L_{90}.

8.3.2 Impacts

Operation of wind turbines will contribute to sound levels in the area. The sound associated with the wind farm 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. Therefore, perceived increases in sound levels within the Project Area as modeled for this project are expected to be minimal.

Shell Rock Wind performed sound impact analysis for both of the preliminary turbine layouts using sound data supplied by the turbine manufacturers, collected wind data, and site topography. Local obstacles such as trees and buildings may further attenuate sound

and lessen project impact, but were not included in the model. Sound modeling was done in WindPRO version 2.7 using ISO-9613-2 general method for calculating the attenuation of sound outdoors. The model used wind speeds from 3 to 15 m/s. Based on the Ontario Ministry of the Environment's "Noise Guidelines for Wind Farms," dated October 2008, a ground absorption factor of 0.7 was used. The ground absorption factor denotes the ratio of porous or acoustically absorptive surface such as farm land to hard or acoustically reflective surface such as roads.

The modeled maximum L_{50} sound level at 1,000 feet for a single turbine using the above assumptions is shown in Table 7:

Table 7: Modeled Maximum L50 Sound Levels	
Turbine	**Sound [dB(A)]**
GE 1.5xle	42.6
Vestas V90 – 1.8MW	42.1

Cumulative sound impact analysis results showing the highest modeled L_{50} sound power level at any home in the Project Area for each of the preliminary layouts are in Table 8:

Table 8: Cumulative Modeled Maximum L_{50} Sound Levels	
Turbine	**Sound [dB(A)]**
GE 1.5xle	44.6
Vestas V90 – 1.8MW	43.8

The results of the cumulative sound impact analysis indicate the sound impact for both preliminary turbine layouts is lower than the Minnesota State Noise Standards of 50 dB(A) by more than 5 dB(A).

Maps 6a and 6b show 40, 45, and 50 dB(A) cumulative sound lines for the preliminary layouts. 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.

During operation of the project, the primary source for sound from the project substation will be the transformer, which can emit a low frequency humming sound. An Option Agreement for purchase of up to 5 acres for the project substation has been executed between Shell Rock Wind Farm, LLC and the parcel landowner. The final location of the project substation within that 5 acre parcel 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 within the 5-acre parcel is located at

least 500 feet away and sound associated with normal operation of the substation is not expected to be audible at this farmstead/home. According to Mr. Sorenson, Freeborn County Planning and Zoning, aside from being at least 40 feet from the right-of-way of a County Road, the county has no setback requirements for Major Essential Services such as a substation.

8.3.3 Mitigation

Shell Rock Wind Farm has taken considerable effort to site turbines carefully and responsibly to exceed the MPCA noise standards. Shell Rock Wind Farm is maintaining a minimum setback distance of 1,000 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. As mentioned above, a 5 dB(A) clearance exists to further support the design criteria and allows additional attenuation of low frequency sound, which travels further than high frequency sound. Shell Rock Wind Farm will continue to take possible sound impacts to nearby rural residences, farmsteads, and other potentially affected parties into account during development, construction, and operation of the proposed project.

8.4 Visual Impacts

The topography of the Project Area is gently undulating and is interrupted only by a small number of public drainage ditches (**Map 3a-1**). Elevations range from 1,263 feet to 1,365 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 may be classified as agricultural and rural open space. Within the Project Area, local vegetation is predominantly 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, which break up the agricultural landscape at a rate of approximately 7.6 units per square mile. Pickerel Lake Church is located within Section 21 along County Road 89, and Heideman School is located in the northeast corner of Section 18. 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 is one gravel pit located within the Project Area, and one located just outside of the project boundary.

The Federal Communications Commission (FCC) database shows no microwave communication towers or AM/FM radio towers located within the Project boundary. There is one microwave communication tower located approximately one mile west of the

Project's northwestern boundary. Within 10 miles of the Project Area, 18 towers (as of March 2010), 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, southeastern Minnesota has not seen as many wind farms as other parts of the state. A substantial number of wind farms have been built in other areas, while others are in various phases of approval. Of the adjacent counties, Mower County has seen the most wind development (see Table 9 and **Map 7**). As of this year, and with the recent completion of the first phase of the Bent Tree Wind Farm project in Hartland, Manchester, Bath, and Bancroft townships, Freeborn County has approximately 122 installed turbines.

Table 9: Wind Turbines in Surrounding Counties (FAA/AWEA)

Counties	January 2009
Rice	2
Dodge	46
Mower	238
Freeborn	122
Waseca	0

Source: FAA, January 2011.

According to the American Wind Energy Association (AWEA), as of September 2010, there was 1,817.9 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.

In January 2009, the Minnesota Department of Commerce Energy Facility Permitting/Department of Administration's Land Management Information Center prepared a map of Minnesota indicating the locations and numbers of wind turbines in the state. As of this date, a total of 1,331 wind turbines had been installed in Minnesota (1,040 wind turbines permitted by the MPUC and 291 wind turbines permitted by local jurisdictions).

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 boundary. 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 wind farm 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.

While existing wind farms are located in adjacent counties, most of them are not located in the immediate vicinity of the Project and is not expected to cumulatively contribute to the visual effect. The newly constructed Bent Tree Wind Farm, with 122 installed turbines, is located approximately 5 miles north of the proposed Shell Rock Wind Farm 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 believed to be consistent with existing use in the area for wind energy production.

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, MMPA will use FAA guidance and standards when applying to the FAA for approval of a lighting plan that will light the project, and will follow the approved plan to meet the minimum requirements of FAA regulations for obstruction lighting. It is MMPA's intent to include details of its lighting plan prior to construction, and at the time Form 7460-1 is submitted to the FAA for final approval.

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), Wildlife Management Areas (WMAs), and state trails located near the Project Area, and although these areas will be avoided, it is possible that the proposed turbines could be visible from these locations. Myre-Big Island State Park is located nearly 7.5 miles east of the Project Area and is not expected to be affected visually.

Visual impacts will be noticeable for users of a state-funded snowmobile trail. Trail 133 runs east-west immediately north of the Conger municipality boundary, approximately ¼-mile north of and paralleling 180th Street. Another section of the snowmobile trail meets this trail along 680th Avenue and runs south mostly along 680th Avenue and exits the Project area along the southern project boundary. No winter use information was available from the DNR or the county on 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.

Shell Rock Wind will work to avoid or minimize visual impacts into 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. Shell Rock Wind proposes the following mitigative measures:

- Turbines will be uniform in color;
- Turbines will not be located in biologically sensitive areas such as public parks, WMAs, SNAs, WPAs, or wetlands;
- Turbines will be illuminated to 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);
- Collector lines will be buried to minimize aboveground structures within the turbine array;
- Existing roads will be used for construction and maintenance where possible to minimize the amount of new roads constructed;
- Access roads created for the wind farm facility will be located on gentle grades to minimize erosion, visible cuts and fills; and
- Temporarily disturbed areas will be converted back to cropland or otherwise reseeded with native seed mixes appropriate for the region.

8.4.3 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. Multiple independent conditions must be met in order for shadow flicker to potentially occur. Based on the preliminary Shell Rock Wind Farm turbine layouts, the most shadow flicker expected on any one home is 25 hours in a year, or less than 1% of all day time hours.

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 can not 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.

Impacts

WindPRO software version 2.7 was used to model the preliminary project layout for potential shadow flicker at homes in and around the Project Area. Turbine operation assumptions are based on measured wind data from the project site, and are shown in Table 10 below:

Table 10: Modeled Annual Operating Hours by Direction

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW
737	411	398	597	785	1,020	985	471	337	462	973	1,102

Table 10 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 1,020 hours in a typical year. The total modeled annual operating hours are 8,278 out of 8,760 hours in a year which is approximately 95% of the time. Based on measured data, the wind may be too slow or too fast for a turbine to operate 5% of the time.

Sunshine probability assumptions are based on 30 years of data for the Minneapolis/St. Paul Airport, and are shown in Table 11 below:

Table 11: Expected Percent Sunshine by Month

Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
53%	59%	57%	58%	61%	66%	72%	69%	62%	55%	39%	42%

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. Table 12 shows the average expected hours of shadow flicker in a typical year for the home receiving the most shadow flicker in a year:

Table 12: Shadow Flicker at Highest Receptor

Turbine	Shadow [hours / year]
GE 1.5xle	25
Vestas V90 – 1.8	22

The potential for shadow flicker varies with time of year and time of day. Based on the 1,000-foot setback from homes, the potential shadow flicker will occur within 2 hours of sunrise and sunset.

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. **Maps 8a and 8b** show 25, 50, and 100 hour/year shadow flicker lines for the preliminary layouts.

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[2].

Mitigation

Shell Rock Wind Farm has taken considerable effort to site turbines carefully and responsibly to minimize the impact of shadow flicker to the area. The potential for shadow flicker will continue to be considered during development, construction, and operation of the project. A 1,000-foot minimum setback from residences will be used. 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. Some wind turbine manufacturers being considered for this project also offer a shadow control option which monitors and mitigates this unlikely condition if controlled curtailment becomes necessary.

8.5 Public Services and Infrastructure

The Project is located in a lightly populated, rural/farming area in southeast Minnesota. Public services to farmsteads and rural residences within the Project Area include transportation/roadways, electric and telephone. The nearest city to the Project Area is the City of Conger located immediately adjacent to the southwestern project boundary of the Project Area (**Map 9**). The City provides sanitary sewer, water, electric, natural gas, and phone services to its residents. Additionally, the City has its own fire department, and is routinely patrolled by the Freeborn County Sheriff's Office. Emergency response is provided by the County's Road Patrolmen, the Conger Fire Department, and the Albert Lea Medical Center. Other communities with similar services within 5 miles of the Project Area include Albert Lea, Alden, Manchester and Twin Lakes. While there are no railroad lines in the Project Area, the Iowa, Chicago & Eastern Railroad generally runs east-west approximately 0.6 miles north of the Project area at its nearest location.

The Project is expected to have minimal effect on existing 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.

[2] http://www.epilepsyfoundation.org/about/photosensitivity/gerba.cfm

8.5.1 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 (CSAHs), County Roads (CR), and an Interstate Trunk Highway (ISTH) provide access to the Project Area. The CSAHs and 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 0.5 miles north of the Project Area, and there are a number of county roads located within the site boundary. CSAH 46 parallels the northern project boundary, CSAH 17 runs east/west through the City of Conger and across the southern half of the Project Area, CSAH 12 parallels the western project boundary and runs through Conger, and CSAH 14 parallels the eastern project boundary.

Existing traffic volumes on the area's federal, state, and county roads and highways are documented in Table 13 and on **Map 10**. Of the roads within or adjacent to the Project Area, CSAH 46 has the highest Annual Average Daily Traffic (AADT) count at 1,750 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 770 to as few as 45 cars per day in the center of the Project Area.

Table 13: Existing Daily Traffic Levels

Roadway Segment Description		Existing Annual Average Daily Traffic (AADT)	Miles within Project Boundary
Freeborn County	CSAH 46	1,750	3 Miles, Northern project boundary
	CSAH 17	770	3 Miles
	CSAH 14	135	4 Miles, Eastern project boundary
	CSAH 12	165	4 Miles, Western project boundary
	CR 69	105	4 Miles
	CR 89	45	3 Miles
	200th	NA	2.5 Miles

Table 13: Existing Daily Traffic Levels			
Roadway Segment Description		**Existing Annual Average Daily Traffic (AADT)**	**Miles within Project Boundary**
Pickerel Lake Township	170th	NA	3 Miles, Southern project boundary

Source: MnDOT 2009 Traffic Volumes General Highway Map Freeborn County, MN.

The maximum construction traffic is expected to be approximately 90 to 230 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 many of the area roadways have AADTs currently well below capacity, the addition of 90 to 230 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. Wind farm 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 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, Shell Rock Wind will coordinate with the applicable local and state entities to ensure that the weights being introduced to area roads are acceptable. Shell Rock Wind will work with the Cities of Albert Lea, Alden, Conger and Twin Lakes; Freeborn County, Pickerel Lake Township, and MnDOT, as necessary, regarding roadway concerns, right-of-way work (if any), and setbacks during construction of the Project. Shell Rock Wind 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 December 23, 2010 Shell Rock Wind Farm, LLC sent letters to the Minnesota Department of Transportation (MnDOT), the Freeborn County Highway Department, and Pickerel Lake Township for road-related comments on the Project. While responses from these agencies had not been received at the time this application was prepared, the

Applicant has previous wind experience in MnDOT District 6. It is expected that MnDOT engineers in this district will require an opportunity to review the Project further in the event any potential high voltage transmission lines are defined and/or delineated in accordance with the project. Authorities having jurisdiction over any work performed within a public right-of-way will 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.

8.5.2 Telecommunications

Telephone service in the area is provided to farmsteads, rural residences and businesses by Winnebago Cooperative Telephone Association and other local telephone companies. Construction and operation of the proposed wind farm 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. Shell Rock Wind Farm will coordinate collector line placement with local telecommunications providers and avoid installing collection lines parallel in close proximity to existing copper telephone lines if concerns exist regarding the possibility of magnetic field interaction and telephone circuit noise. Shell Rock Wind will work closely with local telephone service providers to ensure that if transmission lines are installed by the project, that 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.

Construction and operation of the proposed wind farm will be designed to avoid adverse impact to telephone, television, internet, or cellular phone service. To the extent Project facilities are installed in proximity to existing telephone lines or communication equipment, Shell Rock Wind will closely coordinate with the applicable service providers to avoid interference with such facilities. Should inadvertent impacts to these systems arise, Shell Rock Wind 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 there is one microwave beampath that intersects the project boundary in the far southeastern corner of Section 28, southeast of 170th Street. Comsearch calculated a Worst Case Fresnel Zone (WCFZ), which is considered the mid-point of a full microwave path and the location of the widest Fresnel zone. The microwave path and WCFZ buffer 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 located outside of the identified Fresnel zone, there should be no impact to the microwave beam path 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 one record for an AM

station within 25 miles of the project site. The record represents one non-directional operational station at 6.42 miles from the center of the Project Area. Comsearch determined that there are 15 records for FM stations within a 25-mile radius of the project center point, representing 12 licensed and operational stations. All of the FM stations are outside of the Project Area with the closest station antenna being located 6.44 miles from the center of the Project Area. 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 2 miles of turbine towers and broadcast stations with non-directive antennas are within 0.5 miles. Figure 1 of the Comsearch report shows the location of the AM transmitter antennas with respect to the project site. Because the nearest AM station is 6.42 miles from the center of the Project Area, no interference with AM broadcast stations is expected.

FM stations' coverage when they are at distances greater than 2.5 miles from wind turbines are not subject to degradation. As long as all wind turbines in the project are not located closer than 2.5 miles from the FM stations' antennas, signal degradation should not occur. All of the identified FM stations are outside of the Project Area and at least 6.44 miles from the center of the Project Area. Consequently, no impact to FM broadcasts is expected.

