DOE/EA-1791

FINAL
ENVIRONMENTAL ASSESSMENT

FOR THE

UNIVERSITY OF MINNESOTA WIND ENERGY RESEARCH CONSORTIUM PROJECT

ROSEMOUNT, MINNESOTA

U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
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List of Acronyms and Abbreviations

ACM	Asbestos Containing Material
ARRA	American Reinvestment and Recovery Act
APE	Area of Potential Effect
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
dBA	A-weighted Decibel
DCTC	Dakota County Technical College
DOD	Department of Defense
DOE	Department of Energy
EA	Environmental Assessment
FAA	Federal Aviation Administration
GOW	Gopher Ordnance Works
IBA	Important Bird Area
kV	kilovolt
MAES	Minnesota Agricultural Experiment Station
MCBS	Minnesota County Biological Survey
met	meteorological
MNDNR	Minnesota Department of Natural Resources
MPCA	Minnesota Pollution Control Agency
MW	Megawatt
NAC	Noise Area Classification
NEPA	National Environmental Policy Act
NHIS	Natural Heritage Information System
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NRCS	Natural Resource Conservation Service
OSHA	Occupational Safety and Health Administration
PUC	Public Utilities Commission
RARL	Rosemount Aeronautical Research Laboratory
Section 106	Section 106 of the National Historic Preservation Act of 1966
SHPO	State Historic Preservation Officer
SGCN	Species in Greatest Conservation Need
SWPPP	Stormwater Pollution Prevention Plan
106 Group (The)	The 106 Group Ltd.
UMore Park	University of Minnesota Outreach, Research, and Education Park

List of Acronyms and Abbreviations

University	University of Minnesota
USACE	U.S. Army Corps of Engineers
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VHF	Very High Frequency
VOR	VHF Omnidirectional Range

1.0 INTRODUCTION

1.1 BACKGROUND

The American Recovery and Reinvestment Act (ARRA) of 2009 provided funds to the U.S. Department of Energy (DOE) as part of the federal effort to stimulate the economy and to create and retain jobs. DOE is using some of these funds to encourage focused research on critical wind energy challenges by a consortium of institutions of higher learning and industry in order to help DOE meet its national renewable energy goal of 20 percent by 2030. In addition, these funds would support the mission of the ARRA program established by Congress and implemented by DOE to reduce energy use and emissions. Providing funding would partially satisfy the need of that program to assist U.S. cities, counties, states, territories, and Native American tribes to develop, promote, implement, and manage energy efficiency and conservation projects and programs.

On May 29, 2009, DOE issued Funding Opportunity Announcement Number DE-FOA-0000090: "Recovery Act: Wind Energy Consortia between Institutions of Higher Learning and Industry." On October 27, 2009, after reviewing the responsive grant applications, DOE formally notified the University of Minnesota Consortium that it had been selected for negotiations leading to one of three available awards.

DOE Golden Field Office is now considering whether to authorize the use of federal funds by the University of Minnesota (University) to design, permit, construct, and operate a 2.5-Megawatt (MW) Clipper Liberty wind turbine and an associated 34.5-kilovolt (kV) low-voltage transmission line at the University of Minnesota Outreach, Research, and Education Park (UMore Park) in Rosemount, Minnesota (referred to here as the Proposed Project). UMore Park is owned by the University and is located in Dakota County, Minnesota, approximately 25 miles southeast of the Twin Cities campus (Figure 1). The Proposed Project would be located on a 212-acre section of land in the northeastern corner of the UMore Park property (Figure 2). The permanent construction-related footprint of the proposed turbine facility on the University's 7,822 acres of property would be approximately 0.6 acres.

In addition to the proposed wind turbine and related infrastructure, DOE federal funds would pay for state-of-the-art sensors, measurement devices, and other equipment for use at UMore Park and other University research facilities. The total grant award to the University for the Proposed Project, including the wind turbine and associated research, is approximately $7.98 million. Including recipient cost share, the total cost of the University's Proposed Project is $11.16 million.

The proposed research turbine and associated facilities would allow the University and its industrial partners to complete a range of research and development projects. The turbine and related research equipment would be used, for example, to validate and reinforce research findings regarding turbine wake interaction, wind farm interaction, and wind energy efficiencies. The University consortium's research and development plan also includes active and passive flow control strategies to increase energy capture, improve turbine operations, and reduce structural loads and fatigue.

Figure 1. Location Map

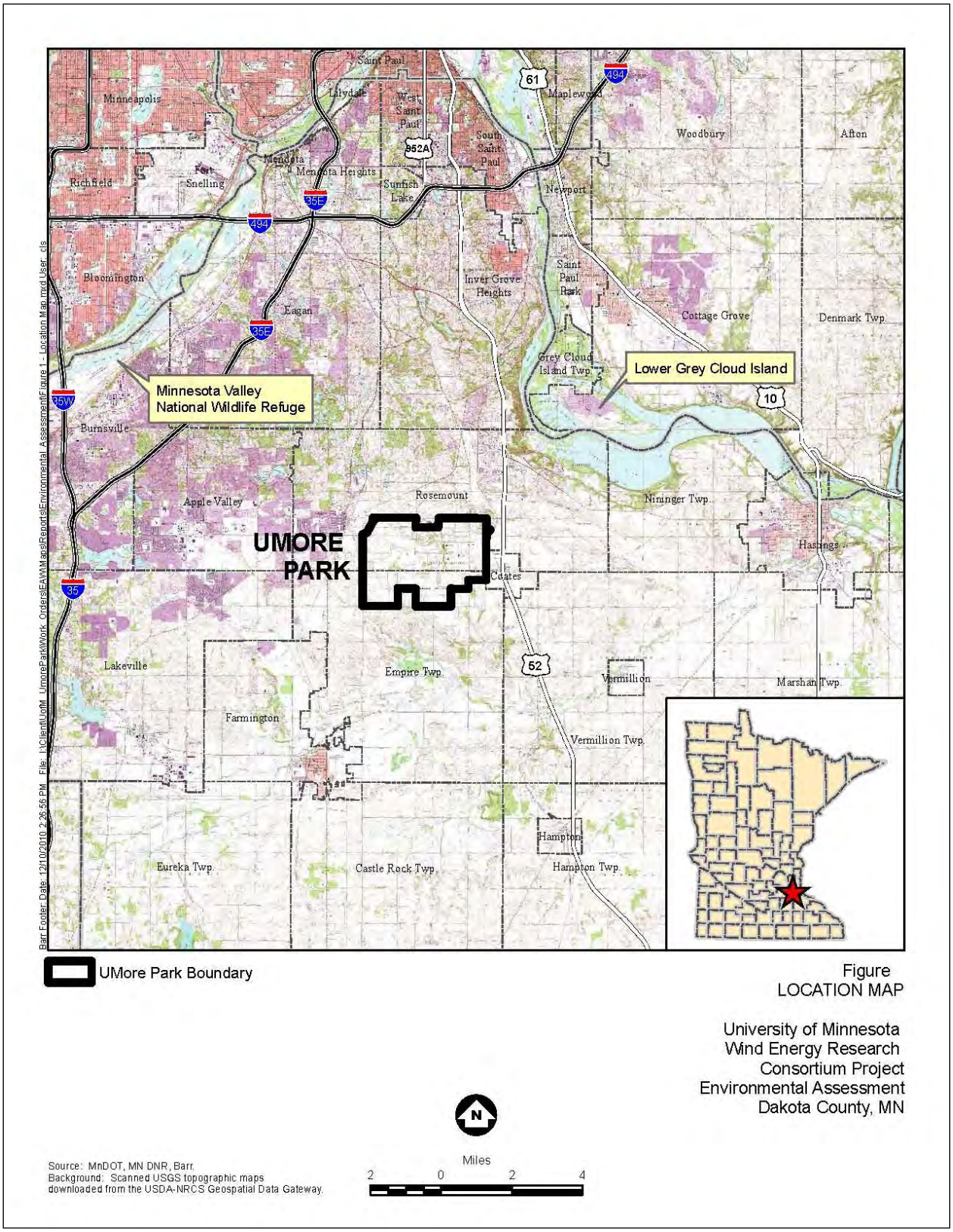
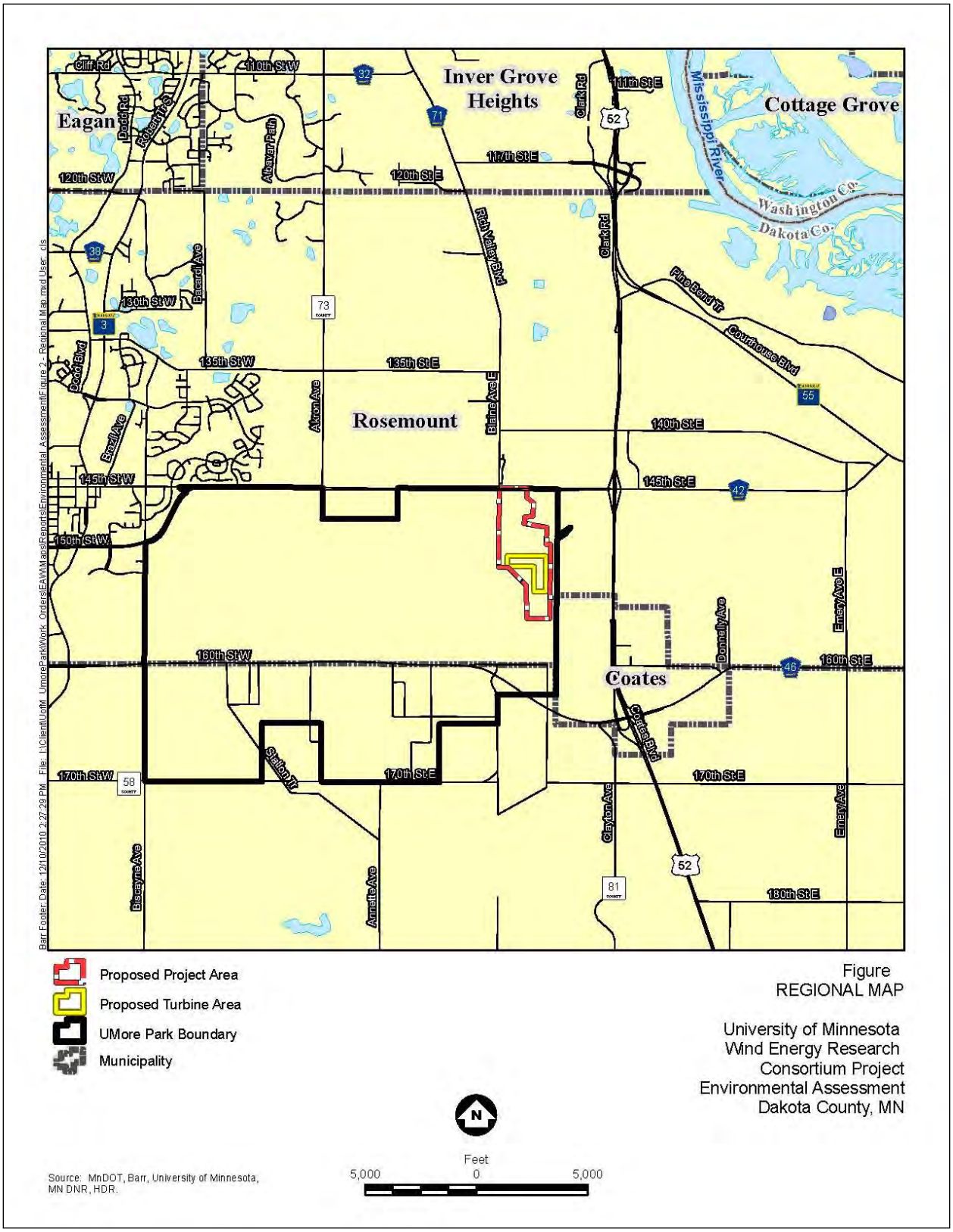