Fixed Land Mobile Stations

Comsearch also searched for fixed land mobile stations within the project vicinity. Fixed land mobile stations can provide critical telecommunication services such as emergency response, public safety, and local government communications. Comsearch identified seven land mobile sites in the vicinity of the project. Specific information about these sites is provided in the attached Land Mobile Report (**Appendix E**). Most of the land mobile sites licensed to county and state entities provide public safety and emergency communications.

Land mobile sites are typically unaffected by the presence of wind turbines, and Comsearch does not anticipate any harmful effect to these services. 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 wind 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 wind Project Area can serve as the platform for a land mobile base station or repeater sites.

8.5.3 Television

Comsearch analyzed the off-air television stations where 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 100 miles of the wind 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 40 miles or less. The stations within 40 miles are listed in the attached Off-Air TV Analysis report (**Appendix E**). There are a total of 50 station records within approximately 40 miles of the center of the Project Area. Of these 50 records, only 18 are currently licensed and operating, and none of the stations are full power digital stations. All of the operating stations are low power. Twelve are low-power digital stations and six are translators. Translator stations receive signals from distant broadcasters and retransmit the signal to a local audience.

Because there are no full power TV stations servicing the Project Area, off-air television stations are not anticipated to be the primary mode of television service for local communities. 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 wind 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. Comsearch does not anticipate the number of residents making this claim will be significant based on the lack of full power stations in the area, and the findings of a recent study which states that only 10% of households currently rely solely on off-air television (Comsearch 2011). This statistic would likely apply to the Shell Rock Wind Project Area because there are no full-power television stations available.

Shell Rock Wind recognized that some impacts to TV service within the Project Area may occur, but these impacts are likely to be minimal based on the findings of the off-air TV analysis. The applicant is committed to operating the facility in a manner that does not adversely impact television reception. Should issues arise following construction of the project, Shell Rock Wind will work with the affected residents in a timely manner to determine the cause of the interference and establish acceptable reception.

8.5.4 Other Local Services

Pipelines

There is one underground pipeline in the Project Area and one other in the Project vicinity. A petroleum products pipeline runs in a general southeast to northwest direction through the northeastern corner of Section 9. A natural gas pipeline runs approximately ¾ of a mile outside the eastern project boundary. At the far southeastern corner, the pipeline comes within approximately 0.1 miles of the project boundary. Turbines will be sited at least 1.1 times the height of the turbine away from the petroleum products

pipeline in Section 9, and turbines and infrastructure will be sited at least ½-mile away from the natural gas pipeline. Consequently, impacts to identified pipelines are not expected and therefore no mitigation measures have been proposed.

Electrical Services

There is currently one utility transmission line within the Project Area. ITC Midwest, LLC has a 69kV transmission line running across the northern portion of the Project Area as indicated on **Map 9**. A Dairyland Power Cooperative 69 kV line runs north-south approximately one mile west of the Project area, paralleling 660th Avenue. There are no substations in the Project area and one substation (Alden Substation) approximately one mile west of the Project boundary, where the two existing transmission lines intersect.

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 project transmission interconnection may also be required. Shell Rock Wind and local service providers will work closely to ensure outages are planned and coordinated with local residents and other impacted users.

Water Supply and Sanitary Service

Pickerel Lake Township has limited public infrastructure services. Homes and farmsteads typically utilize on-site water wells and septic systems for individual household sanitary needs. Two sewer lagoon ponds that service the City of Conger are located within the Project Area in Section 19 of T102N, R22W.

Construction and operation of the proposed Project will not affect the water supply or sanitary service. No installation or abandonment of water supply wells is anticipated for the Project, and no work is proposed within Section 19 that would affect the City of Conger sewer lagoons. In the event that water supply wells are abandoned or installed, or environmental bore holes are drilled, Shell Rock Wind will do so in accordance with applicable Minnesota law and Minnesota Department of Health (MDH) requirements. Shell Rock Wind will also coordinate closely with the City of Conger to ensure that water supply and sanitary service utilities are identified prior to project construction and avoided.

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 requirements of the National Pollutant Discharge Elimination System (NPDES) permit and Storm Water Pollution Prevention Plan (SWPPP) which will be developed for this project.

8.6 Cultural and Archaeological Resources

8.6.1 Description of Resources

The proposed Project Area is located entirely within the Prairie Lakes East Archaeological Region (2e) (Anfinson 1990). The Prairie Lakes East Region is located in south-central Minnesota and includes, Le Sueur, Waseca, Freeborn, and Steele Counties and portions of Blue Earth, Faribault, Rice, Scott, and Dakota Counties.

Topography of this region is typified by ground and hill moraines. Prehistoric habitation sites may be located anywhere, both near water and in historically wooded areas away from water. Resource procurement sites may be located anywhere in the region, but are most likely at the edge of water bodies (Anfinson 1990).

In October 2010, Shell Rock Wind conducted a 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 five previously inventoried historic architectural resources located within one-mile of the proposed Project Area. Only one of the historic architectural resources is located within the defined Project Area. None of the historic architectural resources have been evaluated for eligibility for listing on the National Register of Historic Places (NRHP). A summary of the identified historic architectural resources is provided in the following Table 14 and shown on **Map 11**.

Table 14: Previously Recorded Historic/Architectural Resources

Site Number	Site Name	Twp	Rng	Sec	NRHP Status	Project Area / Buffer
FE-CON-001	Conger Elevator Co.	102	23	24	unevaluated	Buffer
FE-CON-002	School	102	22	30	unevaluated	Buffer
FE-CON-003	Conger Cooperative Creamery Company	102	23	25	unevaluated	Buffer
FE-PIC-001	Pickerel Lake Town Hall	102	22	22	unevaluated	Buffer
FE-PIC-003	Concordia Lutheran Church & Cemetery	102	22	21	unevaluated	Project Area

Key: Site Number = site designation applied by State Historic Preservation Office; Site Name = unofficial site name as listed on inventory form; Twp = Public Land Survey (PLS) Township designation; Rng = PLS Range Designation; Sec = PLS Section Designation; NRHP Status = evaluation status of recorded property in regards to National Register of Historic Places Eligibility; Project Area / Buffer / Moved = denotes if listed site is within the defined Project Area, within the one-mile buffer, or moved outside study area.

No previously recorded archaeological sites have been identified within the Project Area or the one-mile buffer. The absence of recorded sites is most likely due to the lack of investigation within the Project Area.

8.6.2 Impacts

While Shell Rock Wind will attempt to avoid archeological sites, and no archeological sites are currently identified in the Project Area, the proposed construction activities for the Project may have the potential to impact such sites or to add to the visual impacts in the region of the Project Area. In the event that an impact would occur, Shell Rock Wind will determine the nature of the impact and consult with the SHPO on whether or not the resource is eligible for listing in the National Register of Historic Places (NRHP).

On October 4, 2010, Westwood, on behalf of Shell Rock Wind, sent the Minnesota SHPO a letter informing them of the Project and requesting comments. The SHPO responded on October 29, 2010 (**Appendix B**). Due to the nature of the project, SHPO has recommended an archaeological survey of the Project Area. Shell Rock Wind intends on having a Phase I Archaeological Reconnaissance Survey completed prior to construction.

8.6.3 Mitigation

Shell Rock Wind 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. Also, 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 American Indian communities. 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.

8.7 Recreational Resources

8.7.1 Description of Resources

Information from the U.S. Fish & Wildlife Service (USFWS), Minnesota Department of Natural Resources (DNR), and Freeborn County were reviewed to identify recreational resources within and near the Project Area. Significant recreational resources identified within this portion of Freeborn County include multiple Wildlife Management Areas (WMAs) and Wildlife Production Areas (WPAs), recreational lakes and trails, and a state park (**Map 5**). Recreational opportunities in Freeborn County include boating and canoeing, fishing, camping, snowmobiling, hunting, snow shoeing, cross country skiing, bird and wildlife viewing, golfing, and hiking. There are no federal, state, county, or city parks in or near the project boundary. In addition, no DNR Scientific & Natural Areas were identified within close proximity to the project boundary.

While there are no designated public lands within the project boundary, other than snowmobile trails, there are six Wildlife Management Areas and five Waterfowl Production Areas located within approximately five miles of the project boundary. An additional six WMAs, one WPA, and one Scientific and Natural Area (SNA) are located within 10 miles of the project boundary.

Wildlife Management Areas (WMAs) are part of Minnesota's outdoor recreation system and represent a large portion of the Minnesota DNR's wildlife management efforts in the state. The areas were established to protect certain lands and waters that have a high potential for wildlife production, public hunting, trapping, fishing, and other compatible recreational uses. These areas are integral to protecting wildlife habitat for future generations, providing citizens with opportunities for hunting, fishing and wildlife watching, and promoting important wildlife-based tourism in the state (MnDNR 2011).

Twelve WMAs were identified within approximately ten miles of the project boundary. Four WMAs are located within approximately two miles of the project boundary and two more are located within approximately three miles of the project boundary. The remaining six are located at least seven miles from the Project Area. Table 15 identifies each WMA, its general location, and distance from the site boundary.

Waterfowl Production Areas (WPAs) are public, National Wildlife Refuge lands managed by the U.S. Fish and Wildlife Service for the purpose of preserving wetlands and grasslands critical to waterfowl and other wildlife. While no WPAs were identified within the project boundary, six were identified within approximately five miles of the project boundary, and two additional WPA were identified within ten miles of the project. Table 15 identifies each WPA, its general location, and distance from the site boundary.

SNAs are managed to protect rare and endangered species habitat, unique plant communities, and significant geologic features that possess exceptional scientific or educational values, and provide important recreational and wildlife viewing opportunities for visitors. While no SNAs were identified within the Project Area, one SNA was identified approximately 8 miles southwest of the project boundary. The Osmundson Prairie SNA is located southeast of Kiester, Minnesota. The 6-acre parcel is a rare remnant of a mesic blacksoil prairie community and contains species such as pasque flowers, prairie smoke, blazing stars, rattlesnake master, and sunflowers (DNR 2011).

Myre-Big Island State Park is located approximately 7.5 miles east of the project boundary. This 2,028-acre park is located along the northern shores of Albert Lea Lake and provides recreational opportunities to visitors including bird watching, hiking, canoeing and camping. Approximately 103,000 people visit the park annually to enjoy the numerous types of natural communities in the park including oak savanna, wetlands, northern hardwood forests, grasslands, and restored prairie. The Blazing Star State Trail is a paved recreational trail that runs from Albert Lea Lake in Albert Lea to Myre-Big Island State Park, a distance of approximately six miles. The trail offers recreational opportunities including in-line skating, cross-country skiing, biking and hiking (DNR 2011).

Table 15: Public Lands within Approximately 10 Miles of the Project Area

Name and Type	Acres	General Location	Distance from Project
Bryson WMA	18	Northeast of Alden	Approximately 1 mile northwest of the project boundary
Halls Lake WMA	152	Northeast of Alden	Approximately 2 miles north of the project boundary
Magaksica WMA	113	North side of Pickerel Lake	Approximately 2 miles east of the project boundary
Upper Twin Lakes WMA	14	Southeast of Conger	Approximately 2 miles southeast of the project boundary
Bear WMA	64	Southeast of Conger	Approximately 3 miles south of the project boundary
Ann & Leo Donahue WMA	116	West of Glenville	Approximately 3 miles southeast of the project boundary
Manchester WMA	113	Northeast of Manchester	Approximately 7 miles northeast of the project boundary
Panicum Prairie WMA	855	Southwest of Glenville	Approximately 8 miles southeast of the project boundary
Save the Wetlands WMA	100	South of Wells	Approximately 9 miles west of the project boundary
Wells WMA	27	Southeast of Wells	Approximately 9 miles northwest of the project

Table 15: Public Lands within Approximately 10 Miles of the Project Area			
Name and Type	**Acres**	**General Location**	**Distance from Project**
Shell Rock WMA	49	Southeast of Glenville	Approximately 9 miles southeast of the project boundary
Walnut Lake WMA	2,516	Southwest of Wells	Approximately 10 miles west of the project boundary
Iowa, Chicago, & Eastern WPA	99	East of Alden	Approximately 0.5 miles north of the project boundary
Twin Lake WPA	208	West of Glenville	Approximately 2 miles southeast of the project boundary
Halls Lake WPA	410	Northeast of Alden	Approximately 3 miles north of project
Foster Creek WPA	240	West of Alden	Approximately 4 miles north of the project boundary
Two Island WPA	273	Southeast of Manchester	Approximately 4.5 miles northeast of the project boundary
Goose Creek WPA	618	Southwest of Glenville	Approximately 5 miles southeast of project boundary
Unnamed WPA	30	East of Freeborn Lake	Approximately 5.75 miles north of project boundary
Goose Lake WPA	167	North of Myre-Big Island State Park	Approximately 6 miles northeast of project boundary
Osmundson Prairie SNA	6	Southeast of Kiester, MN	Approximately 8 miles southwest of the project
Myre-Big Island State Park	2,028	Along the northern shores of Albert Lea Lake	Approximately 7.5 miles east of the project boundary

There are a few natural lakes within approximately five miles of the Project including Pickerel Lake, Bear Lake, and Upper and Lower Twin Lakes. These lakes offer recreational opportunities including fishing and boating. Pickerel and Bear Lakes provide state-supported water access locations. There are no lakes located within the project boundary.

Freeborn County has four county parks including Arrowhead, White Woods, Pickerel Lake, and St. Nicholas. These county parks are all at least three miles from the project boundary; the nearest parks are Pickerel Lake and White Woods. Freeborn County also has two State Game Refuges within the county boundaries including the Albert Lea State Game Refuge and the Moscow State Game Refuge. The closest State Game Refuge, Albert Lea, is nearly 9 miles southeast of the project location (Freeborn County 2003).

According to the Minnesota Department of Natural Resources Recreational Compass, there are no state forests, national forests, or national wildlife refuges within close proximity to the Project Area. One state-funded snowmobile trail (Trail 133) runs east-west immediately north of the Conger municipality boundary, approximately ¼-mile north of and paralleling 180th Street. Another section of the snowmobile trail meets this trail along 680th Avenue and runs south mostly along 680th Avenue and exits the Project area along the southern project boundary. There are no state-owned Off-Highway Vehicle (OHV) trails within Freeborn County (DNR 2011).

8.7.2 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, or within less than ½-mile of a designated public land. Most public lands are at least two miles away, with Bryson WMA being the only one in the ½-mile to mile range. As non-participating parcels, the project provides public lands with a five rotor diameter setback for turbines along the prevailing wind direction and three rotor diameter setback on the non-prevailing wind direction.

Recreational resources within the Project Area include approximately 4 miles of state-funded snowmobile trail 133, which will be provided a minimum 250-foot setback from the trail right-of-way. The county is provided funding through a state grant-in-aid program according to DNR staff, and is maintained by local snowmobile clubs. Trail use data was not available from the DNR or county. Based on the report *Snowmobiling in Minnesota: Economic Impact and Consumer Profile* (April 2005), most snowmobiling takes place in the northern portion of the state. Consequently, it is anticipated that this particular trail is less traveled than other trails in northern and northeastern Minnesota.

All other identified recreational resources are located outside of the existing project boundary. Potential impacts to recreational resources are anticipated to be visual in nature and primarily from those public lands, trails and open spaces within approximately 4 miles of the project vicinity. More details regarding visual impacts are provided in previous portions of this report. No impacts to tourism and community benefits are expected.

8.7.3 Mitigation

The Project does not plan or expect any encroachment into publicly owned lands; therefore, mitigation measures are not proposed at this time.

8.8 Public Health and Safety

8.8.1 Electromagnetic Fields

Electromagnetic Fields (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. EMF is commonly associated with power lines, but they occur only at close range because the electric field rapidly dissipates as the distance from the line increases (US EPA 2011).

Extensive research has been conducted by the National Institute of Environmental Health Sciences (NIEHS 1999). The scientific evidence suggesting that extremely low frequency EMF exposures pose any health risk is weak.[3] 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."

The Minnesota Environmental Quality Board (EQB) addressed the matter of EMF with respect to new transmission lines in a number of separate dockets from 2003 to 2005. See Docket Nos. 03-64-TR-XCEL (161 kV Lakefield Junction to Fox Lake Substation line); 03-73-TR XCEL (345 kV Split Rock Substation to Lakefield Junction Substation line); 04-84-TR-XCEL (115 kV Buffalo Ridge Substation to White Substation line) and 04-81-TR-Air Lake-Empire (115 kV line in Dakota County). In June 2005, in Docket No. 03-73-TR-XCEL for the 345 kV line connecting the Split Rock and Lakefield Junction substations, the EQB made the following finding with regard to EMF:

"No significant impacts on human health and safety are expected from the Project. There is at present insufficient evidence to demonstrate a cause and effect relationship between EMF exposure and any adverse health effects. The EQB has not established limits on magnetic field exposure and there are no Federal or Minnesota health-based exposure standards for magnetic fields. There is uncertainty, however, concerning long term health impacts and the Minnesota Department of Health and the EQB all recommend a "prudent avoidance" policy in which exposure is minimized."

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

[3] See Electric and Magnetic Fields Research and Public Information Dissemination (EMF RAPID) Program.

minimum allowable distances from 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). 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.

8.8.2 Aviation

There are six registered airports and one heliport located within approximately 20 miles of the Project Area. According to MnDOT airport licensing staff, Albert Lea Municipal Airport is the only licensed airport in Freeborn County. A review of the AirNav, LLC (AirNav 2011) database revealed the nearest registered airports within 20 miles, which are provided in Table 16. Approximate distances are from the boundaries of the Project Area.

Table 16: Nearby Airports and Heliports

Airport ID	City	Airport Name	Approximate Distance from Project	Runway Type	Elevation (Feet)
30MN	Albert Lea	Albert Lea Medical Center Heliport[1]	4.85 mi ENE[1]	Concrete	1,253
AEL	Albert Lea	Albert Lea Municipal Airport[2]	5.75 mi ENE[2]	Asphalt	1,260
OY6	Lake Mills, IA	Lake Mills Municipal Airport	12.9 mi S	Turf	1,260
68Y	Wells, MN	Wells Municipal Airport	13.7 mi WNW	Turf	1,119
MN61	Hollandale	Ward Airport	16.3 mi ENE	Turf	1,205
5D2	Northwood, IA	Northwood Municipal Airport	18.2 mi SE	Turf	1,224
MN74	Minnesota Lake, MN	B & D Flyers International Airport	19.6 mi NW	Turf	1,055

[1] The nearest turbine to the heliport will be at least 5.15 miles away.

[2] The nearest turbine to the Albert Lea Airport will be approximately 6 miles away.

In addition to the registered airports, there are several unregistered landing strips located in the vicinity of the project. One landing strip is located approximately 3 miles north of the project boundary near Manchester (Freeborn County Landing Strip), a second is located approximately 8 miles west of the project boundary near Walters (Passer Landing Strip), and a third is located approximately 8 miles northwest of Freeborn (Jacobsen Airport).

Project planning, construction and operation will be closely coordinated with air traffic agencies and facilities to ensure public safety is not adversely impacted by the project. There are no registered airports located within the project boundary, and all registered airports are at least 5 miles away from the project boundary, with most registered airports being at least 12 miles away. During early development of the project, the project team worked to address the potential for concern regarding the proximity of the preliminary eastern project boundary to the Albert Lea Municipal Airport. As development of Shell Rock Wind Farm evolved, the eastern project boundary was shifted west to mitigate that concern. The Albert Lea Medical Center Heliport is located approximately 5.15 miles away from the nearest proposed turbine, and long approach surfaces are not required for heliports. While impacts are not expected, the applicant will coordinate closely with listed airports and medical heliports to ensure that the proposed wind farm facility will not cause disruptions of use or adversely impact operating conditions. Shell Rock Wind has been communicating with Mn/DOT-Office of Aeronautics staff regarding tall tower permitting and applicable structure height regulations.

There are several small, unregistered airfields ranging from 3 to 8 miles away from the project boundary in the north and western directions. Based on reviewed aerial photography, these appear to be agricultural field and grass runways where small planes occasionally land and are not a generally well defined runway or landing strip. The Applicant will make efforts to coordinate with the owners of these small landing strips to promote project awareness and avoid circumstances that would present a detriment or danger to the continued use of the landing strip for small aircraft.

The installation of wind turbine towers in active croplands and installation of overhead collection lines, if needed, increase the potential for conflict with crop-dusting aircraft. However, overhead collection lines are expected to be minimal and would be similar to existing distribution lines which are located along the edges of fields and roadways. The turbines would be visible from a distance and lighted according to FAA requirements. A permanent meteorological tower, if incorporated into the project, will be free standing and have FAA mandated lighting consistent with the turbines. 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.

Shell Rock Wind contacted the Minnesota Airports District office of the FAA on December 23, 2010, for comments on the proposed Project. A response letter from the FAA had not been received at the time of filing this report. However, the FAA generally recommends that the applicant consider adding identified airports to the project distribution list to allow them opportunity to provide comment on the proposed wind facility. The Applicant will contact these airports and work closely with them to ensure opportunity for comment and that their concerns are addressed.

Shell Rock Wind will work with and coordinate siting of the wind turbines with the FAA. The wind turbines and any permanent meteorological towers will be equipped with

lighting in compliance with FAA requirements. Permanent meteorological towers are typically hub height (80m) and are free standing (no guy wires), have galvanized steel tower construction, and medium dual-intensity day and night lights.

Shell Rock Wind will continue to work to ensure local airports, aerial applicators, and hospital heliports are notified regarding the project.

8.8.3 Safety and Security

Freeborn County has its own emergency management program. The Freeborn County Department of Emergency Management (FC DEM) is part of the Freeborn County Sherriff's Office. According to the county's on-line resources, the FC DEM is charged with coordinating the emergency preparedness and homeland security efforts. In addition to planning and educating, they provide assistance to local jurisdictions and county agencies before, during and after disaster strikes. FC DEM 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 (Freeborn County 2011). The FC DEM meets its mission and vision statements by:

- Preparing and maintaining emergency plans,
- Training staff and conducting drills,
- Testing equipment and coordinating activities with the community,
- Educating the public on disaster preparedness, and
- Meeting all State and Federal requirements related to emergency plan development, program funding, and staff training.

Census data collected during the American Community Survey between 2005 and 2009 indicate that the total population and number of occupied homes have decreased to 570 and 224, respectively. This translates to a 23.5% reduction in population size, and a 15.8% reduction in occupied homes since 2000. The average household size for Pickerel Lake Township is 2.54 people for that period of time. With approximately 52 housing units within the Project Area, the estimated population is 132 people. With a total Project Area of 11.6 square miles, the approximate density of people per square mile is 11.4.

Given that the population within the Project Area appears to be on a steady decline, and low in overall density, construction and operation of the Project is not expected to have an adverse impact on the security and safety of the local population.

Wind turbines constructed as part of the Project will be registered with the FC DEM and Shell Rock Wind will work with the County FC DEM to develop appropriate disaster response procedures. As with any large construction project, some risk of worker or public injury exists during construction. However, Shell Rock Wind 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. Shell Rock Wind 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.

Shell Rock Wind will coordinate with the FC DEM for the purpose of saving lives and protecting property related to the Project during natural, manmade or other incidents. Shell Rock Wind 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. Shell Rock Wind will also work with the County Planning Office for assignment of 911 addresses for coordination of emergency response.

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

- The Project wind turbine locations will be registered with Freeborn County's Department of Emergency Management and Planning Offices to develop appropriate procedures for emergency responses related to the Project;
- Towers will follow PUC and Freeborn County setback requirements;
- Contractors will be trained to use proper construction and maintenance methods to promote and protect workers and public health and safety;
- Shell Rock Wind 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;
- Shell Rock Wind will conduct regular operation, maintenance and inspections during the life of the Project to minimize and address potential equipment failures;
- Turbines will be situated on steel enclosed towers where electrical equipment will be located, except for the pad-mounted transformer. Access to the tower will only be allowed through a solid steel door that will be locked when not in use. External electrical equipment will be clearly marked with appropriate warning signs;
- One permanent, free standing meteorological tower may be included in the Project, and will feature medium dual-intensity day and night lights for FAA compliance.

8.9 Hazardous Materials

8.9.1 Description of Resources

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-base 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/farming areas.

The Minnesota Pollution Control Agency "What's In My Neighborhood?" database (MPCA 2011) of known and potential sources of soil and ground water contamination was consulted for the Project Area. The database revealed twenty-two feedlots and several mapped sites within the project boundary. The nearest mapped sites are listed in the following table.

Table 17: What's In My Neighborhood Sites

Site Name	Type/Activity	General Location
E & W Dist. Bulk Plant	Underground Storage Tanks (4 active and 2 temporarily closed)	180th Street, Conger, Section 30
E & W Distributing Cardtrol	One Storage Tank	103 William St. Pickerel Lake Township, Section 30
County Of Freeborn Shop #5	One Storage Tank	36 Highway 17 Pickerel Lake Township, Section 30
Conger City Dump	Investigation and Cleanup Site; Unpermitted Dump*, Not Active	NE Conger, Section 19
Gary's Pit Stop	Leak Site; Remedial Investigation Monitoring, Not Active	35 County Road 12, Conger, Section 19
Conger Wastewater Treatment Plant	Wastewater discharger	Pickerel Lake Township, Section 19

* Unpermitted dumps are usually old farm or municipal disposal sites that accepted household waste.

During construction, vehicles and equipment will use gasoline, diesel and other petroleum products. In operation, the Project is not expected to generate significant amounts of hazardous waste or materials. The wind turbines will use synthetic gear box oil, hydraulic fluid, and gear grease. Materials used for operating the wind farm will be

handled and maintained by qualified operations and maintenance personnel and brought to the Project Area as needed.

8.9.2 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 site to maintain the wind turbines. If not properly managed, these materials have the capacity to leach into the soils and potentially contaminate the local aquifer and possibly surrounding surface waters. For this reason, materials will be transported, handled and disposed of by trained and qualified personnel utilizing established procedures and proper equipment.

8.9.3 Mitigation

Shell Rock Wind has prepared a turbine layout that avoids farmsteads and other occupied buildings by a minimum setback distance of at least 1,000 feet, thereby avoiding potential encounters with existing hazardous materials and unmarked waste dumps. Consequently, impacts associated with hazardous materials are not expected.

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. Shell Rock Wind will ensure that wastes generated by the Project are properly disposed of offsite using certified waste handlers.

Fuels and lubricants for vehicles and maintenance equipment will not be stored at the site 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 through an approved waste firm by trained technicians.

8.10 Land-Based Economies

Agriculture

Land use within the Project Area is primarily agricultural as shown in the Land Cover Map (**Map 12**). In 2007, over 92% of the land in Freeborn County (roughly 388,488 acres) was used for agriculture by approximately 1,257 farms (USDA, 2007 Census Report). Major crops grown in Freeborn County include: corn, soybeans, vegetables, forage-land (hay) and

sweet corn. Predominant livestock raised in the counties includes hogs and pigs, turkeys, cattle and calves, and sheep and lambs. Freeborn County ranks in the top 11 counties in the state for production of corn for grain, 18th for soybeans, 7th for vegetables, 2nd for sweet corn, and 12th for hogs and pigs. Drain tiles and storm water management structures related to farming operations are located within the Project Area.

As shown on **Map 13**, 22.56% of the farmland within the Project Area is considered prime, 48.79% is prime farmland when drained and 16.03% is considered farmland of statewide importance. Approximately 12.63% of the Project Area is neither non-prime farmland nor farmland of statewide importance.

To the extent possible, Shell Rock Wind will design the Project and locate wind turbines, access roads and associated facilities to avoid or minimize temporary and permanent impacts to farmland and pasture. Turbine and facility siting will include discussions with landowners to identify features on their property, including drain tiles and other obstacles that should be avoided.

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, Freeborn County administers the MPCA's feedlot program and has recently prepared and submitted to the MPCA the required Feedlot Program Delegation Agreement and Work Plan for the period of January 1, 2010 – December 31, 2011. There are currently 502 registered feedlots in Freeborn County (MPCA 2009). Approximately 22 feedlots exist within the project boundary according to the MPCA's "What's In My Neighborhood" map search tool (January 2011).

Some livestock operations and pasture land may be temporarily disrupted during the installation of the wind turbines and associated infrastructure. Shell Rock Wind 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 grazing and use by livestock. The Project will have little, if any, long-term effects on the ability of the land to be productive for raising livestock.

The only land that will be taken permanently out of crop production will be those areas encumbered by turbines, access roads, and supporting aboveground 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. However, the construction equipment used in the erection of wind turbines, much like agricultural equipment, is designed with wide tires and tracks to distribute their weight over a larger area and provide stability. This minimizes the degree of soil compaction resulting from construction. Once construction is complete, Shell Rock Wind 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, Shell Rock Wind 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 significant amounts of traffic which will likely require de-compacting 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 planned, Shell Rock Wind will promptly repair or replace drain tile that may be impacted by the Project. Prior to beginning site work, Shell Rock Wind will contact the landowner where the work will be conducted to properly identify and locate drain tiles or other drainage structures that may be present in the work area.

If a project is affecting agricultural lands, and federal monies are involved, it is generally a requirement that a Farmland Policy Protection Act (FPPA) site assessment be appropriately filed. FPPA land evaluations are typically conducted by local NRCS personnel who review the project for possible effects on unique, prime or statewide important farmland. Shell Rock Wind will coordinate with the USDA to determine if the FPPA applies to this project, and submit the appropriate documentation, as necessary.

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. Once the Project is completed, Shell Rock Wind will restore disturbed areas as close as practicable to its 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 Shell Rock Wind 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 Shell Rock Wind Farm.

Forestry

There are no significant forestry resources within the Project Area. Minnesota Land Cover Classification mapping (**Map 12**) indicates that approximately 0.64% of the Project Area is forested. According to Freeborn 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 3.9% of land cover within the county. Because of Freeborn County's agricultural history, much of the original woodlands were removed to make way for agricultural production within fertile soils. Most of the remaining forested areas in the county are association with farmsteads, which typically contain woodlots and shelterbelts. Therefore, Freeborn County does not currently represent an economically important source for forestry products.