Figure 2. Regional Map



The funding of projects by DOE requires compliance with the *National Environmental Policy Act of 1969*, as amended (NEPA; 42 United States Code [U.S.C.] 4321 et seq.), Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Parts 1500 to 1508), and DOE NEPA implementing procedures (10 CFR Part 1021). In compliance with NEPA and its implementing procedures, this EA examines the potential environmental impacts of DOE's Proposed Action to authorize the expenditure of federal funds under this grant for the University's Proposed Project. CEQ and DOE regulations require consideration of the No Action Alternative. The No Action Alternative serves as a baseline against which the impacts of the Proposed Action and other potential action alternatives can be evaluated. In this Draft EA the No Action Alternative assumes that the University would not proceed with the project if DOE chooses not to provide financial assistance. The purpose of this EA is to inform DOE's decision making about the potential environmental impacts of the Proposed Project and alternatives and to provide the public an opportunity to comment on those potential impacts.

1.2 NATIONAL ENVIRONMENTAL POLICY ACT

In accordance with the DOE NEPA implementing procedures, DOE must evaluate those aspects of its Proposed Action that may have a significant impact on the human and the natural environment, including decisions on whether to provide federal funding to government agencies and private entities. In compliance with these regulations and DOE's procedures, this EA:

- Examines the potential environmental impacts of the Proposed Action and the No Action Alternative;
- Identifies unavoidable adverse environmental impacts of the Proposed Action;
- Describes the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity; and,
- Characterizes any irreversible and irretrievable commitments of resources that would be involved should DOE decide to implement its Proposed Action.

DOE must meet these requirements before it can make a final decision to proceed with any proposed federal action that could cause adverse impacts to human health or the natural environment. This EA provides DOE and other decision-makers with the information needed to make an informed decision about DOE's proposed authorization of federal funds for the construction and operation of the proposed wind turbine research facility. The EA evaluates the potential individual and cumulative impacts of the Proposed Project. For purposes of comparison, this EA also evaluates the impacts that could occur if DOE did not provide funding (the No Action Alternative), under which DOE assumes that University would not proceed with the Proposed Project. Based on the analysis in this EA, DOE will either issue a Finding of No Significant Impact, which could include mitigation measures, or determine that it must prepare an Environmental Impact Statement.

1.3 PURPOSE AND NEED

The purpose of the Proposed Action is to support the mission of the ARRA program established by Congress and implemented by DOE to reduce energy use and emissions at the local and regional level. Providing funding would partially satisfy the need of that program to assist U.S. cities, counties, states, territories, and Native American tribes to develop, promote, implement, and manage energy efficiency and conservation projects and programs designed to:

- Reduce fossil fuel emissions;
- Reduce the total energy use of the eligible entities;

- Improve energy efficiency in the transportation, building, and other appropriate sectors; and
- Create and retain jobs.

The ARRA enacted legislation to create jobs, restore economic growth, and strengthen America's middle class through measures that modernize the nation's infrastructure, enhance America's energy independence, expand educational opportunities, preserve and improve affordable health care, provide tax relief, and protect those in greatest need. Provision of funds would partially satisfy the needs identified under the ARRA.

The objective of the University's Proposed Project is to develop a university and industry-focused utility-scale research wind turbine. The Proposed Project would also develop new curricula and educational initiatives on critical wind energy issues.

1.4 PUBLIC AND AGENCY INVOLVEMENT

On June 3, 2010, DOE posted a scoping notice on the DOE's Golden Field Office online Public Reading Room (www.eere.energy.gov/golden/Reading_Room.aspx). Announcements of the notice were sent to potentially interested local, state, and federal agencies, including the Minnesota State Historic Preservation Officer (SHPO), Minnesota Public Utilities Commission (PUC), Minnesota Department of Natural Resources (MNDNR), Minnesota Pollution Control Agency (MPCA), U.S. Army Corps of Engineers (USACE), and the U.S. Fish and Wildlife Service (USFWS). Project notices were also sent to Tribal Chairs and Tribal Historic Preservation Officers of 14 tribes. DOE also sent announcements of the scoping notice to other potentially interested individuals and organizations to solicit public comment (**Appendix A**). The scoping notice described the Proposed Project and requested assistance in identifying potential issues to be evaluated in this EA.

In addition to the scoping notice announcements published and mailed by DOE, an Invitation for Public Comment was published in five local newspapers; the Rosemount Town Pages, Farmington Independent, and the weekly papers of Rosemount-Apple Valley, Farmington-Lakeville, and Burnsville-Eagan. A copy of the Invitation for Public Comment is included in **Appendix C**.

The announcements for the public and agency scoping period specified June 25, 2010, as the deadline for submitting written comments. During the scoping comment period three agencies replied: the MNDNR, U.S. Environmental Protection Agency (USEPA), and the PUC. Copies of the agency comment letters are located in **Appendix C**. A summary of the comments is below:

- MNDNR considers the proposed wind power facility as a small-scale facility. However, they believe that given the proposed hub height and rotor diameter, the potential for negative effects to rare and natural resources exists. MNDNR recommended a loggerhead shrike (*Lanius ludovicianus*) habitat assessment and survey be conducted prior to construction; the University has completed the suggested survey. Additional correspondence from MNDNR detailing potential monitoring of the loggerhead shrike was received on October 7, 2010. The agency recommended post-construction surveys for the loggerhead shrike and on-going coordination with MNDNR as the project progresses. The loggerhead shrike is discussed in **Section 3.4.1**.
- USEPA suggested topics to be included in the EA such as construction materials, decommissioning, and project impacts. The relevant topics suggested by USEPA are included in this EA.
- The PUC inquired as to the release date of the EA.
- The Flandreau Santee Sioux Tribe stated that they have no objection to the project.

Additional agency correspondence, unrelated to the scoping period, has been received from the USFWS, Dakota County, the Minnesota Historical Society, SHPO, and MNDNR. A summary of the comments is listed below:

- USFWS did not recommend bird surveys unless the turbine placement changes.
- Dakota County recommended soil sampling across the project area and within the drainageway in the northern portion of the project area to identify contaminants of concern and to conduct sampling of surface soil (shallower than 6 inches) where the potential releases resulting from the operations of the Gopher Ordnance Works (GOW) are expected to have impacted the soil. This sampling was completed in June 2010 and is summarized in **Section 3.11.1**.
- DOE and the Minnesota SHPO have corresponded throughout the development of the EA regarding compliance with Section 106 of the National Historic Preservation Act of 1966 (Section 106). That correspondence is included in **Appendix C**, and actions taken and decisions made to comply with Section 106 are discussed in **Section 3.5**.

The Draft EA was available for public comment beginning with the publication of a Notice of Availability in the Minneapolis-St.Paul Star Tribune on January 28 and ending on February 15, 2011. The Notice of Availability was sent to the same agencies, organizations, and individuals who received the scoping announcement (Appendix A) and the Draft EA was posted on the Golden Field Office online Public Reading Room. DOE received four comments on the Draft EA, which are summarized below.

The Minnesota Pollution Control Agency stated that they have reviewed the Draft EA and had no comments at this time.

Dakota County stated that information included in the EA acknowledged their concerns about known or suspected contaminants within or near the proposed wind turbine construction site; their staff concurred with the determination that no remediation would be necessary within the immediate footprint of the proposed wind turbine and access road; and they still have concerns about potential contaminants nearby, which they expect would be addressed in future planning documents conducted by property owners as development plans mature. Soil contaminants and other hazardous materials are discussed in Section 3.10 of this EA.

The USFWS provided the following comments.

- The EA addresses the USFWS concerns about the potential impacts to bats and birds. The Service recommended the development of an avian and bat protection plan that includes post-construction monitoring of bird and bat mortalities. They also stated that, because the proposed project is intended to provide wind turbine and technology research opportunities, the facility should be used to address research needs from an ecological perspective and to consider wildlife impacts when evaluating the overall efficiency and effectiveness of the energy produced by the facility. As described in Section 3.4.2, the University plans to conduct monitoring and research on the impacts of their wind turbine and met tower on bats, contingent on the availability of funding. As part of that work, regularly scheduled surveys would be conducted to find dead or injured birds and bats and methods to reduce mortalities of birds and bats at this and other wind energy projects would be developed and tested.
- The USFWS recommended that all proposed tree removal and any other clearing of potential avian nesting habitat be completed outside of the primary nesting season (April 15 to August 1) and that nests of early-nesting raptors also be avoided. A commitment by the University to avoid harming

nesting migratory birds by conducting tree removal and clearing of avian nesting habitat outside of the primary nesting season has been added to Section 2.2.6 and is further discussed in Section 3.4.

The City of Rosemont commented on the following topics.

- Questioned statements in the EA about the timing of future development surrounding the Proposed Project site and raised issues about the potential impacts on future land uses, including development of a planned eco-industrial park, that would result from restricting development around the wind turbine and met tower. DOE has clarified how the University and City would cooperatively evaluate whether proposed land uses would be compatible with operation of the turbine and met tower. Discussions of future development in the area, including the analysis of land use in Section 3.3, have been modified to better describe future land uses and the possible impacts of the Proposed Action.
- Requested that the University reconsider whether tree removal is necessary and whether the turbine could be moved to reduce the number of trees that would have to be cut down. They also suggested that the EA include tree replacement to mitigate the loss of trees in the project area. As described in Section 2.2.2, trees must be removed to reduce wind turbulence that would interfere with operation of the turbine. Moving the turbine to another area within or near the project area would not substantially reduce the number of trees that would have to be removed. A statement has been added to Section 3.4.2 describing the long-term plans to plant trees within UMore Park as development occurs.
- Requested that the entire infrastructure, regardless of depth, be removed during decommissioning. As clarified in Section 2.2.6, the depth to which foundations will be removed would depend on the future use of the land.
- Identified misstatements about the City's requirements for zoning reviews and for development of a greenway system. Tables 2 and 5 have been modified to correct these errors.