Woodlands were generally evaluated in the field by Westwood Professional Services in September 2010, and were confirmed to be fairly scarce within the Project area. As previously mentioned, forested areas (woodlots) 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. Dominant tree species observed included a mix of bur oak, locust, box elder, and cottonwood.

Only negligible, if any, impacts to forestry resources are anticipated. Forested areas near farmsteads and waterbodies will be, for the most part, avoided by the proposed Project. While significant tree removal is not anticipated, some trees and limbs may occasionally need to be removed to install access roads, or trimmed to prevent damage to electrical lines from wind and ice, and to ensure reliable operation. Shell Rock Wind will coordinate with affected landowners for replacement of trees lost on private property as a result of the Project.

Mining

There are no significant mining resources within the Project Area. However, crushed rock, sand, and gravel are extracted from mines around the county 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 mapping, there is only one gravel pit located within the Project Area in the SW¼ of Section 21 (**Map 14**). Two active gravel pits and one inactive gravel pit are located east of the project boundary within Sections 15 and 22, and one additional active pit is located within Section 31 just south of the project boundary. According to Freeborn County LMIC land cover mapping for the period between 1988 and 1990, gravel pits and open mines makes up less than 0.1% of land cover within the county.

No impacts to mining resources or operations are anticipated; however, some of the identified aggregate resources may be used for access road construction. The Applicant will coordinate with the appropriate landowners prior to utilizing materials from these aggregate resource locations.

8.11 Tourism

Freeborn County, known as the southern gateway of Minnesota, has many recreational opportunities available. Tourism is an important part of the Freeborn County economy and the economies of local municipalities such as Albert Lea, Glenville, and Clark's Grove. Freeborn County ranks 35 of 87 counties with annual traveler expenditures of approximately $63,239,582 (UMTC 2008), which equates to about 1,015 tourism-related jobs in the county. Tourism in the county centers around the multitude of outdoor recreational opportunities provided by resources such as Myre-Big Island State Park for hiking, biking, camping, wildlife watching, snow shoeing, cross country skiing and canoeing. The Blazing Star Recreational Trail, which will be 18 miles long when completed, will run from the State Park to Hayward and eventually connect with the

Shooting Star Trail in Mower County. Albert Lea, Geneva, Freeborn, Fountain, Bear, and Twin Lakes provide ample opportunity for fishing and boating. Freeborn County is also home to numerous Waterfowl Production Areas and Wildlife Management Areas, which provide a significant tourism attraction for anglers and hunters. The City of Albert Lea has thirty-eight city parks and Freeborn County maintains four County parks along with over 250 miles of groomed snowmobile trails that provide a tourism draw.

Local town festivals and fairs are other important tourism attractions. The City of Albert Lea is the nearest large city to the Project Area and hosts a number of annual events including festivals such as Cinco de Mayo, Eddie Cochran Festival, Festival of Bands, July 3rd Parade, 4th of July Fireworks Display, Freeborn Days, Emmons Days, Hayward Days, Harvest Festival, Big Island Rendezvous, and Doc Evans Jazz Festival. The Freeborn County Fair hosts "The Best Six Days of Summer", which draws visitors from across the state, and typically has an attendance of approximately 97,000 per year (Freeborn County 2011).

Because all project facilities will be located on private lands, there will be no direct impacts to existing recreational facilities and tourism activities that typically generate revenue for the local community. Consequently, no negative impacts to tourism and community benefits are expected and therefore no mitigative measures are proposed.

8.12 Local Economies

8.12.1 Economic Impacts of the Project

Jobs are expected to be added as a result of the Project. This includes approximately 120 temporary jobs for construction of the Project and approximately 3 permanent jobs for operation of the Project once it is built. The communities near the Project are also expected to receive positive economic impacts. Short-term impacts to the socioeconomic resources of the area are expected to be minor. It is anticipated that roughly 15 acres of land associated with wind turbine foundations and access roads currently being used for agriculture will be removed from production for the length of the easement agreements. Landowners will be compensated for this loss under the terms of the landowner agreements. Participating landowners with fully executed agreements within the Project Area who receive a wind turbine on their property, and those who do not, will be compensated for wind rights through easements. Construction is anticipated to stimulate some local industries and is not expected to have any negative impacts to the local industries as a whole. 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, Shell Rock Wind plans to use local contractors and suppliers for portions of the construction. Wages and salaries paid to contractors and workers in Freeborn County will contribute to the overall personal income of the region. Additional

personal income will be generated for residents in the counties and state by circulation and recirculation of dollars Shell Rock Wind 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 counties and the state. Landowners having a turbine or other Project facilities on their land will receive payment annually for the life of the Project. Such payments should strengthen the local economy.

Construction and operation of the Project will provide long-term beneficial impacts to the counties' tax bases and contribute to improving the local economy in this part of Minnesota. As described in other nearby wind farm site permit applications, the development of wind energy in this area of Minnesota has been important in diversifying, supporting and strengthening the personal income and property tax base of southeastern Minnesota.[4]

8.12.2 Tax Payments Made to Counties

In addition to creating jobs and personal income, the Project will pay an energy production tax to the local units of government of $1.20 cents per MWh of electricity produced, resulting in an annual wind energy production tax projected to be between $177,000 to $218,000.

8.12.3 Impacts and Proposed Mitigation

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 bases from the construction and operation of the wind turbines and associated infrastructure. In addition, the easement payments to landowners will offset potential financial losses associated with removing land from agricultural production and wind rights. Therefore, because no negative impacts are expected, no mitigative measures are proposed.

8.13 Topography

Elevations in the Project Area range from 1,263 feet above mean sea level (AMSL) in the east-central portion of the site to 1,365 feet AMSL in the northeastern portion of the site, with the average altitude of the county being approximately 1,250 feet AMSL (USDA 1980). An elevation map of the Project Area is provided on **Map 15**. According to the

[4] See Minnesota Public Utilities Commission, Docket Nos. IP6631/WS-07-388 (Site Permit Application for a Large Wind Energy Conversion System for the Elm Creek Wind Project in Jackson and Martin Counties, Minnesota (June 15, 2007); NSP-WGR-1-95 (NSP Phase II). See also *Assessing the Economic Development Impacts of Wind Power* (2003), Northwest Economic Associates, which analyzes the NSP Phase II/Lake Benton I Wind Project in Lincoln County, MN.

Soil Survey of Freeborn County, topography within the Project Area was defined by the Wisconsin glacial period and the Des Moines lobe which deposited glacial material in a few prominent, and several minor, moraines.

The prominent moraine system left behind by the Wisconsin ice sheet runs in a northwest to southeast direction through the county and a portion of the Project Area. The project is characterized by irregular hills and basins and a few gravelly knolls. The low areas in the Project vicinity are associated primarily with drainage ditches. The topography of Freeborn County can generally be described as the typical swell and swale topography found in ground moraine settings.

Siting and construction of the turbines, associated facilities, access roads and electrical lines will require grading. The site has very good access from existing public roadways across the Project Area, which will make it possible for Shell Rock Wind to minimize the overall length of new access roads. Reduction in access road length will also reduce the amount of grading required to construct the project. Significant impacts to existing topography are not anticipated because steep slopes (greater than 10%) only comprise about 263 acres of the entire Project Area. Steep slopes are generally located in the southeast quarter of the Project area, along a corridor that runs from northeast to southwest. Grading within steep slope areas will be avoided to the degree practicable. Minimizing cut and fill requirements will reduce erosion control potential as well as decrease overall construction costs. Layout and siting of access roads will be completed in such a way as to tie into existing public roads, where possible, to reduce unnecessary grading.

As shown on **Map 16**, Shell Rock Wind is considering steeps slopes and other topographic features during the preliminary turbine siting process. Areas of steep slopes are being avoided to the degree possible, but there may be a few areas in the southeastern portion of the project where steep slopes require grading. However, care will be taken when siting the collection lines and access roads to minimize grading activities within and near steep terrain. Construction Best Management Practices (BMPs) will be implemented surrounding all graded areas in accordance with state standards, the MPCA Stormwater Best Management Practices Manual, and the approved Stormwater Pollution Prevention Plan (SWPPP) for the project. BMPs are mitigation measures applied to the development process to help ensure that construction occurs in an environmentally responsible manner, such as preventing erosion to regional waterways and wetlands. Examples of steep slope and erosion and sediment control BMPs that will be used during the construction process include silt fence, bio-rolls, temporary mulch, and seeding.

8.14 Soils

There are four general soil associations mapped in the Project Area: the Webster-Nicollet-Clarion-Canisteo and Storden-Nicollet-Clarion soils are associated with the higher elevation moraines in the majority of the Project Area, and the Webster-Estherville-Dickinson and Delft-Clarion soils are associated with the lower elevation outwash plains of

the southeastern corner of the Project Area (**Map 14**). According to the Soils Survey of Freeborn County, soils associated with the higher elevation moraines are generally clay loam soils, while soils in the lower elevation outwash plains are generally silty, sandy loam soils. Management needs include providing adequate drainage where needed, irrigation of planted vegetation, proper fertilization, and protection of exposed soils from potential wind erosion. The mapped soil units within the Project Area are summarized in **Appendix F**.

Construction of the wind turbines, associated facilities, access roads and electrical collection lines will require grading. Approximately 38.6% of the Project Area qualifies as prime farmland or 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. Consequently, 26 of the proposed 29 turbines are proposed within prime farmland categories. Each turbine will require a 60-foot diameter permanent gravel work area for future maintenance access.

As part of turbine micrositing, turbine locations may be shifted if preliminarily sited on slopes that are unsuitable for construction. Geotechnical investigations will also be completed at each individual turbine location to confirm suitability for turbine foundation construction. If locations are found unsuitable, adjustments will be made to the turbine positions. Because the design of the Project is in preliminary stages, the precise amount of land to be disturbed cannot be precisely quantified. However, it is anticipated that a very small percentage of soils within the Project Area will be displaced.

According to the Freeborn County Comprehensive Water Management Plan 2006 - 2015, soil erosion has resulted from urban development and farming practices. The County plan outlines four action items to protect and preserve topsoil including: educate landowners on soil erosion practices, participate in Minnesota Department of Agriculture Best Management Loan Program, implement Minnesota construction site erosion and sediment control planning, and support enrollment of highly erodible lands into the federal Conservation Reserve Program (CRP), reinvest in Minnesota (RIM) program, and Environmental Quality Incentives Program (EQUIP). 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. Shell Rock Wind will work with landowners in the Project Area to site turbines and access roads so as to minimize impacts to high quality farmland. As mentioned in section 8.12, approximately 15 acres of farmland are expected to be permanently impacted. However, 15 acres is only 0.2% of the 6,593 acres under agreement.

Shell Rock Wind will obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Minnesota Pollution Control Agency (MPCA) to control the discharge of storm water during construction activities. A Stormwater Pollution Prevention Plan (SWPPP) will be prepared and submitted to the MPCA at the time the NPDES permit application is submitted. Appropriate BMPs will be used during construction and operation of the project to protect topsoil and to control soil erosion. Typical BMPs include: (1)

encompassing excavated material and disturbed soil with silt fence and/or bio-rolls; (2) protecting exposed soil with temporary seed mixes or hydro-mulches; (3) covering slopes with erosion control blankets and mulches, and (4) restoring disturbed areas as soon as practicable.

8.15 Geologic and Groundwater Resources

Bedrock geology in the Project Area consists of limestone, dolomitic limestone, and dolomite of the Cedar Valley and Wapsipini groups (Morey and Meints 2000). These materials yield water from fractures and solution cavities, and have a thickness of about 100 feet. Based on mapping from the Minnesota DNR Division of Waters, the bedrock surface within the Project Area is generally around 1,150 feet. With most of the Project Area ranging in elevation from 1,250 to 1,375 feet above mean sea level, bedrock would likely be encountered between 100 and 200 feet beneath the ground surface. No bedrock outcrops are known to exist within the Project Area.

Additionally, Minnesota Karst Lands mapping was reviewed for karst geology in the vicinity of the Project Area (Gao et. al 2002). Karst can develop in locations where limestone and dolostone are at or near the land surface. Over long periods of time, the carbonate minerals in these rocks can be dissolved by water, creating karst (Lively 1995). The majority of Freeborn County, and the Project Area, contain covered karst geology, which is categorized as areas underlain by carbonate bedrock with more than 100 feet of sediment cover. Portions of southeastern Freeborn County have transitional and active karst, which are regions underlain by carbonate bedrock and 100 feet or less of sediment cover. Some karst features, such as caves and sinkholes, have been known to occur in transitional karst areas. Karst landscapes can be problematic for construction due to the possibility of sinkhole collapse. Prior to construction, geotechnical borings will be completed in the proposed turbine and other facility locations to ensure karst geology does not exist. If karst is discovered at a proposed turbine location, that turbine location will be adjusted. Minnesota counties with known karst landscapes include Dakota, Rice, Goodhue, Dodge, Olmstead, Wabasha, Mower, Fillmore, Winona, and Houston (Lively 1995).

The County Well Index (CWI) indicates that there are approximately 12 domestic wells located within the Project Area (**Map 9**). However, given that there are roughly 52 residential units located within the boundaries of the project, the true number of domestic groundwater wells is probably closer to 52. According to the Freeborn County Comprehensive Water Plan 2006-2015, groundwater used in the Project Area is mainly drawn from the uppermost bedrock aquifer, the Cedar Valley – Maquoketa – Galen Limestone. The bedrock aquifers in Freeborn County are among the highest water yielding aquifers in the United States, as estimated water yields in the glacial outwash range from 100-500 gallons per minute.

Recharge of groundwater in the Project Area occurs primarily from infiltration of precipitation within upland areas. From these upland areas, groundwater percolated downward and is discharged primarily along stream and river corridors as base flow.

Infiltrated precipitation within the county generally moves southeastward through the Shell Rock and Cedar Rivers. The northwestern part of the County drains to the Minnesota River via the LeSuer and Blue Earth River basins. According to the National Hydrography Dataset and major watershed basin mapping, streams and ditches within the Project Area primarily drain to the east and northeast (**Map 16**). Consequently, precipitation falling within the upland areas of the project site likely infiltrates the glacial deposits and slowly discharges as base flow in tributaries and ditches that eventually flow east and northeast to the Shell Rock River.

No impacts to geologic and groundwater resources are expected as a result of construction or operation of the Project. Proposed turbine locations appear to be in areas where bedrock will not be encountered during construction. Water supply requirements for the Project will be limited and relate to temporary water needs for construction activities.

No impacts to geologic and groundwater resources are expected and no specific mitigation measures are proposed. Shell Rock Wind will follow MDH regulations concerning Environmental Bore Holes and well installation, if needed, for the Project.

8.16 Surface Water and Floodplain Resources

8.16.1 Description of Resources

There are a number of intermittent ditches and streams that traverse the Project Area, although none completely dissects the site. The Project is drained by the Winnebago and Shell Rock River Watersheds. There are no perennial streams through the Project Area. MnDNR Public Waters Inventory (PWI) mapping indicates that two public ditches exist within the Project Area (**Map 16**). One ditch is unnamed and passes through approximately 1.6 miles of the west-central portion of the Project Area. The other is County Ditch 66 which covers 1.7 miles in the northeastern portion of the Project.