1.5 ORGANIZATION OF DOCUMENT

This EA is organized as follows.

- **Chapter 1** describes the Purpose and Need for the proposed DOE agency action and the scope of the analysis.
- **Chapter 2** describes the DOE Proposed Action of authorizing the expenditure of federal funding, the University's Proposed Project, and the No Action Alternative.
- **Chapter 3** describes the affected environment and potential environmental consequences of the Proposed Project and the No Action Alternative. It also includes a summary of the unavoidable adverse impacts and irreversible and irretrievable commitment of resources that would result from the Proposed Project.
- **Chapter 4** discusses the Cumulative Impacts of the Proposed Project.

Appendices in this EA include:

- **Appendix A** - Scoping Distribution List,
- **Appendix B** - FAA Hazard Determination Letters, and
- **Appendix C** - Agency Correspondence.

2.0 PROPOSED ACTION AND ALTERNATIVES

This chapter describes DOE's Proposed Action (**Section 2.1**), the University's Proposed Project (**Section 2.2**), and the No Action Alternative (**Section 2.3**).

2.1 DEPARTMENT OF ENERGY'S PROPOSED ACTION

DOE has previously authorized the University to use a percentage of their federal funding for preliminary activities, which include preliminary design, environmental studies, preparation of the EA, and permitting. These activities are associated with the Proposed Project and do not significantly impact the environment nor represent an irreversible or irretrievable commitment by the DOE in advance of the conclusion of the EA for the Proposed Project. Under the Proposed Action, DOE would authorize the University to expend additional ARRA funding to design, permit, and construct a wind turbine research facility. Specifically, the University would use a portion of the DOE funding in the amount of approximately $4.7 million to purchase and construct a 2.5-MW capacity Clipper Liberty C-100 wind turbine. The remaining portion of the DOE funding and cost-share funding would be used for turbine research activities (e.g., funding graduate students, obtaining research equipment, and paying for certain operations and maintenance staff and activities).

2.2 PROPOSED UNIVERSITY OF MINNESOTA PROJECT

The University proposes to install a wind turbine research facility at its UMore Park property in Rosemount, Minnesota, using DOE funding. The proposed wind turbine research facility would be located in the northeastern corner of UMore Park (Figure 3). The Proposed Project would be located within the City of Rosemont, which extends west and north of the Proposed Project area. The City of Coates is located adjacent to the eastern border of the Proposed Project area, and the Mississippi River flows approximately 3 miles northeast of UMore Park.

The major components of the Proposed Project are shown in Figure 4 and would include:

- A 2.5-MW capacity Clipper Liberty C-100 wind turbine with a total height of 426.5 feet from the ground to the tip of the top blade, with a 262.5-foot steel tower;
- A 426.5-foot meteorological (met) tower;
- An associated 34.5-kV interconnection low-voltage transmission line to be located along Blaine Avenue, south of Highway 42 /145th Street East;
- A fiber-optic data transfer line connecting the turbine with an existing building; and
- Two short access roads connecting 152nd Street and Old Patrol Road to the turbine area and the met tower, respectively.

The proposed wind turbine research facility would be the cornerstone of an industry-driven, field-scale, research demonstration facility at the University with the following major objectives:

- Develop a research agenda driven by industry needs and aimed at enhancing the efficiency and reliability of wind turbines;
- Develop laboratory-scale wind-energy research facilities enabling testing and demonstration at field scale of a wide range of wind turbine technologies, and the collection of field-scale data sets for validating computational models; and,
- Develop new curricula and educational initiatives for training the next generation of wind industry leaders.

Figure 3. Proposed Project Area Map

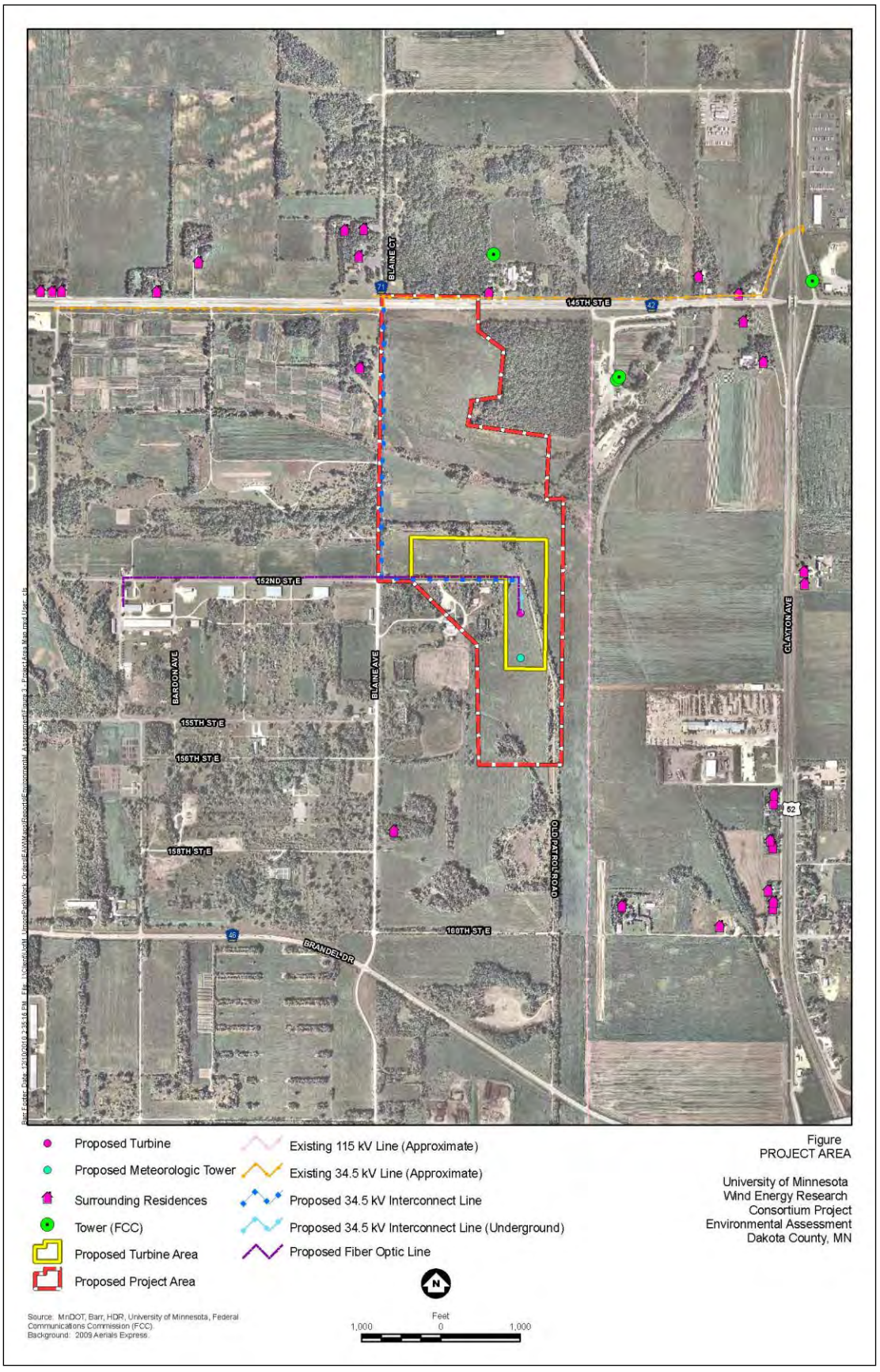
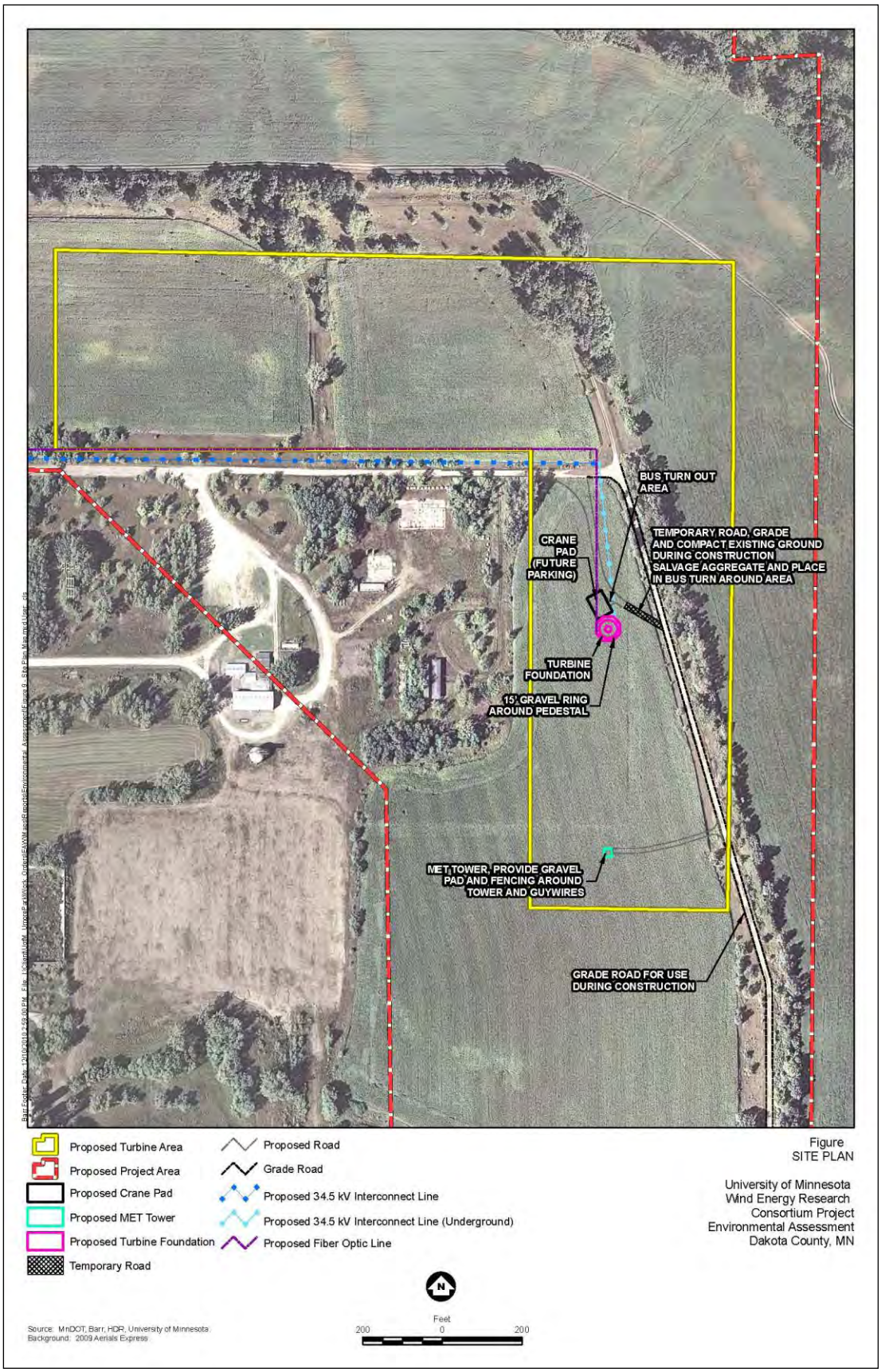


Figure 4. Proposed Project Layout Map



2.2.1 Project Location

The University owns two adjacent parcels of land in the vicinity of the City of Rosemont: (1) The 5,000-acre UMore Park to the north, and (2) the 2,822-acre Vermillion Highlands, a research, recreation, and wildlife management area to the south. Vermillion Highlands is currently jointly managed by the University and MNDNR. These two parcels of land were transferred to the University in 1947 and 1948. In 1948-1949, the Rosemount Agricultural Experiment Station – now known as the Rosemount Research and Outreach Center – was established, joining five other centers across the state to engage University researchers in regional agricultural projects. In addition to devoting approximately 600 to 900 acres of the property annually to agricultural research, the University has leased relatively small parcels of land over time to local farmers and public and private entities across the 7,822 acres.

Prior to being transferred to the University, the land was part of the GOW, a facility owned by the U.S. War Department from 1942 to 1948. The GOW manufactured smokeless gun powder and related products between January 1945 and October 1945, assisting in the World War II effort.

The Proposed Project would be located on an approximately 212-acre parcel of land in the northeastern corner of UMore Park. Other potential sites for the proposed wind turbine within UMore Park were reviewed by the University in 2009. Sites were reviewed for their potential to have contaminated soil from past use, for compatibility with current land use plans, for communication and Federal Aviation Administration (FAA) obstruction conflicts, and for other constraints. Sites were also evaluated based on their proximity to electrical interconnection substations, research needs, and feedback from City of Rosemount. The University determined that the Proposed Project site would provide the best combination of avoidance of contaminated areas; ease of interconnection to the Xcel Energy distribution system; and setbacks from residences, roads, and other nearby infrastructure. The proposed turbine would be located within the central portion of the Proposed Project area at the intersection of 152nd St. East and the former GOW Patrol Road.

The Proposed Project area is primarily cultivated land with tree lines along existing paved and gravel roadways and an abandoned railroad track. Building foundations and unused storage and staging areas are located in the central portion of the project area where the GOW oleum and nitric acid plants formerly existed.

The University's Board of Regents have recently developed and approved plans to create a new, sustainable community of 20,000 to 30,000 residents on the UMore Park property over the next 30 years (University of Minnesota, 2009). The community would be environmentally, socially, and economically sustainable and would contribute to economic development in the region through business expansion and attraction, job creation, and application of new technologies. The concept master plan calls for 1,000 acres of green space in the 5,000-acre community. As development proceeds, contouring would occur that would feature community landscaping, including a range of vegetation and reforestation.

The concept master-plan for the community was approved by the Board of Regents in December 2008 and released to the public in January 2009 (University of Minnesota, 2009). Consistent with the plan and the directive of the Board of Regents to make the land ready for development, a number of planning activities have been launched, many in conjunction with local units of government. In addition, more than half of the third-party tenant leases that were in place in 2005 have been allowed to expire as the University pursues planning objectives. The majority of tenants have been on month-to-month leases since 2000. In addition to local farmers, tenants have included a produce marketer's field rental, a trucker's training program, a grass air-strip facility, a gun club, and a model airplane club. At this time, active leases to about 35 tenants constitute about 800 acres of the 7,822 acres of University property.

With completion of the entitlement process, the first phase residential development tentatively would commence in 2013, in the northwestern region of the property. It is likely that the eastern edge of the property, where the turbine would be sited, would not be developed for at least 15 years. The University has made the turbine location available for 15 years, at which point the objectives of the Wind Energy Research Project and the property development time line would be reevaluated.

2.2.2 Construction

Construction would be required to install the proposed turbine, met tower, transmission lines, communications system, and access roads (Table 1). All construction activities would be based at the laydown area, an approximate 0.5-acre area adjacent to the proposed turbine location. Construction would involve the following tasks:

- Surveying and constructing access road and turbine pad
- Constructing a foundation for the turbine and met tower
- Trenching for underground utilities
- Placing underground and aboveground electrical and communications cables in trenches and along overhead poles
- Connecting to the transformer
- Transporting turbine and met tower sections to the site and assembling the towers with a crane
- Installing nacelle, rotor, and other turbine equipment
- Installing met tower equipment
- Final testing
- Final road grading, erosion control, reseeding temporary areas, and site cleanup

Table 1– Proposed Project Elements

Proposed Project Element	Approximate Size
Overall Proposed Project Area (includes turbine area, met tower, access, low-voltage transmission lines, and open space)	212 Acres
Turbine Area	32 Acres
Turbine Foundation	0.26 Acres Total (0.04 acres permanent and 0.22 acres temporary).
Tree Removal	25 Acres
Laydown Area	0.50 Acres (no clearing or grading needed)
Crane Pad & Future Parking	0.06 Acres
Met Tower Foundation	20’ x 20’ = 400 square feet (0.01 acre) plus additional 1,200 square feet for the 6 guy wires (0.03 acre) (all permanent).
Transmission Line	16.5 square feet for 21 poles (permanent)
Buried Data Transfer Line (fiber optic)	0.1 Acres (temporary)
Access Roads	0.33 Acres (0.29 acres permanent and 0.04 acres temporary)

The turbine tower would arrive on trucks in two or three pieces and would be assembled on site. The turbine nacelle and three blades would arrive separately on trucks. A large crane would be used to assemble the tower,

place the nacelle on top of the tower, and attach the blades to the nacelle hub. The tower would be bolted to the concrete pad using anchor bolts; guy wires or other external support systems would not be used.

The met tower would also arrive by truck in pieces and would be assembled on site. A large crane would be used to assemble the met tower. Guy wires would be used as external support systems. A safety zone area equal in radius to the height of the met tower, up to 450 feet, would be kept free from further development.

All underground and aboveground low-voltage transmission lines would be installed using conventional installation/trenching techniques. Specific plans would be provided by Xcel Energy or through the University.

Turbine

The University's Proposed Project would include construction of a 2.5-MW capacity Clipper Liberty Turbine at UMore Park with a rotor diameter of up to 328.1 feet. The total "swept area" of the turbine rotor would be approximately two acres. The turbine would be installed on a 262.5-foot steel monopole. The total maximum height from the foundation to the top of the turbine blades would be 426.5 feet above ground level.

The base for the turbine would be an industry-standard spread-footing foundation. The foundation for the turbine would be approximately 55 to 65 feet in diameter and 7 to 10 feet in depth, and would disturb less than 0.1 acre. The final type and size of the foundation would be determined by the project structural engineer based on the results of a geotechnical investigation and consideration of global stability, bearing capacity, stiffness, settlement, concrete and steel strength, and backfill density.

To prevent vandalism, chain link fencing with barbed wire would enclose the base of the turbine. The steel access door to the turbine tower would be secured by an industrial strength padlock.

Met Tower

The Proposed Project would also include the installation of a 426.5-foot, guyed-mast Rohn met tower with a tubular structure and guy wires. The met tower would measure weather conditions and wind speed. It would be installed south of the turbine, and would be used to characterize the approaching wind. Figure 4 shows the proposed location of the met tower and associated access road. The met tower would be constructed on an approximately 20-foot-square concrete footing. The tower would be supported by six guy wires that would require a disturbance area of approximately 10 by 20 feet each. The guy wire anchor points and the base of the met tower would be enclosed by a chain link fence. To prevent vandalism, fencing with barbed wire would be provided around the base of the met tower.

Electrical Interconnection and Low-Voltage Transmission Line

A pad-mounted medium-voltage primary switchgear, generator step-up transformer, and Clipper control switchgear would be located on a concrete pad (approximately 4 by 4 feet) adjacent to the turbine. Underground 600-volt power and control circuits would be installed from the turbine to the pad-mounted Clipper switchgear, from the Clipper switchgear to the transformer, and from the transformer to the medium voltage switchgear. Pending final design, the turbine's output would be connected from the pad-mounted transformer to the Xcel Energy 34.5-kV distribution system. That connection would be via a new, 34.5-kV underground feeder (approximately 450 feet long) from the transformer to 152nd Street East. It would then travel aboveground via a new low-voltage transmission line for approximately 1,750 feet to the north side of 152nd Street East. From the north side of 152nd Street East, the turbine output would travel to Blaine Avenue and finally 3,375 feet along the east side of Blaine Avenue, where it would interconnect with an existing 34.5-kV feeder owned by Xcel Energy at County Road 42 (Figure 4).

The proposed 34.5-kV interconnect low-voltage transmission line would include 21 new poles spaced approximately 275 feet apart. The proposed poles would be 35 feet high from the ground surface and the proposed low-voltage transmission line would be 33 feet above the ground. Poles would be placed and strung using standard one-ton bucket trucks equipped with post-hole diggers. Each pole would disturb 0.785 square feet, or approximately 16.5 square feet total for all poles. A 10-foot-wide licensure agreement (i.e. easement) would be required for the corridor, which would be developed between the University and Xcel Energy. Each pole would include a standard 8-foot cross. Guy wires would be tied to existing poles on Blaine Avenue or to driven rods where a line changes directions or terminates.

The electrical interconnection would require a transfer trip system and associated communication system for the transfer trip. The transfer trip system would involve installation of electrical relays located on both the substation side and turbine side of the electrical collection line. A point-to-point, wireless communication system would be installed from the substation to the turbine and would work with the relays to protect both the turbine and the substation from electrical faults. Because it would be wireless, no physical disturbance would be associated with the transfer trip communication.