NWI mapping indicates that approximately 11 acres of wetlands are located within the Project Area (**Map 16**), which represents less than 1% of the overall area of the Project. Wetlands are discussed in further detail in Section 8.17.

8.16.2 Designated Wildlife Lakes and Special Waters

There are no MnDNR Designated Wildlife Lakes within the Project Area or one-mile buffer. Three Designated Wildlife Lakes occur within four miles of the Project Area: Upper Twin Lake, approximately 1.3 miles southeast, Lower Twin Lake 2.2 miles southeast, and Bear Lake 2.75 miles southeast. There are also no outstanding resource value waters, known meandered waterbodies, Public Waters or Watercourses, designated shoreland areas or trout streams within the Project Area.

No impaired waters exist within less than one mile of the project boundary. Pickerel Lake, and an unnamed creek leading from Mud Lake, are the nearest listed impaired waters.

8.16.3 FEMA Floodplains

Non-digital Federal Emergency Management Agency (FEMA) Mapping was reviewed to analyze the extent of floodplains within the Project Area (**Map 16**). FEMA flood panels for the Project Area are provided in **Appendix G**. The Project Area is mapped in Flood Zone C, defined as an area determined to be outside 100- and 500- year floodplains.

8.16.4 Impacts

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. The Project Area is served by a regular mile by mile grid network of county and township roads, which will provide flexibility in the avoidance of water features during the design process. Based on the current site layout, only minimal, if any, impacts to drainage ditches and wetlands are anticipated. Some minor impacts to unavoidable drainage ditches and associated wetlands may occur as a result of access road construction and collector line installation. However, it is the goal of Shell Rock Wind to maintain access road and collector line wetland impacts below levels that would require mitigation in the form of replacement. No impacts to wetlands or ditches are expected or proposed for turbine placement. As the design of the Project moves forward, Shell Rock Wind will coordinate with the St. Paul District of the U.S. Army Corps of Engineers (USACE), and the Freeborn Soil & Water Conservation District (SWCD) to obtain project concurrence regarding stream and surface water body impacts and avoidance. Freeborn SWCD is the Local Government Unit (LGU) responsible for administering the Minnesota Wetland Conservation Act in this area, and the St. Paul District of the U.S. Army Corps of Engineers administers Section 404 of the Federal Clean Water Act. If wetlands cannot be avoided, the permitting process to be followed is described in Section 8.17.2.

The Minnesota Pollution Control Agency (MPCA) administers the National Pollutant Discharge Elimination System (NPDES) permit program in Minnesota and regulates construction activities that disturb more than one acre of land. As part of its NPDES permit application, Shell Rock Wind will develop a Storm Water Pollution Prevention Plan (SWPPP) to 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 on the project site do not incur adverse construction-related stormwater impacts.

Freeborn County has a Comprehensive Water Plan for 2006 - 2015. The plan highlights existing and potential water issues and sets specific actions to achieve goals for sound

hydrological management of water resources in the County. Priority concerns in the County include: (1) Water Wells, (2) Sewer Systems, (3) Top soil, (4) Wetlands, (5) Feedlots, (6) Municipal Waste Water, (7) Mixed Soil Waste, (8) Hazardous Waste, (9) Storm Water, (10) Watersheds, (11) Flooding, (12) Shoreland, and (13) Public Waters. Shell Rock Wind is committed to addressing these priority concerns as they apply to the project. Table 18 provides a summary of the priority concerns that apply to the project and describes how the project will address each one.

Table 18: Priority Concerns: Freeborn County Comprehensive Plan

Concern	Description*	Project Specifics
Water Wells	Protect aquifer from contamination by water wells.	No new water wells anticipated; existing water wells will be avoided.
Sewer Systems	Protect surface water and groundwater from individual sewage treatment systems (ISTS) contamination.	No sewage treatment systems proposed.
Top Soil	Protect and preserve topsoil.	Upper levels of topsoil will be scraped and stockpiled and reapplied to disturbed areas following construction.
Wetlands	Preserve existing wetlands.	Wetlands will be avoided with the exception of minor impacts associated with access road and cable crossings.
Hazardous Waste	Protect water resources from hazardous waste contamination.	The project will not generate hazardous wastes. Fuels and lubricants will be stored and secured according to local, state, and federal requirements.
Stormwater	Work to bring Freeborn County Lakes, ditches, rivers into compliance with TMDL requirements.	The project will prepare a Stormwater Pollution Prevention Plan (SWPPP) prior to construction that will outline BMPs for erosion and sediment control. BMPs will include the use of silt fence, temporary mulch and seeding.
Watersheds	Manage land resource to reduce contamination into surface waters.	
Flooding	Control surface water run-off.	
Shoreland	Protect and preserve existing shorelands.	There is no designated shorelands within the Project Area.
Public Waters	Provide recreational opportunities.	There are no Public Waters within the Project Area.

* Freeborn County Comprehensive Water Plan (2006-2015)

8.16.5 Mitigation

No surface water or floodplain mitigation is anticipated at this time, as Shell Rock Wind is planning on avoiding impacts to surface waters through design, and there is no FEMA designated floodplain within the Project Area. Potential impacts from construction storm water discharges will be mitigated through the application of BMPs that will be implemented as part of the SWPPP for the Project. Primary BMPs will include the use of silt fence and temporary mulching and seeding in areas of soil disturbance.

8.17 Wetlands

8.17.1 Description of Resources

A field review of wetlands within the Project Area was conducted in September 2010, and a jurisdictional wetland delineation will be completed in spring or summer 2011 prior to project construction. Based on the field review, wetlands are relatively sparse within the Project Area, with most associated with streams and agricultural drainage ditches. The location of wetlands appeared to be relatively consistent with NWI and NHD mapping. Wetlands consist primarily of Types 1 and 2 basins, either with stunted crops or annual weeds such as smartweed, barnyard grass, and foxtail as the dominant vegetation.

Data used to assess wetland conditions in the Project Area were obtained from the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) and the U.S. Geological Survey (USGS) National Hydrography Dataset (NHD). These combined datasets serve as a reliable reference to document the existence and approximate location of wetlands and waterways (**Map 16**).

Based on NWI data, the Project Area consists of 12 wetlands covering approximately 11.2 acres (0.2% of Project Area). Of these wetlands, four have been partially excavated (PUBFx), and two have been partially drained (PEMCd and PEMAd). Many of these wetlands are associated with streams and public ditches; however, others are completely isolated. Additionally, all but three wetlands are less than one acre in size. Table 19 provides a breakdown of the results of the NWI analysis summarized by the type of wetlands present.

Table 19: NWI Wetlands Mapped Within Project Area

Wetland Type	Count	Acres by Type
PEMA	1	0.3
PEMAd	1	1.8
PEMC	4	6.0
PEMCd	1	1.2

Table 19: NWI Wetlands Mapped Within Project Area		
Wetland Type	**Count**	**Acres by Type**
PUBF	1	0.2
PUBFx	4	1.7
Totals	**12**	**11.2**

8.17.2 Impacts

Impacts typically associated with similar projects include the conversion of wetland to upland to accommodate project infrastructure including access roads and associated facilities. Access roads are more likely to necessitate wetland fill than turbines, collection lines, and substations. Impacts to wetlands are not anticipated at this time; however, a minor amount of impact may be necessary for temporary and permanent road crossings, and temporary impacts associated with collector line installation. Impacts for road crossings typically require a small amount of fill for placement of culverts and road base materials. Temporary crossing widths would be 40 to 45 feet wide to allow for construction cranes. Crossings would be reduced in width following construction to approximately 16 feet wide. Collector lines are generally installed by trenching and only create temporary impacts. It may be possible to directional bore some collector lines beneath wetland areas, which would eliminate both temporary and permanent impacts.

Activities regulated by the Corps would include the installation of underground utilities through waters of the U.S. if there is discharge of dredge or fill material. However, underground utilities installed using vibratory plow and directional bore methods would not require a permit unless there is the need to excavate or backfill at the location of connecting points. Temporary placement of fill material into any waterbody or wetland for purposes of constructing bypass roads, temporary stream crossings, cofferdams, or storage sites will require coordination with the Corps as well.

8.17.3 Mitigation

Given the isolated nature of the wetlands found within the Project Area, mitigation should not be required as wetlands should be relatively avoidable. As field work 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.

If some wetlands are determined to be unavoidable, a wetland delineation will be completed and a wetland replacement plan submitted for review by the USACE, Freeborn SWCD, and the Board of Water and Soil Resources (BWSR). Wetland impacts will be minimized in accordance with sequencing and replacement requirements of the Minnesota Wetland Conservation Act (WCA) and Section 404 of the Federal Clean Water Act (CWA).

Mitigation will be necessary if the areas impacted exceed the minimum exemption thresholds (e.g. the maximum amount of wetland fill permitted without necessitating replacement – approximately 2,000 square feet depending upon wetlands types). If replacement is necessary, a wetland replacement area will be constructed onsite, or Wetland Bank Credits from an approved wetland bank in the same Wetland Bank Service Area of the impact will be purchased.

8.18 Vegetation

8.18.1 Description of Resources

The Project Area lies within a portion of the state that was historically covered predominantly with oak openings and barrens, wet prairie, and prairie. However, with the exception of steep slopes and drainages, virtually all of the native vegetation in the Project Area has been converted to agriculture. The University of Minnesota (U of M) Remote Sensing and Geospatial Analysis Laboratory statewide land cover-type for the year 2000 indicates that the vast majority of the Project Area consists of agricultural land (**Map 12**). About 92.5% of the Project Area is mapped as agriculture on the U of M analysis, 1.1% grassland, 5.4% urban or developed land (farmsteads and roads), 0.6% deciduous forestland (around farmsteads), 0.2% wetland, and 0.2% shrubland. A site visit by Westwood on September 30, 2010 confirmed the predominant agricultural land use. All preliminary turbine locations are sited in agricultural fields, according to NLCD mapping and available aerial photography. To the extent possible, access roads have been designed along parcel lines to minimize fragmentation and impacts to agricultural lands. Permanent impacts for access roads are also predominately agricultural. Preliminary collector line routes have been provided and are expected to avoid groves of trees, shelterbelts, shrublands, grasslands, and wetlands to the extent practicable. However, some public drainage ditches and drain tile systems will require collector line crossing due to the linear nature of these features. Table 20 provides the number of acres of each land cover type and the estimated number of acres to be temporarily and permanently impacted by the project. These land cover impact numbers are preliminary and are subject to change as the site design is developed.

Table 20: Estimated Land Cover Impacts (Permanent and Temporary)

Land Cover Type	Acres in Project Area	Permanent[1] Impacts (acres)	Approximate[1] Temporary Impacts (acres)
Agricultural	6,873.8	15.17	94.05
Grassland	84.5	0.02	0.36
Urban/Developed	397.6	0.00	0.00
Forest	47.4	0.00	0.00
Wetland	15.3	0.04	0.07
Shrubland	14.4	0.00	0.18[2]
Total	**7,433**	**15.2**	**94.7**

[1]Permanent and temporary impacts are approximate and were estimated for the GE 1.5xle layout from U of M Land Cover Type mapping (2000).

[2]Recent aerial photography does not indicate shrubland within the specific area proposed for temporary impacts.

The Minnesota County Biological Survey (MCBS) for Freeborn County was completed during 1987-2010. The MCBS began in 1987 as a systematic survey of Minnesota's rare biological features. Survey data include railroad-right-of-way prairies, native plant communities, and sites of biodiversity significance. Sites of biodiversity significance represent areas with varying levels of native biodiversity that may contain high quality plant communities, rare plants, rare animals, and/or animal aggregations. As shown in **Map 5**, the Project Area does not have any mapped MCBS railroad right-of-way prairies, native plant communities, or sites of biodiversity significance. The nearest MCBS mapped feature is adjacent to the southwestern edge of the Project Area, a 2.8 acre site of biodiversity significance that is "below the minimum biodiversity threshold." Sites below the minimum biodiversity threshold are disturbed areas where native plant communities have been seriously altered or destroyed by human activities such as farming, recent logging, draining, and development.

Additionally, rare plant species records were obtained through Natural Heritage Information System (NHIS). A request was submitted as part of a Critical Issues Analysis during fall 2010. The response, dated November 30, 2010, does not include any plants or plant communities. A formal request for comments as part of this Site Permit Application was submitted to the DNR December 23, 2010 and includes the updated Project boundary. A formal letter response was received from NHIS staff on February 25, 2011 (**Appendix B**) indicating that they concur with the revised assessment of DNR Ecological Services and that "they do not believe the proposed project will adversely affect any known occurrences of rare features." Additional information regarding the NHIS database search is provided in Section 8.19.2.

Large areas of impact to native vegetation are not expected as a result of the proposed Project, although some minor impacts may occur. Proposed turbine locations will be sited primarily on agricultural lands, and access roads will be sited and connected to public roads while avoiding woodlands, shrubland, grasslands and wetlands. Similarly, it is anticipated that collection lines can be sited to avoid such resources. However, as discussed in Section 8.16, some minor impacts to unavoidable drainage ditches and adjacent wetlands, grasslands and shrubland may occur associated with access road construction and collector line installation. These areas may contain some native vegetation. Should native vegetation disturbance become necessary, Shell Rock Wind will seed these areas with native mixes appropriate for the region.

8.19 Wildlife

8.19.1 Description of Resources

In accordance with the U.S. Fish and Wildlife Service Wind Turbine Advisory Committee Recommendations (March 2010), Shell Rock Wind has conducted a tiered approach for assessing potential impacts to wildlife and habitats. Tier 1 of the approach is a preliminary evaluation or screening of sites (landscape-level screening of possible project sites). Tier 2 includes site characterization (broad characterization of one or more potential project sites), and Tier 3 is characterized by field studies to document site wildlife conditions and predict project impacts (site-specific assessments at the proposed project site). To date, Shell Rock Wind has completed two levels of the process. The DNR has indicated that further Tier 3 studies are not warranted prior to construction; formal USFWS comments for the project are forthcoming.

Tier 1 was completed by Shell Rock Wind as they evaluated available sites for wind development. Along with proximity to transmission interconnection, distance from airports, and willing landowners, Shell Rock Wind also looked for a site that was primarily agricultural and had a reasonable buffer from publicly managed lands in an effort to reduce impacts to wildlife. Tier 2 was addressed through the completion of a Critical Issues Analysis (CIA) for the site during October 2010. The CIA consisted of evaluating publicly available mapping (e.g. wetlands, land cover, public lands), a visit to the site by a qualified biologist, and requests for comment from wildlife agencies including the USFWS and Minnesota DNR. The results of Tier 1 and 2 processes are outlined in the remainder of Section 8.19 and Section 8.20.