Data Transfer Line

A fiber-optic based data-transfer line would be installed to provide necessary data transfer between the turbine and the turbine owner and manufacturer. This fiber-optic line would consist of a 48-strand line routed due west a total of 0.9 miles along 152nd Street from the turbine to an existing unused machine shop building. The building would be repurposed as an Operations and Maintenance and Supervisory Control and Data Acquisition System building for the Proposed Project; no modifications to the exterior of the building will be required.

Small, 8-inch-wide trenches would be required for the fiber-optic cable installation. A vibratory plow would burrow into to the soil, minimizing loosening soil during installation. The trenches would be refilled and reseeded following cable installation.

Access Roads

Short access roads would be constructed from 152nd Street and Old Patrol Road to the turbine area and the met tower, respectively. The gravel service road to the turbine area would be about 600 feet long and 16-foot-wide, and would disturb approximately 0.25 acres. Disturbance to the southeastern 0.04-acre portion of this road would be temporary, while the remaining 0.21 acres would be permanently impacted. The gravel from the 0.04 acres of reclaimed road would either be taken off site or reused to provide the required hard surface needed for the creation of a construction crane pad that will eventually become a parking lot with dimensions acceptable for parking buses. Topsoil would be salvaged at the start of construction and spread over the temporarily disturbed areas so that the land could be returned to its previous use. Any disturbed areas would be reseeded with a MNDNR-approved native seed mix.

The road to the met tower would be 12 feet wide and 6 to 10 inches deep. The road would be approximately 275 feet long and disturb 0.08 acres. In addition, a large circular turnout would be constructed adjacent to 152nd Street to allow for transport of oversized vehicles. The proposed roads would be constructed of class-five gravel meeting Minnesota Department of Transportation specifications. Service roads would not be gated because both the met tower and wind turbine would be fenced and trespassers could bypass a gate through the surrounding fields. The preliminary site plan is shown in Figure 4.

Total land disturbance for all components of the Proposed Project during construction would be approximately 1.0 acre within the project area, including the turbine foundation, roads, and met tower. Of this disturbance, 0.4

acres would be temporary and 0.6 acres would be permanent. In addition, trees would be removed from an approximately 25-acre area surrounding the wind turbine to reduce wind turbulence that would interfere with operation of the turbine and met tower. The University has proposed the minimum acreage to be cleared of trees that is necessary eliminate wind resistance effects on the research site.

Project construction would require up to 20 personnel and associated equipment for 1 to 2 months. During construction, the contractor would provide necessary facilities consistent with similarly sized projects, including a construction trailer, temporary chemical toilets, and solid waste collection containers. All solid and liquid wastes would be removed from the site in accordance with applicable regulations and permit conditions. Fuel would be used on site to power vehicles and other equipment during construction and maintenance. Turbine oil would be used on site as a lubricant. No other hazardous or flammable materials are expected to be used. Construction of the wind turbine is expected to be completed approximately 6 months after the EA process is complete and research would begin in late 2011. The University has committed to using the turbine in the proposed location for a period of up to 15 years.

Construction would begin after all necessary federal and state permits and approvals are obtained (see Table 2 in Section 2.2.5 below).

2.2.3 Operation

Once the turbine and met tower are constructed and tested, the operations phase of the Proposed Project would begin. There would be two full-time operations and maintenance personnel assigned to the turbine facility. The turbine and met tower would be monitored from a remote location through a computerized control system as recommended by the turbine and met tower suppliers. Any problems would be promptly reported to operations and maintenance personnel, who would perform routine maintenance and most major repairs. Most servicing would be performed without removing the turbine from the tower, thus eliminating the need for a crane. Routine maintenance would include replacing lubricating fluids periodically and checking parts for wear and damage. The roads, turbine pad, and trenched areas would be inspected regularly and maintained. Vegetation within the Proposed Project area would be maintained by mowing for the lifespan of the project.

The turbine would be connected to the energy grid, but energy production is not a primary goal of the research project. The turbine would be routinely taken off line in order to conduct sensor and materials analyses. On average, the turbine would be in operation approximately 70 percent of the time. Energy generated by the turbine would be sold to Xcel Energy as per the terms and conditions of a Power Purchase Agreement.

2.2.4 Decommission

The turbine and other infrastructure are expected to have a useful life of 15 years. The trend in the wind energy industry has been to “repower” older wind energy projects by upgrading equipment with more efficient turbines. If the University decides to continue to operate the wind turbine on the UMore Park site beyond the current consideration of 15 years, the turbine may be upgraded with more efficient equipment and, therefore, would have a longer useful life. However, if the project were terminated, the turbine and other infrastructure would be decommissioned per DOE’s financial assistance regulations. When the University decommissions the turbine, all facilities and infrastructure would be removed to a depth of at least 3 feet below grade, and depending on future land uses, most or all of the subsurface foundations may be removed. Unsalvageable material would be disposed of at authorized waste disposal sites. Salvageable items (including fluids) would be sold, reused, or recycled as appropriate. The soil surface would be restored as closely as possible to its original condition. Reclamation procedures would be based on site-specific requirements commonly employed at the time the area is to be

reclaimed and would include re-grading, adding topsoil, and replanting of all disturbed areas. Decommissioned roads would be reclaimed or left in place, at the discretion of the University.

The estimated decommissioning cost in current dollars is expected to be between $50,000 and $60,000, including associated facilities. The University would be responsible for all costs to decommission the turbine and associated facilities. Based on current estimated costs of decommissioning and the salvage value of decommissioned equipment, the salvage value of the wind turbine is expected to exceed the costs of decommissioning; however, this would depend upon the prevailing rates for salvage value of the equipment and labor costs at the time of decommissioning.

The salvage value of the turbines and other components ensures that sufficient funds would be available to cover decommissioning and restoration costs. Because the uncertainty surrounding future decommissioning costs and salvage value increases with time, the University would review and update the cost estimate for decommissioning and restoration of the turbine 10 years after commissioning. If necessary, this revised estimate of decommissioning and salvage value would then be submitted to Dakota County for review and comment.

Beginning in year 10 of the turbine's operational life, the University would either create a reserve fund, enter into a surety bond agreement and create an escrow account, or provide for a combination of both a reserve and surety bond that would ultimately fund decommissioning and site restoration after project operations cease, to the extent that the salvage value does not cover decommissioning costs. The combination of salvage revenues plus income generated from the sale of wind energy to the local utility provider would be used to create necessary funds.

2.2.5 Permits and Approvals

A list of the permits, reviews, and approvals required for the Proposed Project, along with the status of the permits, is provided in Table 2.

2.2.6 Applicant Committed Measures

The University is committed to the following design, construction, and operational measures to minimize or avoid environmental impacts.

Soil and Water Resources

Potential turbine construction and site runoff would likely be regulated under a National Pollutant Discharge Elimination System (NPDES) permit. Best Management Practices (BMPs) and other requirements would be used at the site during construction to minimize runoff and site erosion.

Topsoil would be salvaged at the start of construction and spread over the temporarily disturbed areas. Any disturbed areas would be reseeded with a MNDNR-approved native seed mix.

Land Use

The University, in cooperation with the City of Rosemont, would evaluate developments and other land uses proposed for UMore Park property in the vicinity of the wind turbine to ensure that those proposed uses are safe and compatible with operation of the turbine.

Biological Resources

Transmission line components would be designed to eliminate the risk of bird and bat electrocution.

Contingent on the availability of funding, the University plans to conduct monitoring and research on the impacts of their wind turbine and met tower on birds and bats. The University recognizes the potential for research studies

related to this subject and, as a result, the Office for UMore Park Academic Initiatives has informed University faculty about this research opportunity. Faculty may seek future funding opportunities to develop this research topic. Depending on the availability of funding, regularly scheduled surveys would be conducted to find dead or injured birds and bats and methods to reduce mortalities of birds and bats at this and other wind energy projects would be developed and tested. These and other specific details would be included as part of a monitoring plan.

To avoid harming nesting migratory birds, all tree removal and clearing of potential avian nesting habitat would be completed outside of the primary bird nesting season (April 15 to August 1). If tree removal is to occur prior to April 15, all large nests large nests identified in the project area would be monitored to ensure that they are not being used by nesting raptors.

Cultural Resources

The University would conduct activities required by a Memorandum of Agreement between DOE, the University, and the Minnesota SHPO, including as appropriate preparation of photographic documentation of a nearby historic property following the Minnesota Historic Property Record Guidelines (Level II documentation).

Table 2 - Permits and Approvals

Agency	Permit/Approval	Status
U.S. Department of Energy/ Minnesota State Historic Preservation Office	Consultation under Section 106 of the National Historic Preservation Act	DOE is consulting with the State Historic Preservation Office about the impacts of this project on historic properties.
Federal Aviation Administration	Form 7460-1 Notice of Proposed Construction for turbine and met tower	FAA No Hazard Determination Letters Issued June 15, 2010, and September 10, 2010.
	Form 7460-2 Notice of Actual Construction	To be submitted 10 days prior to construction
U.S. Fish and Wildlife Service	Consultation under Section 7 of the Endangered Species Act	DOE has concluded that this project would not affect threatened or endangered species
U.S. Department of Commerce	Federal agency communication corridor study	Completed
Minnesota Department of Transportation	Air navigation aids interference review	Completed
Federal Communications Commission	Microwave communication corridor study	Completed July 2009
Minnesota Pollution Control Agency	NPDES construction stormwater permit	To be submitted prior to construction

Transportation

The University would obtain and adhere to the requirements of all necessary permits and reviews listed in Table 2, including required FAA lighting for turbine and met tower. FAA requires that the turbine be lit at night to provide for aviation safety. FAA currently recommends red strobe lights with a 2,040 per minute pulse rate on

wind turbines when turbines are painted a neutral color. The same type of lighting would be used for the turbine and met tower.

After the completion of construction, approximately 0.4 acres of the road near the turbine foundation would be reclaimed. The gravel from the reclaimed road would be taken off site or reused to provide the required hard surface needed for the creation of a crane pad/parking lot.

Utilities

The University would comply with the "Call Before You Dig" law (Minnesota Statute 216D) which requires that any excavator must call the state-wide notification center at least 48 hours prior to the start of any digging activities.

Hazardous Materials

During construction, BMPs would be implemented to minimize the potential for releases of lubricants, fuel, antifreeze, or other potentially hazardous materials used in operating heavy equipment. The University would follow manufacturer-recommended procedures in performing any routine maintenance or repairs that involve handling or disposal of such lubricants or coolants.

Once the final design for the proposed low-voltage transmission line is completed, any additional soil testing required for the underground low-voltage transmission line installation would be determined and completed according to MPCA protocol, if required by that agency.

Prior to conducting any work on the UMore Park property, all workers affiliated with the Proposed Project would be required to take an asbestos awareness course. The UMore Park Asbestos Emission Control Plan (Barr Engineering Company, 2009a) would be used as a guideline for dealing with asbestos if and when it is encountered during any phase of the project. Additionally, trained asbestos abatement personnel would be present during tree and shrub removal activities to remove any asbestos-containing materials (ACM) that are uncovered during that process. If asbestos is encountered, the site would be cleared prior to tree removal.

During both construction and operation of the proposed wind turbine, all solid and liquid wastes would be removed from the site in accordance with all applicable regulations.

Health and Safety

Worker health and safety during construction would be the responsibility of the contractor. The contractor would prepare a construction phase Health and Safety Plan for worker safety that complies with all state and federal standards. That plan will address confined space entry, hoisting and rigging operations, and proper handling and disposal of toxic and hazardous substances. Additional practices related to health and safety which would be addressed by the construction contractor include providing safe drinking water, waste disposal, portable toilets, fencing of open pits, and limiting site access to contractors and other necessary personnel. If project work requires access to grounds outside of the project limits, field staff would contact University staff. During wind turbine construction, a security officer will be stationed on site during non-construction hours.

Post-construction security would include:

- All facilities (turbine, met tower) would be enclosed by a chain link fence topped with barbed wire.
- The steel turbine door would be secured by an industrial strength padlock.
- Safety protocols developed by Clipper Wind for approaching and entering the wind turbine would be strictly administered and adhered to. This includes, but is not limited to, having only authorized and

trained personnel access the turbine when the turbine is off-line and following protocols for approaching and servicing the turbine during winter conditions.

In accordance with the Stipulation Agreement between the University and the MPCA, all site workers would attend a site-specific 2-hour Asbestos Awareness Training session annually.

Decommissioning

The project area would be decommissioning as described in Section 2.2.4.

2.3 NO ACTION ALTERNATIVE

Pursuant to 40 CFR 1502.14(d), the No Action Alternative must be analyzed. "No Action" means an action would not take place. The No Action Alternative provides a benchmark for decision makers to compare the magnitude of potential environmental effects of the Proposed Project or alternatives with the conditions that would occur if the action does not take place. Under the No Action Alternative, DOE would not authorize the expenditure of federal funding for the University of Minnesota Wind Energy Research Project.

It is possible that construction and operation of the proposed wind energy research facility could proceed without any federal monetary contribution. If the project did proceed without DOE's financial assistance, the potential impacts would be essentially identical to those under the Proposed Project. However, for the purposes of providing a baseline for describing and quantifying the impacts associated with the Proposed Project, a No Action Alternative, which assumes that the Wind Energy Research Project would not be constructed due to the lack of federal financial assistance, is analyzed in this EA.

Under the No Action Alternative scenario, the University would not be able to meet its objectives of establishing an industry-driven, field-scale demonstration facility aimed at enhancing the efficiency and reliability of wind turbines. Additionally, reductions in fossil fuel use and improvements in energy efficiency would not occur and DOE's ability to achieve its objectives under the ARRA would be impaired.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section of the EA examines in detail the potential environmental impacts of the Proposed Project and the No-Action Alternative on the following resource areas:

- Geology and Soil Resources
- Land Use
- Biological Resources
- Cultural Resources
- Socioeconomics and Environmental Justice
- Noise
- Aesthetics and Visual Resources
- Transportation
- Utilities
- Hazardous Materials
- Health and Safety

3.1 CATEGORIES EVALUATED AND DISMISSED FROM FURTHER ANALYSIS

DOE commonly addresses resource and subject areas in addition to those listed above in their EAs. In an effort to focus the NEPA analysis, as per NEPA implementing regulations and guidance, this assessment did not examine some resource areas at a higher level of detail. The focus for the more detailed analysis was on those activities or actions that would require new or revised permits; have the potential, or perceived potential, for significant adverse environmental impacts; or have the potential for debate.

For the reasons discussed below, DOE concludes that the Proposed Project would result in no impacts, or minimal impacts, to the following resource areas, and that the detailed description and analyses of these resources are not necessary; thus, they are not carried forward in this chapter.

3.1.1 Air Quality

The USEPA Region 5 and the MPCA regulate air quality in Minnesota. The Clean Air Act, as amended, gives USEPA the responsibility to establish the primary and secondary National Ambient Air Quality Standards that set acceptable concentration levels for the seven regulated criteria pollutants. Dakota County, and therefore the Proposed Project area, is currently in attainment for all criteria pollutants. Because the Proposed Project area is in an attainment area, the air conformity regulations do not apply for the *de minimis* emissions of criteria pollutants associated with the proposed construction activities. Emissions and dust generated from trucks and other equipment used during construction of the proposed wind turbine facility would be minor and temporary.

Wind turbines do not emit air pollutants. Once operational, the proposed wind energy facility would have a minor, beneficial, long-term impact on regional air quality. The power generated by the turbine could offset a minor amount of fossil fuels that would otherwise be used to produce power. This would reduce emissions of air pollutants, including greenhouse gases that are produced from generating electricity through combustion of fossil fuels. For these reasons, the impact topic of air quality is dismissed from further analysis.

3.1.2 Water Resources

The Proposed Project lies within the drainage of the Mississippi River system. The Mississippi River flows approximately 3 miles northeast of the Proposed Project site and the Vermillion River flows approximately 4 miles south of the site. However, no surface water bodies are located on the Proposed Project site itself. The closest surface waters are a few small intermittent streams located south of the site.

The Proposed Project site contains no federally regulated or other wetlands. According to the USFWS National Wetland Inventory, there are a few small, isolated wetlands located nearby. The closest wetland is approximately 0.14 miles east of the site (Figure 5). Additionally, there are no designated 100-year floodplains either on the Proposed Project site or in the immediate vicinity.

The Proposed Project site is not near any state-listed impaired waters or other sensitive waterways. In Minnesota, several reaches of only one river, the St. Croix, are designated as a National Wild and Scenic River. The St. Croix River is not located within the same watershed as the Proposed Project, and as a result, the river will not be impacted by the project.

Construction of the Proposed Project would likely be regulated under an NPDES permit. BMPs and other requirements would be used at the site during construction activities to minimize runoff and site erosion. The potential for site runoff and soil erosion is discussed further in Section 3.2.2.

Groundwater flow in UMore Park is to the northeast, toward the Mississippi River, and the regional water table is approximately 100 feet below the ground surface at the Proposed Project area (Barr Engineering Company, 2009b). Because groundwater is located much deeper than the wind turbine foundation (approximately 7 to 10 feet) and no surface water resources are located in the immediate vicinity of the Proposed Project area, the Proposed Project would result in negligible impacts on water resources. As a result, this impact topic is dismissed from further analysis.

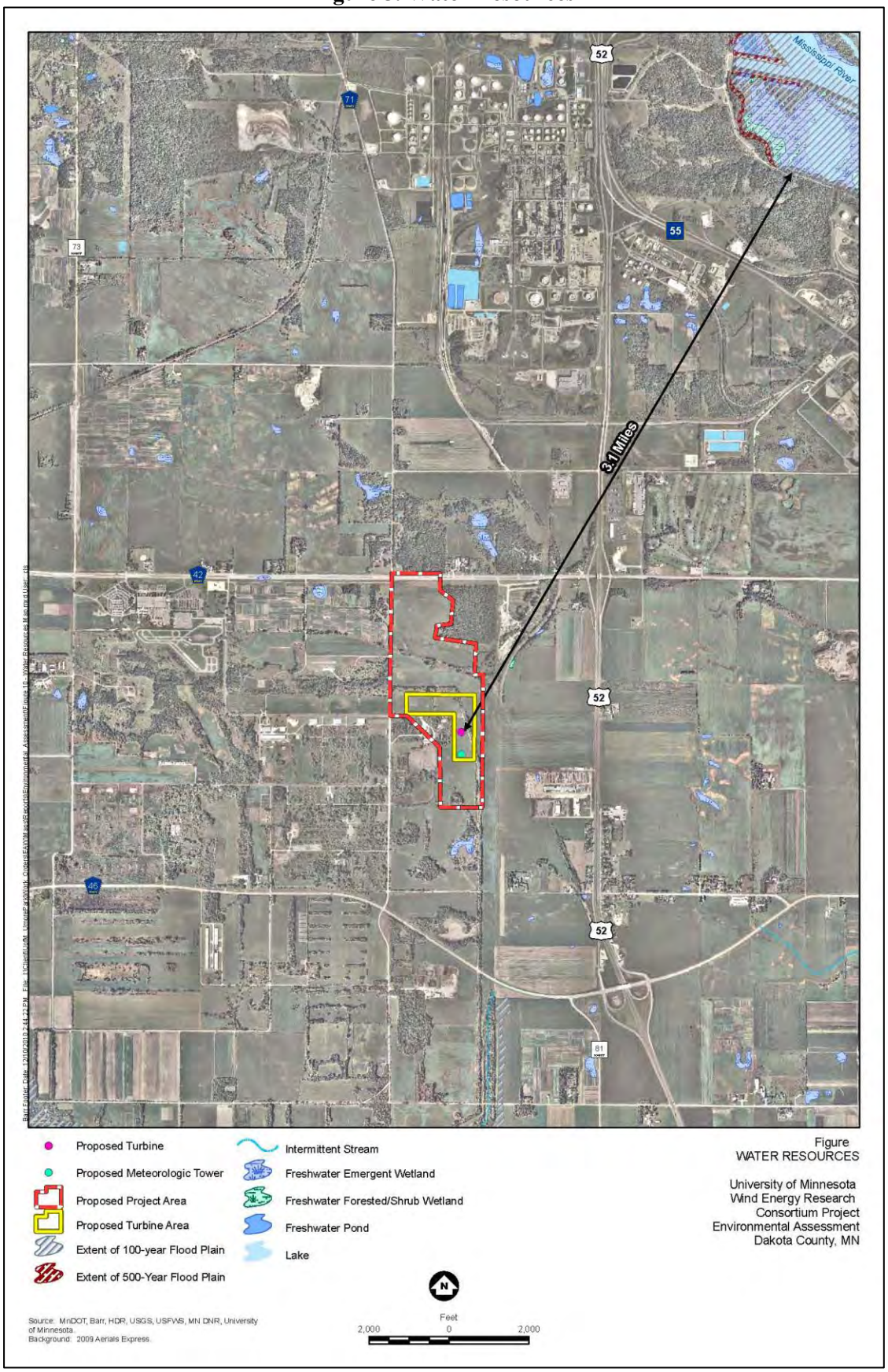
3.1.3 Recreation Resources

No federal or state parks are located within ten miles of the Proposed Project area. The primary recreation resource in the immediate vicinity of the Proposed Project is the Vermillion Highlands. The Vermillion Highlands was created in part to provide recreation opportunities for the public and research opportunities for the University. Primary recreational opportunities at the Vermillion Highlands include hiking, horse trails, wildlife viewing, and hunting.