Wildlife species in the Project Area are those common to agricultural areas of south-central Minnesota. Mammals likely using the area include white-tailed deer (*Odocoileus virginianus*), red and gray fox (*Vulpes fulva and V. Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), cottontail (*Sylviligus floridanus*), coyote (*Canis latrans*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), gray and fox squirrels (*Sciurus carolinensis* and *S. niger*), striped skunk (*Mephitis mephitis*), badger (*Taxidea taxis*), and short-tailed weasel (*Mustela erminea*). Bat species that could be found in the Project Area include the big brown bat (*Eptesicus fuscus*), hoary bat (*Lasiurus cinereus*), eastern red bat (*Lasiurus borealis*), little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), and silver-haired bat (*Lasionycteris noctivagans*). All of these species are common and abundant and no state or federally listed bat species are known or believed to occur in the Project Area (See USFWS and DNR NHIS response letters provided in **Appendix B**.

Bird species found in the cultivated portions of the Project Area include crows (*Corvus brachyrynchos*), rock doves (*Columbia livia*), brown-headed cowbirds (*Molothrus ater*), house sparrows (*Passer domesticus*), mourning doves (*Zenaida macroura*), European starlings (*Sturnus vulgaris*), American robins (*Turdus migratorius*), barn swallows

(*Hirundo rustica*), and American goldfinches (*Carduelis tristis*). The cultivated areas of the site also likely support red-tailed hawks (*Buteo jamaicensis*) and American kestrels (*Falco sparverius*). The Project Area has limited habitat for waterfowl, wading birds (e.g. herons and egrets) or shorebirds on scarce wetlands, but lakes adjacent to the Project Area may provide more suitable habitat. Three lakes, all over 1.5 miles south of the Project Area, are designated wildlife lakes: Bear Lake, Upper Twin Lake, and Lower Twin Lake. This designation allows DNR staff to temporarily lower lake levels periodically to improve wildlife habitat and regulate motorized watercraft and recreational vehicles on the lake. Additionally, there is a colonial waterbird nesting site associated with Sugar Lake approximately 2.5 miles north of the Project Area which is utilized by great blue herons (no conservation status in Minnesota).

Amphibian and reptile species found in the Project Area are limited due to the scarcity of wetlands. This is particularly true of frog and turtle species that require surface water. There is a Blanding's turtle record from 1994 approximately 5.3 miles northeast of the Project Area and within Albert Lea. Other species of amphibians such as the Western chorus frog (*Pseudacris triseriata),* American toad (*Bufo americanus),* Northern Leopard Frog *(Rana pipiens),* and the Tiger Salamander *(Ambystoma tigrinum)* may utilize the habitat along drainage ditches and streams in the Project Area. Common upland snakes in the area include common garter snake (*Thamnophis sirtalis*), and plains garter snake (*Thamnophis radix*).

8.19.2 DNR Waterfowl Feeding and Resting Areas

There are no wildlife lands in the Project Area or one mile buffer including: Wildlife Management Areas, Waterfowl Production Areas, waterfowl feeding and resting areas, or Designated Wildlife Lakes.

8.19.3 Important Bird Areas

Important Bird Areas are "sites that provide essential habitat for one or more species of bird, and include sites for breeding, wintering, and/or migrating birds" (Audubon Society 2011). There are no Audubon Important Bird Areas that have been identified in or near the Project Area.

8.19.4 Impacts

Wildlife habitat impacts are expected to be minimal because turbines and access roads will be placed on agricultural lands, with the exception of some potential minor impacts to drainage ditches and associated wetlands, grasslands, and shrubland which will be identified during micrositing (see Table 20). It is estimated that less than 1% of the land area within the Project Area will be affected by permanent construction. Grasslands,

forested areas, shrublands, streams/drainages, and wetlands will be avoided whenever possible.

The Project Area has similar general habitat and wildlife species composition as many other wind farms in the upper Midwest, and it is anticipated that bird fatality rates documented at other locations will be similar to the proposed Project. Studies outside of California have identified an average of 1.83 fatalities/turbine/year for all birds (0.006 are raptors). Studies at nearby Buffalo Ridge in Lincoln County, Minnesota estimated a range of 1.43-5.93 fatalities/MW/year (Erickson et al. 2002). Potential indirect impacts to breeding birds due to displacement by turbines and roads are anticipated to be negligible because turbines, access roads and associated facilities will largely be sited on agricultural lands (see Table 20).

Potential bat roosting habitat at the site includes trees and a few old farm buildings; abandoned buildings can provide potential roosting habitat for bats. Stands of trees are relatively sparse. Most wooded areas consist of shelter belts or small woodlands surrounding active farmsteads and residences, or wooded hillslopes along drainages and streams. Dominant tree species observed during a 2010 site visit included a mix of bur oak, locust, box elder, and cottonwood. While numerous structures were identified, few of these appeared to be abandoned. Consequently, there appears to be somewhat minimal roosting and hibernacula habitat for bat species within the Project Area.

Bats may forage over the entire Project Area, although the extent of use is not known. Bat fatalities have been reported for most wind farms where post-construction monitoring data is available. Reported estimates of bat mortality at wind farms through 2001 ranged from 0.07 to 10 bats/turbine/year. Bat fatality rates in the Upper Midwest have been estimated at 1.7 bats/turbine/year or 2.7 bats/MW/year (NWCC 2004). However, recent reports from the Wisconsin DNR indicate that some studies on wind farms in that state are showing preliminary average fatality rates for bats that are higher than national averages. Fatalities of birds and bats are highly variable among facilities and regions of the country (NWCC 2010). Most documented bat fatalities at wind farms have been migratory species that conduct long migrations between summer roosts and winter hibernacula. The exact magnitude of these mortalities and the degree to which bat species may be affected is difficult to determine. The relatively flat to gently undulating topography of the Project Area and vicinity does not appear to contain topographic features that would funnel bat movements during migration.

The overall impact of the proposed Project on wildlife is expected to be minimal. Operation of the wind farm will not change adjacent land uses and a relatively small portion of the Project Area will be affected by construction activities. Also, because all wind farm facilities will be sited on agricultural land, with the exception of minor wetland, grassland and shrubland impacts associated with access roads and collection lines, habitat impacts are expected to be negligible. There is some potential for avian and bat collisions with facility turbines; however, based on the distance of the project to managed lands, and minimal roosting habitat for bats within the Project Area, impacts are

not expected to be different from results of other previous studies conducted in similar agricultural settings in Minnesota.

Shell Rock Wind requested up-to-date comment letters from both the MnDNR and USFWS on December 23, 2010 after the project boundary had been further refined. The refinement of the project boundary resulted in the project being further away from managed lands, thus reducing the potential for impacts to these lands and associated wildlife. Westwood also requested an up-to-date NHIS request from the MnDNR. Some of the wildlife agency concerns in the original letters are a function of the larger, less refined, Project Area. These are generally related to proximity to wildlife lands such as Waterfowl Production Areas (WPAs), Wildlife Management Areas (WMAs), Designated Wildlife Lakes, Public Waters Inventory (PWI) basins and streams, and Conservation Reserve Program (CRP), Wetland Reserve Program (WRP), Reinvest In Minnesota (RIM), and DNR Native Prairie Bank easements. Only CRP occurs in the Project Area, or within a half mile buffer of the Project Area, and it occurs in isolated areas, mostly along stream corridors. Westwood received a revised comment letter from MnDNR on January 7, 2011 (**Appendix B**). The MnDNR notes that "the revised project boundary is located in an area with less potential impacts to natural resources than previous project boundaries."

Wildlife agency coordination as part of the Critical Issues Analysis yielded a variety of pre-construction avian and bat survey recommendations. The USFWS recommended migration and breeding season bird surveys, raptor nest surveys and monitoring, radar studies for birds and bats, and bat detection using Anabat detectors. DNR Ecological Services considered portions of the Project Area, namely the southeast quarter, to be high risk for bird and bat fatalities due to the proximity of the project to Upper Twin Lake and Bear Lake (Designated Wildlife Lakes/Waterfowl Resting and Feeding Areas/Public Waters) and Lower Twin Lake (Designated Wildlife Lake/Public Water). Therefore, the state agency recommended avian flight characteristic surveys to help determine the fatality risk of the project. However, after reviewing the revised Project Area, the MnDNR "considers the revised Project Area to be low/moderate risk for bird and bat fatalities from operational wind turbines" and does not recommend pre-construction surveys but recommends at least one year of post-construction fatality monitoring. The MnDNR NHIS recommended a Loggerhead Shrike Habitat Assessment due to a record of this state-threatened bird within a mile of the generalized boundary. The Applicant requested modified comment letters that reflect the current permitting boundary. A formal letter response was received from NHIS staff on February 25, 2011 (**Appendix B**) indicating that they concur with the revised assessment of DNR Ecological Services and that "they do not believe the proposed project will adversely affect any known occurrences of rare features." Because the permitted boundary is smaller than the original, it is anticipated that recommendations and comments from the USFWS may also be modified. The Applicant will continue wildlife agency coordination based on the permitted project boundary and agency concerns and to evaluate the need for pre- and post-construction surveys.

8.19.5 Mitigation

Wildlife habitat impacts will be mitigated by: (1) siting turbines, roads and other facilities on cultivated/agricultural land rather than natural wildlife habitat (with the possible exception of a few minor unavoidable areas for utility and access road crossings); (2) using tubular monopole towers to minimize perching; (3) placing electrical collection/feeder lines underground; (4) implementing a Wildlife Response Reporting System (WRRS) once turbine construction is completed (the WRRS will include protocols for field technicians during routine maintenance operations to report and document avian mortalities); (5) Minimally lighting turbines and meteorological towers while meeting FAA requirements; (6) designing to avoid impacts to wetlands, streams, forested areas and shrublands to the extent practicable, and (7) minimizing other Project infrastructure. An Avian and Bat Protection Plan (ABPP) will also be prepared prior to project construction, and will function to outline Best Management Practices to minimize and reduce risks for birds, bats and their habitat.

8.20 Rare and Unique Natural Resources

8.20.1 Description of Resources

Shell Rock Wind reviewed publicly available sources of information regarding federal and state-listed threatened and endangered species known or likely to be found within the Project Area. A formal Natural Heritage Information System (NHIS) data request was submitted to the Minnesota DNR (MnDNR) Natural Heritage Program, which maintains the most up-to-date database of rare species records. The formal response received from natural heritage review staff indicates that their search of the state database did identify rare features within an approximate one-mile radius of the proposed project, but these records were either historical or not of concern given the project details that were provided with the data request (**Appendix B**).

Federally Listed Species

The USFWS maintains a list of federally listed threatened and endangered species that are known or have the potential to exist in Minnesota counties (USFWS 2010). There are no federally listed species known to occur, or with potential to occur, in Freeborn County. However, the Minnesota Rare Species Guide [Web Application] lists the Western Prairie Fringed Orchid as known to occur in Freeborn County. This is based on one historic record from 1939; the species has not been recorded since. Due to the historic nature of this record and the lack of re-confirmation records since 1939, the USFWS does not list this species in Freeborn County. Accordingly, no federally listed threatened and endangered species are expected to exist in the Project Area.

Similar to MnDNR NHIS coordination, a USWFS comment letter received November 24, 2010 referenced the larger, less refined, Project Area that may cause some recommendations to be revised. At the time of the original letter, there were “no

federally-listed candidate, threatened, or endangered species present within Freeborn County, Minnesota." Shell Rock Wind requested comments on the current Project Area on December 23, 2010. As of this time, the USFWS has not provided a formal revised response letter; however, it is anticipated that some surveys may still be recommended. Shell Rock Wind will follow up with the USFWS and coordinate potential concerns it may have regarding threatened or endangered species and the Project. Once a more complete understanding of USFWS concerns is developed, Shell Rock Wind will work with the USFWS to address them.

State-Listed Species

Westwood's licensed NHIS data (current as of January 5, 2010) shows that there are 2 records in the one-mile buffer of the larger, original Project Area, and one record partially within the one-mile buffer of the smaller, refined Project Area. The Minnesota County Biological Survey data and NHIS data show no records within the Project Area. This includes Native Plant Communities, Sites of Biodiversity Significance, Railroad right-of-way prairies, and NHIS rare species records. There are three sites below biodiversity significance in the one-mile buffer, two of which are associated with the railroad approximately three-quarters of a mile north of the Project Area and one that is associated with a small woodland. There is one NHIS record of state-listed special concern common Moorhen that is associated with Twin Lake and partially within the one-mile buffer; however, this species was last observed in 1955.

To further assess the likelihood that state-listed threatened, endangered and special concern species might be potentially found in the Project Area, the life histories and distribution data for each of the listed species for Freeborn County were researched from the Minnesota DNR Rare Species Web Application (MnDNR 2007 and 2008). None of the seven listed plant species are known to occur in the Project Area. Most listed plant species are associated with sand and gravel prairies, high quality native dominated sedge meadows and floodplain forests along larger rivers. Some species are associated with high quality remnants of habitat types that occur in the Project vicinity (i.e., the railroad right-of-way prairie associated with Iowa, Chicago, and Northeastern Railroad), but impacts are not expected as these features are outside the Project Area. Due to the extent of agricultural disturbance, it is unlikely that state-listed plant species exist in the Project Area.

The Minnesota DNR lists three bird species, two insects and one reptile species found in Freeborn County as endangered, threatened or special concern. All three avian species have specific habitat requirements: loggerhead shrike (threatened) characteristically inhabits open grassland with sparse trees or hedgerows for nesting; bald eagle (special concern) inhabits riparian woodlands and lakes; and the common moorhen (special concern) typically inhabits freshwater cattail marshes. There are NHIS records of all three species in Freeborn County; both the loggerhead shrike and common moorhen records are within 1.5 miles of the Project Area. The Bald Eagle record occurs in northeastern Freeborn County. The loggerhead shrike has low potential to occur in the Project area as suitable grassland habitat is very limited. The Project Area lacks breeding

habitat for common moorhen and bald eagle, but these species may occur in the Project Area as migrants. Due to their specific habitat requirements and the lack of suitable habitat in the Project Area, there is low potential for these species to breed in the Project Area.

Two species of insects are listed for Freeborn County: arogos skipper and regal fritillary, both special concern species. Records for these species are likely associated with the Osmundson Prairie Scientific and Natural Area (SNA), a 6-acre parcel in Faribault County, immediately adjacent to Freeborn County. Due to the lack of suitable aquatic habitat, it is unlikely that any of the listed mussel species exist within the Project Area.

The Blanding's turtle is a state threatened reptile known to occur in Freeborn County. The Blanding's turtle inhabits calm, shallow wetlands rich with aquatic vegetation and sandy uplands. There are two records of this species in Freeborn County, both more than five miles from the Project Area. There is limited habitat for Blanding's turtle in the Shell Rock Wind Project Area.

Overall potential for rare species to occur in the Project Area is low. The forthcoming response from the USFWS will clarify potential concerns specific to the current Project Area. Additionally, the need for pre-construction avian and bat surveys will be coordinated with agencies to address concerns.

Based on the few rare species records in the Project vicinity, and lack of suitable habitat to support rare species in the Project Area, no adverse impacts to rare and unique resources are anticipated from the Project. Mitigation of potential impacts to rare and unique resources will be in the form of avoidance. The siting of turbines, access roads and other infrastructure will be carried out in a manner that avoids impacts to rare plant communities and threatened, endangered or special concern plant and animal species. As previously discussed, turbine, access road and collector line locations are expected to be primarily on agricultural cropland so as to avoid potential rare or unique natural resources.

8.20.2 Native Prairie

Shell Rock Wind evaluated the presence of Native Prairie Bank easements in the Project Area and determined that there are no such banks located on the site or within Freeborn County (which potentially support rare plant species). There were also no potential native prairie stands observed within the Project Area during a field review in September 2010.

8.21 Preconstruction Inventories

Shell Rock Wind will conduct the following preconstruction inventories concerning the Project as determined necessary in coordination with regulatory agencies:

- Avian and bat surveys (the type and duration of which will be evaluated once all revised comment letters are received from wildlife agencies);
- Phase I Archaeological survey; and
- Wetland delineation and inventory.

Shell Rock Wind will submit copies of these preconstruction inventories to the PUC as they become available.

9.0 SITE CHARACTERIZATION

9.1 Description of Resources

The Department of Energy's Wind Program and the National Renewable Energy Laboratory (NREL) recently published a new wind resource map for Minnesota (January 2010). This revised wind resource map shows the predicted mean annual wind speeds at 80-m height. The wind resource across Southeastern 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. These revised data suggest that the long-term mean annual 80-m wind speeds across Freeborn County in the area of interest for the Shell Rock Wind Farm range from 7 to 8 meters per second (mps) (15.7 to 17.9 mph) (WPA 2010).

The temporary meteorological tower for the project (MET 0020, datum WGS84) is located at N43° 37.4852', W093° 29.2355' and is installed at an elevation of 406 meters (1,334 feet) above mean sea level (AMSL). Meteorological tower 0020 is located atop a slight rise in terrain, and has a total height of 265.8 feet. The meteorological tower is a Sabre 80m lattice-type guyed tower and is equipped with an NRG IceFree3 Anemometer and directional vane. It meets FAA lighting requirements with an attached L350-864-G medium intensity red light.

Shell Rock Wind Farm has collected data from this facility for 13 months between September 4, 2009 and September 27, 2010 at ten-minute intervals, and has engaged a wind resource consultant (WindLogics) to estimate the long term wind resource at the Shell Rock Wind Farm for purposes of assessing the viability of wind energy generation. Based on measured data, the average annual wind speed at the site is 7.90 m/s at an 80-meter hub height (17.7 miles/hour at 262.5 feet). The long-term wind speed was estimated at 8.18 m/s by WindLogics.

Ground elevations in the Project Area vary only slightly from 1,263 feet to 1,365 feet above mean sea level, with the land generally rising from west to east. This part of Minnesota is characterized by nearly level to gently undulating ground moraine topography. Public drainage ditches exist in several locations across the site, but the

depressions they cut in the terrain are fairly shallow and likely do not significantly influence winds near the surface.

The climatological characteristics representative of the Shell Rock Wind Farm were gathered from data collected by the National Climatic Data Center (NCDC) at the Albert Lea weather station. The climatological temperature information recorded at the Albert Lea station indicates an annual daily average maximum temperature of 54.0°F, a minimum of 33.9°F, and an annual daily average temperature of 44.0°F. The average annual precipitation for the site is approximately 33.1 inches (HPRCC 2010).

9.1.1 Interannual Variation

Figure 1 below shows modeled annual average wind speeds between 1970 and 2009. Annual average wind speeds range between approximately 7.75 m/s and 8.54 m/s during the time period. The Shell Rock wind resource consultant (WindLogics) developed site-specific annual wind speed averages by using their proprietary and widely utilized 'Enhanced Measure, Correlate, Predict' (E-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 13 months of actual measured data from the site meteorological tower between September 4, 2009 and September 27, 2010. The long-term data used is historical information available from the National Centers for Environmental Prediction / National Center for Atmospheric Research (NCEP/NCAR).

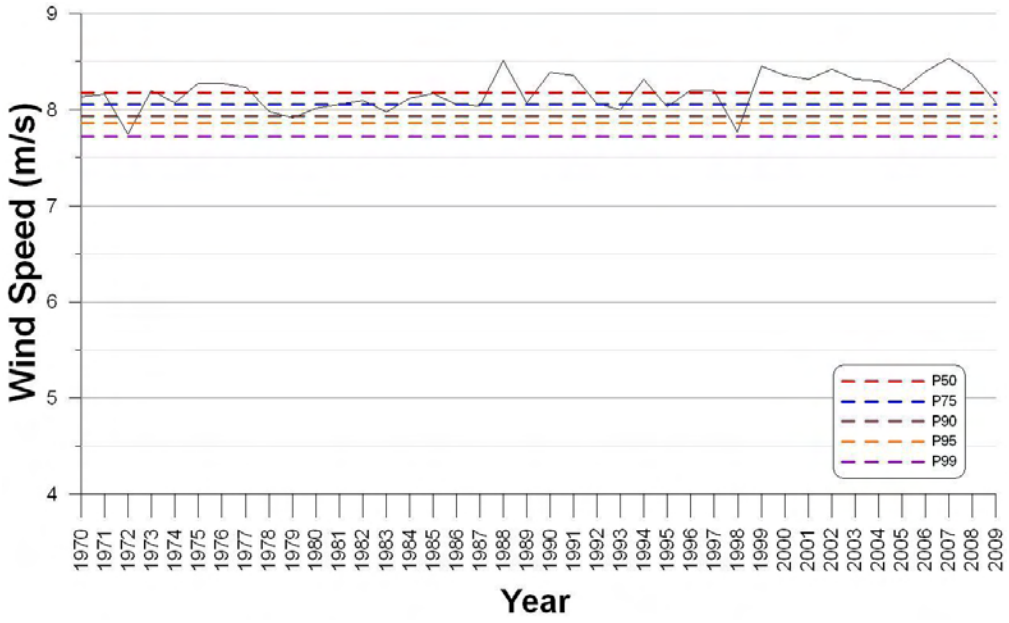

Figure 1. Graph of Annual Wind Speed Average Time Sequence.

9.1.2 Seasonal Variation

Seasonal wind variations were studied using the project meteorological tower 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 October at 8.73 m/s (19.53 mph) and lowest in July at 7.17 m/s (16.04 mph).

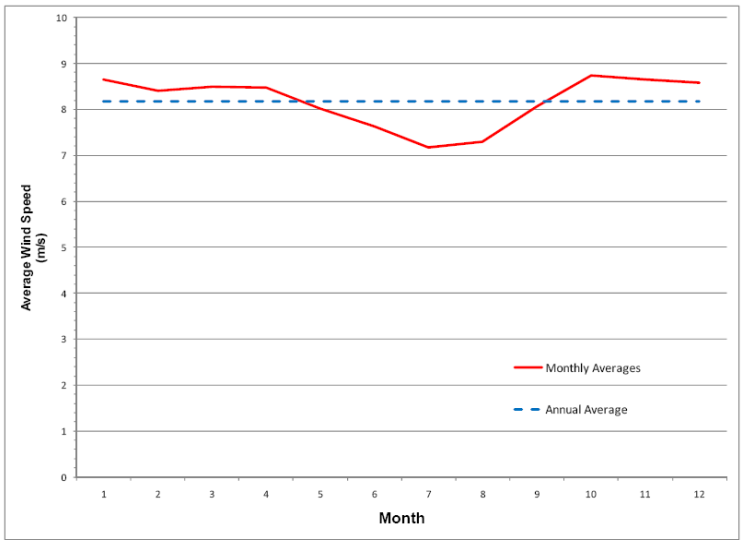

Figure 2. Seasonal Variations in Wind Speeds at 80 Meters

9.1.3 Diurnal Conditions

As shown in Figure 3, the daily wind pattern at the Shell Rock Wind Farm site has an increase in wind speeds during the evening and overnight hours as the atmosphere heats from the ground upward and convective mixing occurs (Figure 3). 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.

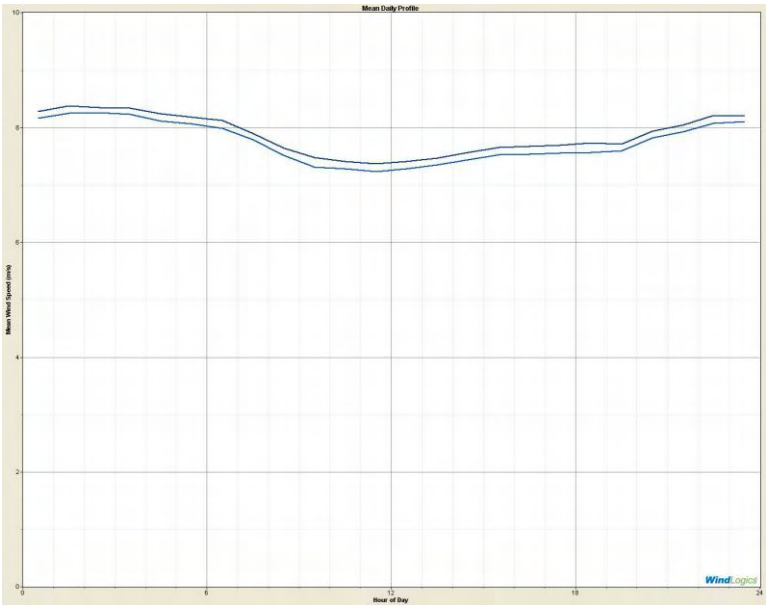

Figure 3. Diurnal Wind Speed Pattern at Shell Rock Wind Farm

9.1.4 Atmospheric Stability

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

9.1.5 Hub Height Turbulence

The turbulence intensity at the site 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 Shell Rock Wind Farm is on average 9.45% at 78 m 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.

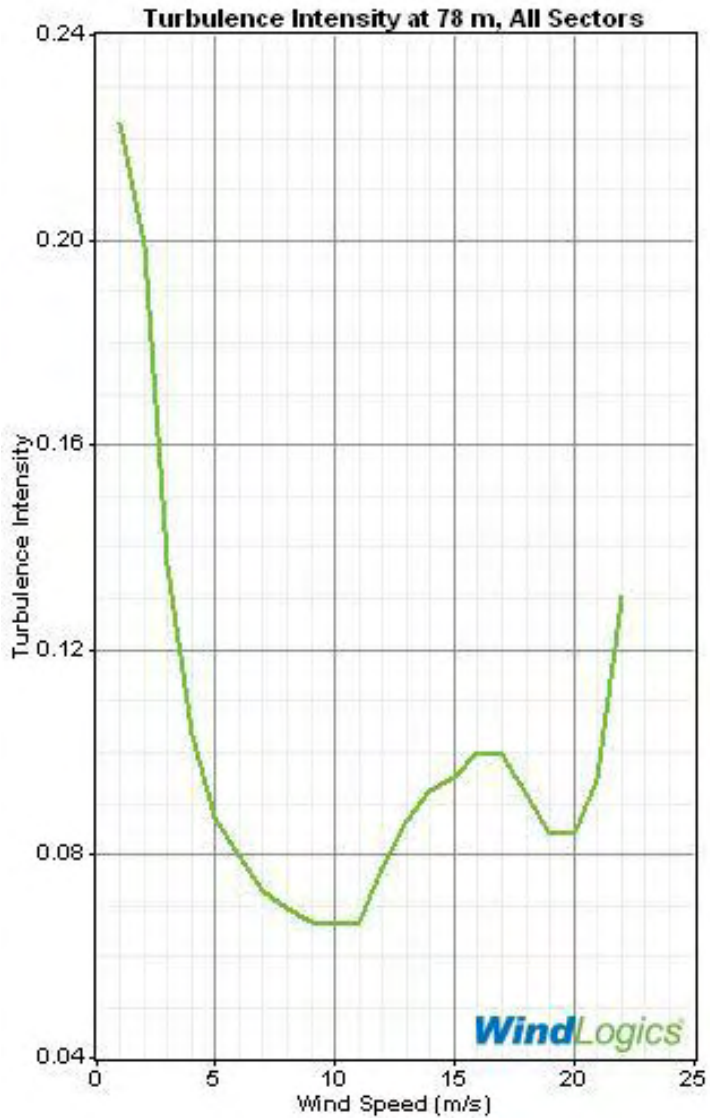

Figure 4. Turbulence Intensity (%) for a Range of Wind Speeds (m/s)

9.1.6 Extreme Wind Conditions

The extreme wind speeds for the project were estimated by the project wind resource consultant WindLogics using the 13 months of measured wind data from the site meteorological tower between September 4, 2009 and September 27, 2010. The estimated 50-year maximum 10-minute average wind speed at the Project Area is 28.5 m/s (63.8 mi/h). There have been 42 tornadoes in Freeborn County over the past 60 years. Other extreme conditions that occur around the Project Area are thunderstorms during the summer months and blizzards during the winter months.

9.1.7 Wind Speed Frequency Distribution

Figure 5 provides the anticipated long-term annualized wind speed frequently distribution for the Shell Rock Wind Farm meteorological tower at 80 meters (262.5 feet).

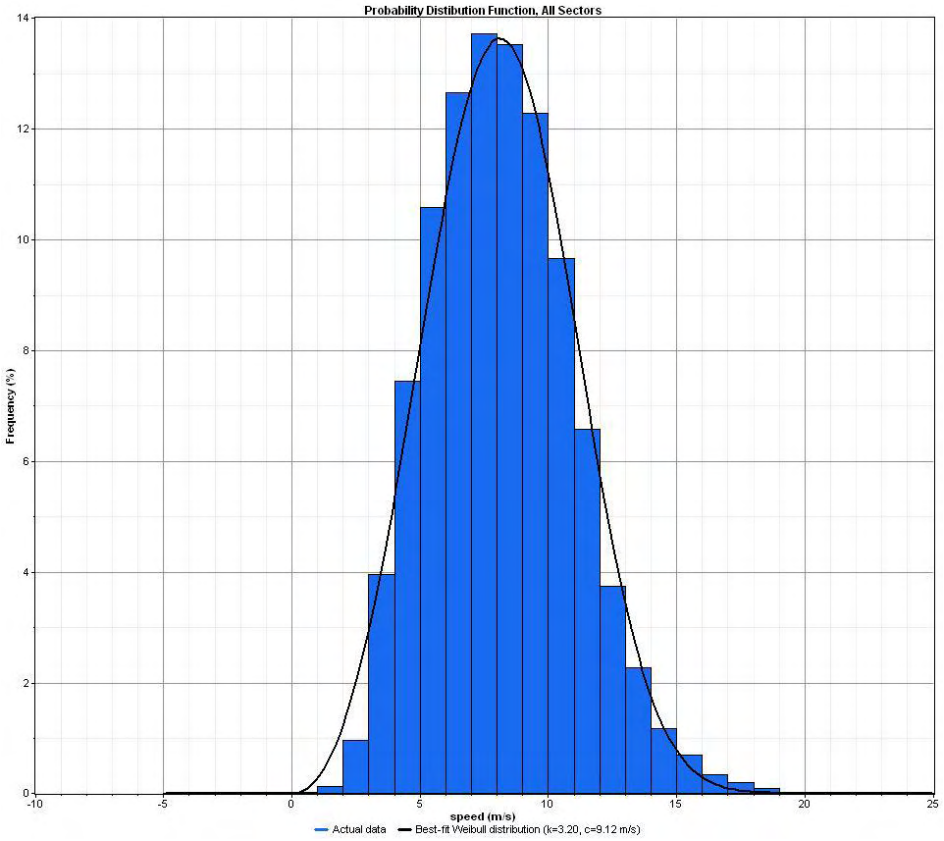

Figure 5. Annual Average Wind Speed Frequency Distribution at 80 meters.