The Dakota County Technical College (DCTC) recently constructed a soccer complex in the southwestern corner of the campus, just east of Akron Avenue. This complex lies approximately 1.5 miles west-northwest of the Proposed Project area, and is used for a variety of local and regional soccer games and tournaments.

The proposed wind turbine facility would be located more than 1.0 mile from both the Vermillion Highlands and the DCTC soccer complex, and construction and operation of the proposed turbine facility would neither directly or indirectly affect recreational uses of the areas. As further described in Section 3.8, the turbine would be visible from the Vermillion Highlands and the DCTC soccer complex but would not dominate views from that distance. In addition, as described in Section 3.7, the turbine would not be audible at that distance. Thus, DOE concludes that the Proposed Project would not affect recreational resources and this impact topic is dismissed from further analysis.

Figure 5. Water Resources



3.1.4 Shadow Flicker

As wind turbine blades rotate, they can cast a shadow upon the ground and objects below. Wind turbine shadow flicker is a result of alternating changes in light intensity caused by rotating blades casting shadows on the ground and on stationary objects, such as a window at a dwelling. Shadow flicker can result in an adverse impact on residences, schools, or other occupied locations. Landscape elements such as terrain, trees, or buildings between the wind turbine and a potential shadow flicker receptor can substantially reduce or eliminate shadow flicker effects. Changes in elevation can also either reduce or increase the effects.

At distances greater than about one-half-mile (2,640 feet) light is sufficiently dispersed so that turbine blades no longer produce distinct shadows (Danish Wind Industry Association, 2007). However, two studies that have evaluated the effects of shadow flicker have both concluded that the nearest affected receptors should be no closer than 10 rotor diameters from the turbines (Meridian Energy, 2005; Office of Deputy Prime Minister, 2004). For the Proposed Project, a distance of 10 rotor diameters equates to approximately 3,281 feet.

The closest affected receptors to the Proposed Project site are residences. The two occupied residences nearest to the site are located on UMore Park property and are owned by the University. Both are located more than 3,000 feet from the proposed turbine site. The closer of these two residences is located 3,186 feet southwest of the proposed turbine site.

The two closest residential receptors outside of UMore Park are located approximately 3,580 feet (0.68 miles) away from the proposed turbine location. One of these residences is located directly east of the turbine site along State Highway 52, and the other is on County Road 42 to the north of the preferred turbine location (Figure 3).

The residential receptors outside of UMore Park are located at a greater distance (3,580 feet) than the 3,281 feet (10 rotor diameters) conservatively considered to be the area within which impacts from shadow flicker may occur. Therefore, these residences would not experience shadow flicker effects.

The single residence located within the 10 rotor diameter zone (located approximately 3,186 feet from the proposed turbine site), is located 95 feet from the end of this zone. This residence could experience some minor amount of attenuated shadow flicker effects based on the more conservative approach to estimating impacts. However, this residence is surrounded by mature tree cover that would block the majority of shadows caused by the turbine. Thus, DOE concludes that the Proposed Project would have no more than minimal adverse effects on occupied receptors from shadow flicker. Therefore, this impact topic is dismissed from further analysis.

3.1.5 Ice Throw

Ice throw, or ice shedding, refers to the situation which can occur when ice accumulates on turbine rotor blades and subsequently breaks free or melts and is thrown to the ground. Ice fragments typically land within 300 feet of the turbine, and seldom more than 700 feet away (Garrad Hassan Canada, Inc., 2007). Some turbine manufacturers recommend distances as much as 1.5 times the turbine height (approximately 640 feet in this case) from occupied structures and roads. Clipper, the proposed manufacturer of the turbine for this Proposed Project, recommends a minimum setback equal to the height of the tower which would be 426.5 feet.

The proposed turbine would be located more than 2,000 feet from public roads and more than 3,000 feet from the nearest occupied building. To ensure that future development would not occur in areas that may be affected by ice throw, the University, in cooperation with the City of Rosemont, would evaluate developments and other land uses proposed for UMore Park property in the vicinity of the wind turbine to ensure that those proposed uses are safe and compatible with operation of the turbine.

The turbine proposed to be installed is a state-of-the-art turbine, certified for operation in extreme cold climate conditions. The turbine would contain an internal heating system and an advanced Conditions Based Monitoring system. The Conditions Based Monitoring system would continually monitor the environmental, mechanical, and electrical performance of the turbine during operation. Ice build-up would be detected as a deviation from ideal performance of the turbine. If detected, the turbine would automatically shut down until visual inspections could be completed.

The University would develop an Operational Plan for the wind turbine and met tower, which would including the manufacturer's recommendations for ice-prone conditions. For all the reasons discussed above, the possibility of harm from ice being thrown from the turbine is negligible. This impact topic is thus dismissed from further analysis.

3.1.6 Natural Resources and Energy Supply

The Proposed Project would not increase demand on natural resources as a result of construction activities, needed building materials, or energy supplies. The Proposed Project would have a long-term beneficial impact to energy supplies because wind energy is a renewable energy resource. Therefore, this impact topic is dismissed from further analysis.

3.1.7 Intentional Destructive Acts

In December 2006, the DOE Office of General Counsel issued interim guidance stipulating that NEPA documents completed for DOE actions and projects should explicitly consider intentional destructive acts (i.e., acts of sabotage or terrorism). Construction and operation of the proposed wind turbine facility would not involve transportation, storage, or use of radioactive, explosive, or toxic materials. Consequently, it is highly unlikely that construction or operation of the turbine or met tower would be viewed as a potential target by saboteurs or terrorists. Therefore, impacts are not anticipated and intentional destructive acts are dismissed from further analysis.

3.2 GEOLOGY AND SOIL RESOURCES

3.2.1 Affected Environment

The Proposed Project area is generally flat with gently sloping topography ranging from 900 to 950 feet above mean sea level with the greatest elevation at the northern end of the project area along East 145th Street. The geology at the Proposed Project site consists of sandy to gravelly glacial outwash deposited over discontinuous glacial clay till and older outwash deposits. Bedrock in the area consists of remnant St. Peter Formation sandstone and the Prairie Du Chien Group dolostone. The dolostone separates the outwash from the underlying Jordan Formation sandstone, which is used as a source aquifer for many drinking water wells, including the City of Rosemount's water supply (Barr Engineering Company, 2010c). The depth to groundwater is approximately 100 feet below the ground surface in the Proposed Project area.

The soils across the Proposed Project site are generally derived from loess (windblown silt). Specifically, the Proposed Project area is underlain by soils from the Waukegan silt loam group. The Waukegan silt loam group of soils consists of very deep, well-drained soils that formed in 20 to 40 inches of loess or silty glacial alluvium and in the underlying sandy or sandy-skeletal glacial outwash. This soil group includes Waukegan silt loams and an Urban land-Waukegan complex. The soils have negligible to medium surface runoff potential [United States Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) 1983].

The proposed met tower would be located on Waukegan silt loam and the proposed turbine would be located on the Urban land-Waukegan complex. The Urban land-Waukegan complex consists of 90 percent urban land, which includes disturbed land with 35 to 80 percent impervious surfaces, and 10 percent of the Waukegan silt loam with 0 to 1 percent slopes. Waukegan silt loams are classified as Prime Farmland soils, while the Urban land-Waukegan complex is not classified as a soil of importance with regards to farmland (USDA NRCS, 1983).

3.2.2 Environmental Consequences of Proposed Project

The foundations for the proposed turbine and met tower would extend 7 to 10 feet below surface grade for protection from frost (Barr Engineering Company, 2010c). At this depth, the Proposed Project would have no impact on primary geologic resources including economically viable deposits of sand and gravel, and groundwater.

Construction of all components of the Proposed Project would total approximately 1.0 acre. Of this disturbance, 0.4 acres would be temporary and 0.6 acres would be permanent. In addition, trees would removed from a 25-acre area surrounding the wind turbine to reduce interference with operation of the wind turbine and met tower.

Construction equipment used during construction activities for the Proposed Project would include backhoes, earth scrapers, heavy haul trucks, large tractors, concrete trucks, concrete pavers, compactors, and a large crane. As with any construction project involving the use of heavy equipment, there is some risk of an accidental fuel or chemical spill, and the resultant potential contamination of soils. Fuel products (petroleum, oils, lubricants) would be needed to operate and fuel excavation equipment. To reduce the potential for soil contamination, fuels would be stored and maintained in the designated equipment staging area. A person(s) designated as being responsible for equipment fueling would closely monitor the fueling operation, and an emergency spill kit containing absorption pads, absorbent material, a shovel or rake, and other cleanup items would be readily available on site in the event of an accidental spill. By following these precautions, the potential for an accidental chemical or fuel spill to occur and result in adverse impacts on soils would be negligible.

The use of construction equipment would have the ability to disturb soils physically. Soil disturbance is defined as anything that causes the impairment of physical, chemical, and biological properties and processes, such as erosion, compaction, displacement, rutting, burning, loss of organic matter, and mass movement of soil (USDA, 2005). Heavy equipment would cause soil compaction, reducing the porosity and conductivity of the soil. Such compaction is likely to slightly increase the amount of surface runoff in the immediate area. Stabilization of soils would be conducted to prevent sediment runoff impacts to water sources in the vicinity of the project area.

No fill soil or other fill material would be used for the Proposed Project. The soil underlying the Proposed Project site belongs to the Waukegan silt loam group. These soils are well drained with negligible to medium runoff. Disturbance of up to 1 acre within the relatively flat Proposed Project site would not result in substantial sedimentation and runoff into nearby surface waters. Nonetheless, the conversion of vegetated and previously unpaved land to developed surfaces will result in some soil disturbance and compaction.

Construction of the Proposed Project would require coverage under NPDES. Within Minnesota, the NPDES program is administered by the MPCA. The chief components of the NPDES permit are a construction Notice of Intent, and development and adherence to a site-specific Stormwater Pollution Prevention Plan (SWPPP). Both the Notice of Intent and SWPPP would be submitted to and approved by the MPCA prior to site development. Measures identified in the SWPPP to reduce soil erosion and prevent pollution from petroleum, oil and lubricants, and other chemicals or hazardous/toxic materials present at the construction site would be implemented.

In addition to adherence to all permit stipulations, incorporation and maintenance of standard construction erosion and sediment controls, including vegetative stabilization practices, structural practices, stormwater management, and other controls as necessary would occur throughout the construction phase of the project. Use of these BMPs would minimize erosion at the construction site and sediment runoff into water resources in the vicinity of the Proposed Project area.