9.1.8 Wind Variation with Height

Based upon data collected from the Shell Rock Wind Farm meteorological tower during the 13 month data collection period between September 4, 2009 and September 27, 2010, the average wind shear ration of 0.20 was derived from the maximum value of two 78 m above ground level (AGL) wind speed sensors and the maximum value of two 70 m AGL wind speed sensors. The estimated average wind speeds at 80 meters AGL is 7.90 m/s during the 13-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.

9.1.9 Spatial Wind Variation

Due to the relatively uniform topography of the Project Area, significant variation in wind speed is not expected. 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 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 tower. Winds at the Shell Rock Wind Farm site prevail from the northwest with occasional periods of south/southeasterly flow. Northwesterly flow dominates the winter months while southeasterly wind directions are common during the spring, summer, and fall months. Figure 6 shows an annual wind rose at the met tower location.

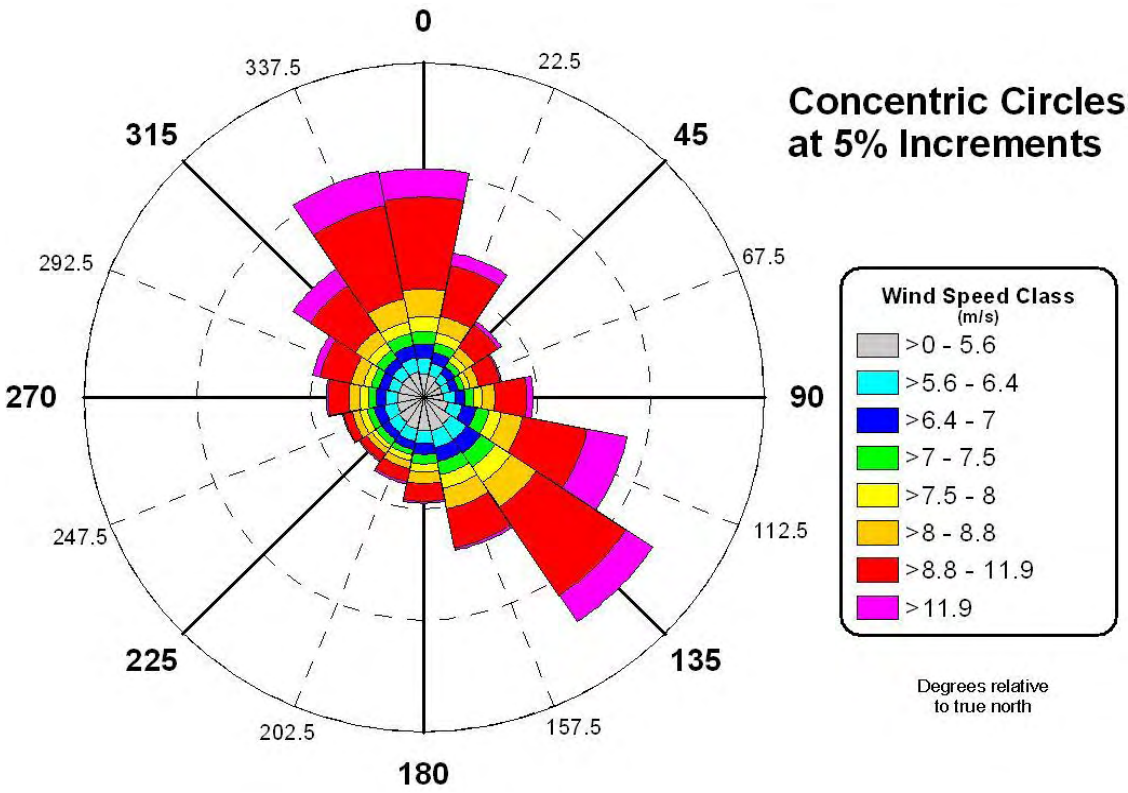

Figure 6. Annual Long-Term Wind Speed and Direction Rose (80 m) – WindLogics 2010

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 a National Weather Service climate station located approximately eight miles east of the site near Albert Lea (Station 210075; Latitude: 43° 36' N Longitude: 93° 18' W) was used to represent meteorological conditions at the site. The warmest month of the year is July with an average maximum temperature of 83.3 degrees Fahrenheit, while the coldest month of the year is January with an average minimum temperature of 4.8 degrees Fahrenheit. Temperature variations between night and day tend to be moderate during summer with a difference that can reach 22 degrees Fahrenheit, and more limited during winter with an average difference of 17 degrees Fahrenheit. The annual average precipitation at Albert Lea is 30.78 inches. Rainfall is fairly evenly distributed throughout the year, with the wettest month being July with an average rainfall of 4.56 inches.

Extreme weather events in the Project Area have been recorded by the National Climatic Data Center (NCDC) in the US Storm Events Database for the period of time from January 1950 through August 2010. 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 365 extreme weather events in Freeborn County during this time period including 48 tornadoes, 12 high wind events, 103 thunderstorm wind events, and 6 blizzards. Typically, such storms are local in extent, short in duration, and result in damage to relatively small geographic areas (NCDC 2010).

9.2 Other Nearby Wind Turbines

The Bent Tree Wind Farm, just completed in 2011, is located approximately four miles north of Albert Lee and five miles north of the proposed Shell Rock Wind Project in Hartland, Manchester, Bath, and Bancroft townships, Freeborn County. This project has approximately 122 installed turbines. No other commercial-scale wind turbines area known to exist within the county.

10.0 PROJECT CONSTRUCTION

Professional design engineering firms and experienced pre-qualified trade contractors will be hired for the design and construction of the Project. Avant Energy, Inc., as the Agent for MMPA, will have overall project management responsibilities. Contracts for construction and third party testing and inspection services will be awarded for civil work, electrical work, and noise analysis and turbine erection. The services of local contractors to assist in Project construction will be considered where possible. The construction team will be on-site to handle materials purchasing, construction, and quality assurance. An on-site Construction Manager will coordinate all aspects of the work, including ongoing communication with local officials, citizens groups, and landowners.

The Construction Manager will also oversee the installation of roads, concrete foundations, towers, turbines and blades, electrical infrastructure, as well as the coordination of materials receiving, inventory, and distribution.

The permanently impacted area is considered to be only the land that will be disturbed by the exposed portions of the turbine foundations, permanent access roads, and the substation footprint. Approximately 15 acres (or less than 1%) of the total project site are anticipated to be permanently impacted utilizing the more intensive GE 1.5xle layout. Impacts associated with the Vestas V90 layout are expected to be less. The collector system will be underground and is 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 90 to 230 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 Shell Rock Wind. 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 to meet applicable state and local requirements. The roads will consist of graded dirt, overlaid with geotechnical fabric (if needed) and covered with gravel. To facilitate crane movement and equipment delivery, additional gravel roadway will be temporarily installed on either side of the permanent roadway. The temporary roads will be approximately 40 to 45 feet wide.

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 60-foot diameter gravel work area centered on the base of each turbine will be needed after construction. 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. Roads will include appropriate drainage and culverts while allowing for the crossing of farm equipment.

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. Access roads will be re-graded, filled, and dressed as needed after construction is completed.

10.3 Associated Facilities

Because an Operation and Maintenance Facility will not be constructed for the project, the only other associated facility will possibly be one permanent meteorological tower. Details regarding the meteorological tower, and installation, are provided in Section 6.3.2.

10.4 Turbine Site Selection

Construction of the turbines will involve both permanent and temporary impacts. In order to access the turbine locations with delivery trucks and construction cranes, the access roads will be temporarily enlarged by 12 to 15 feet on either side. 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. In addition, 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, temporary crane pads and lay down areas will be restored and access roads will be returned to their permanent width of approximately 16 feet.

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). Typical foundation design include freestanding towers connected by stud races embedded in concrete or by anchor bars embedded in the foundation with high quality grout (e.g. L-flange tower base or T-flange tower base). Turbine pads generally range in width from 50 to 65 feet and from 4 to 6 feet in depth. Material removed to excavate the turbine foundation is expected to range from 800 to 900 cubic yards, depending upon the turbine size. The project intends to balance the site, whereby any excavated material is fully utilized as fill within the Project Area. During construction, top soil will be piled separately from sub soils, and a silt fence may be installed around the base of the pile to contain the material and control runoff. Geotechnical surveys, turbine tower load specifications and cost considerations will dictate final design parameters of the foundations.

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. Disturbed soils will be reclaimed, and temporarily disturbed areas will be restored to their previous use (e.g., agricultural use) upon turbine commissioning. As described further in Section 10.10, Shell Rock Wind 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. Shell Rock Wind 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

Shell Rock Wind Farm, LLC will pursue contractual agreements with prequalified service providers for operation and maintenance services for the project. Avant Energy, Inc., as the project Owners Agent, will oversee operation and maintenance (O&M) of the facilities. Maintenance and service agreements may be negotiated as part of the Turbine Supply Agreement with the turbine manufacturer, or to other pre-qualified O&M providers. Avant Energy, Inc. will oversee all maintenance, management and service activities of the

turbines and supporting facilities, monitoring transmission interconnection and ensuring O&M response to turbine outages is timely.

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. The O&M 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. Civil maintenance will include maintaining Project structures, as well as access roads, drainage systems, and other facilities.

The O&M contractor will address both scheduled and unscheduled major maintenance on the wind farm, including repairs, replacement of parts and removal of failed parts. The O&M 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 on-going 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 under the interconnection agreement.

Other maintenance 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.

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 during the initial commercial operation date, the turbines will be remotely monitored on a continuing basis with planned service and maintenance at routine intervals recommended by the turbine manufacturer.

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 Supervisory Control and Data Acquisition (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 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. The SCADA system also reports and archives generation data. Design of the SCADA system is not yet finalized.

The turbines will be monitored and operated remotely. Shell Rock Wind Farm, LLC may enter into contractual agreements with a third party or parties to provide off-site operations, and on-site service and maintenance for the Project.

10.7 Costs

The Shell Rock Wind project will be financed by the MMPA through various private financing resources including bond sales. Overall project cost for construction is currently projected to be approximately $100M excluding interconnection costs. The bulk of Project costs are attributed to the wind turbine equipment. Annual ongoing operating and maintenance costs are expected to be on the order of $2.0M.

10.8 Schedule

Shell Rock Wind expects to begin construction of the Project in May 2012 and plans to begin commercial operation by December 31, 2012. To accomplish this, Shell Rock Wind has acquired wind rights and easement agreements from landowners, which are substantially complete. Shell Rock Wind expects the Site Permit to be issued within approximately six months of this Application's acceptance. Preconstruction studies are currently underway and will continue through summer 2011. Equipment deliveries and site mobilization will be initiated upon the issuance of the Site Permit and will continue through construction.

Shell Rock Wind 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. The commercial operation date is dependent on the completion of permitting and other development activities.

10.9 Energy Projections

Shell Rock Wind Farm, LLC has performed wind and energy production analysis using measurements collected at the nearby project meteorological tower between the dates of September 4, 2009 and September 27, 2010. The long-term average wind speed results were estimated at 8.18 m/s by wind resource consultant WindLogics, corresponding to a net capacity factor value of approximately 44%. Based on the inter-annual variation in wind speed, long-term annual generation projections range from 148,000 to 182,000 MWh. Energy estimates will be further analyzed after the final design and layout of the wind farm has been completed.

10.10 Decommissioning and Restoration

10.10.1 Anticipated Life of the Project

In the agreement with landowners, Shell Rock Wind Farm, LLC, identifies the term of the agreement to be effective for a thirty (30) year initial term with two renewal provisions, each for an additional term of fifteen (15) 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; however, adequate funds will be set-aside with oversight of an independent administrator of such funds on behalf of the Project.

10.10.3 Method and Schedule for Updating Decommissioning/Restoration Costs

The independent administrator will report annually to the Project on the status of the decommissioning funds. The Project will establish a recurring reporting interval to provide the independent administrator with an updated budget for the cost of decommissioning the plant in current-year and in decommissioning-year dollars.

10.10.4 Ensuring Availability of Funds for Decommissioning and Restoration

The project owner and operator (MMPA) will administer this project with governance and good practice as it does its other generating assets and facilities. Over the life of the project, the Applicant will budget and maintain funds to cover decommissioning costs. Shell Rock Wind has a contractual obligation with landowners for remediation of the properties back to a condition comparable to that of the property prior to the installation of the wind project.

10.10.5 Anticipated Methods of Site Decommissioning and Restoration

Following termination of the landowner agreement, Shell Rock Wind 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 Shell Rock Wind's sole cost and expense. Easement agreements include a license to enter the Property to perform such removal and restoration. There are provisions within the landowner agreement 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. Shell Rock Wind 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 Shell Rock Wind'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 original.

Shell Rock Wind Farm, LLC requests the right to re-evaluate decommissioning alternatives at the end of the LWECS Site Permit term and to update decommissioning costs. Shell Rock Wind 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. Shell Rock Wind 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 21. Permits dependent on the final site layout will be applied for after receiving PUC approval, but prior to construction.

Table 21: Potential Permits and Approvals Required for Construction and Operation of the Proposed Facility

Agency		Name and Type of Approval
Federal	Federal Aviation Administration	Notice of Proposed Construction or Alteration (within six miles of Public Aviation Facility and structures over 200 feet to complete a 7460 Proposed Construction or Alteration Form)
		Determination of No Hazard
	U.S. Army Corps of Engineers	Section 404 Permit (for discharges of dredged or fill material into waters of the United States, and adjacent wetlands)
State of Minnesota	Minnesota Public Utilities Commission	Large Wind Energy Conversion System (LWECS) Site Permit
	Minnesota State Historic Preservation Office	Cultural and Historical resources review; State and National Register of Historic Sites review
	Minnesota Department of Natural Resources	Public Waters Work Permit
		License to Cross Public Lands and Waters

Table 21: Potential Permits and Approvals Required for Construction and Operation of the Proposed Facility		
Agency		**Name and Type of Approval**
	Minnesota Pollution Control Agency	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	Plumbing Plan Review
		Water Well Permit
	Minnesota Department of Transportation	Utility Access Permit
		Highway Access Permit
		Aviation clearance from Office of Aeronautics (review and approval of FAA 7460 permit, if needed)
		Oversize and Overweight Permit
Local	Freeborn County	Building Permit
		Conditional Use Permit
		Roadway Access Permit
		Drainage Crossing Permit
		Work in County Highway Right-of Way Permit
		Overweight Vehicle Permit
		Utility Permit
	Freeborn County Soil and Water Conservation District	Wetland Conservation Act Approval
	Pickerel Lake Township	Roadway Access and Utility Permits

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