The proposed met tower foundation (20x20 feet), some of the anchor points (each 10x20 feet), and 0.03 acres of the access road leading to the met tower would be located on prime farmland soils. A total of 0.05 acres of the Proposed Project would be located on soils designated as prime farmland. This is a very small amount of the total of over 47 square miles of prime farmland soils in Dakota County; therefore, the proposed project would not adversely affect the availability of quality farmland soils or production of agricultural products in the region. The overall impacts to geology and soils from both construction and operation activities associated with the Proposed Project are expected to be minor.

3.2.3 Environmental Consequences of No Action

Under the No-Action Alternative, DOE would not authorize funding for the University's Proposed Project and the proposed wind turbine, met tower, and associated infrastructure would not be constructed. There would be no change in the use of the project area and no impacts to geological resources or soils.

3.3 LAND USE

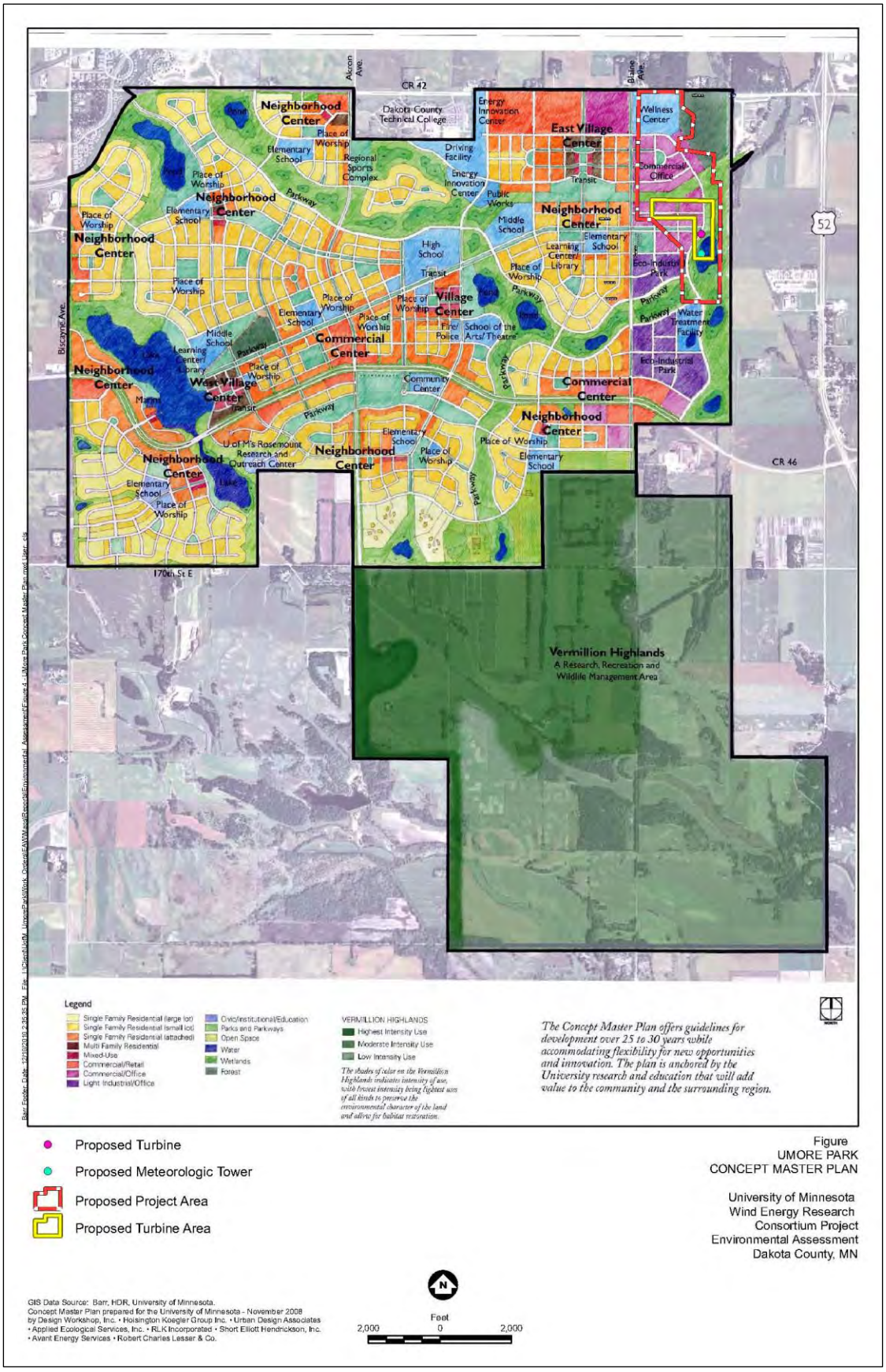
3.3.1 Affected Environment

Land use within the 212-acre Proposed Project area includes 177 acres (84 percent) of cultivated crops (mostly cornfields), 13 acres (6 percent) of open space, 6 acres (3 percent) of pasture/hay, and 6 acres (3 percent) of low and medium intensity development consisting of University associated structures and single family houses. The Proposed Project area is located within the boundaries of the City of Rosemount and is subject to zoning jurisdiction by the City. The City has zoned the Proposed Project area as agricultural land.

There are 21 farmstead and single family residences within 1 mile of the Proposed Project area (Figure 3). The nearest residence is located 3,186 feet southwest of the proposed turbine site. Other adjacent land uses consist of agriculture and institutional/research facilities, including the areas of UMore Park south and east of the Proposed Project. Areas of suburban growth have increased over the last twenty years near UMore Park, particularly to the north and west within the City of Rosemount. On a regional scale, this development pattern is consistent with much of central Dakota County. Dakota County is located at a suburban-rural interface. The area is situated in the southeastern corner of the Twin Cities Metropolitan area, and Dakota County is the third most populous county in the state. Dakota County maintains a land use mixture of one-third urban, one-third suburban, and one-third rural.

The Concept Master Plan for future use of UMore Park was approved by the University Board of Regents in December 2008 (Figure 6). Phased development of the UMore Park property will occur over 30 years. A new, sustainable community of 20,000 to 30,000 residents will be developed on approximately 5,000 acres of the University's property to the southwest of the project area over the next 20 to 30 years. The Vermillion Highlands Research, Recreation, and Wildlife Management Area would remain as open space. The first phase of residential development is slated to begin in 2013. The UMore Park agreement with the Proposed Project consortium is for a commitment of land for the wind turbine site for up to 15 years. In part because of work required to remove the remaining structures in the area associated with the GOW, it is likely that the portion of UMore Park surrounding the proposed turbine location would not be developed during that 15-year period.

Figure 6. UMore Park Concept Master Plan



The Concept Master Plan contemplates the development, over time, of UMore Park for a mixture of residential and commercial uses. The University currently holds short-term leases with about 35 tenants. In anticipation of this development and in furtherance of the Plan, the University has allowed leases with third parties to expire in accordance with their terms. The Jensen Field lease is among the leases allowed to expire. Jensen Field is a grass airstrip that was used by airplane hobbyists approximately 1.2 miles west of the turbine location. The occupants of Jensen Field were advised in 2005 of the plan to phase out this use. One tenant grew crops where the turbine would be constructed. This tenant was not offered a new lease for the acreage where the construction would occur. After construction is completed, the University may again offer to lease for farming purposes parts of the site that do not interfere with access to or operation of the research facility. If the University is required to do so under applicable state or federal law, the University would offer relocation assistance and payments to tenants.

3.3.2 Environmental Consequences of Proposed Project

The area to be developed for the Proposed Project is owned by the University, and in the past has been leased for agricultural use. The University is allowing the agricultural leases on the land to expire so that the land use would become unmaintained open space. The Proposed Project, a research facility, would be compatible with University goals and desired land uses. Plans for the Proposed Project would be submitted to the City of Rosemount's development director for review and comment to ensure that the project is compatible with the City's zoning.

Other land uses close to the Proposed Project site include low-density residential and farmstead uses. The two occupied residences nearest to the site are located on UMore Park property and are owned by the University. Both are located more than 3,000 feet from the proposed turbine site. The closer of these two residences is 3,186 feet southwest of the proposed turbine site. The two closest residences outside of UMore Park are located approximately 3,580 feet (0.68 miles) away from the proposed turbine location.

Installation and operation of the Proposed Project elements are not anticipated to interfere with existing uses of surrounding land. As described in Sections 3.1, 3.7 and 3.8, respectively, the project would have minimal impacts on nearby residences from shadow flicker, noise, and changes in surrounding views. Potential conflicts between the project and the surrounding land uses are not anticipated.

Future uses of the land surrounding the Proposed Project site identified in the Concept Master Plan include open space and commercial and light industrial development, such as a planned eco-industrial park (Figure 6). Those uses generally would be compatible with operation of the wind turbine. However, the UMore Park land use plan is conceptual at this time, and other uses of the area may be proposed in the future. The University, in cooperation with the City of Rosemont, would evaluate all proposed land uses for UMore Park property in the vicinity of the wind turbine to ensure that those proposals are safe and compatible with operation of the turbine. This may result in some proposed uses, such as residential development, being delayed or prohibited from the immediate vicinity of the wind turbine. This delay in some uses of the land surrounding the wind turbine would be extended if the University decides to continue operating the wind turbine beyond the current plan of 15 years.

3.3.3 Environmental Consequences of No Action

Under the No Action Alternative, DOE would not authorize the expenditure of federal funding for the wind turbine, met tower, and associated infrastructure. Agricultural and other ongoing uses of the project area and surrounding region would continue, and future land use plans for the area would not be affected.

3.4 BIOLOGICAL RESOURCES

3.4.1 Affected Environment

Vegetation

The Proposed Project site is located in the Oak Savanna ecological subsection of the Eastern Broadleaf Forest Province (MNDNR, 2005). In the mid 1800s, much of the Proposed Project area consisted of prairie (Marshner, 1974). By the late 1800s, much of the land had been converted to cropland. Present-day land cover in the Proposed Project area is primarily agricultural, with corn being the primary crop.

The cultivated fields and open spaces at the Proposed Project area are intersected by narrow lines of buckthorn (*Rhamnus spp*.), box elder (*Acer negundo*), and other trees and shrubs. Wildlife habitat within the area is limited: shrub/scrub habitat comprises 2.1 acres (1 percent), deciduous forest comprises 3.66 acres (2 percent) and grassland/herbaceous habitat comprises 3.0 acres (1 percent) of the 212-acre Proposed Project area. There are no wetlands or surface waterbodies within the area. Scattered patches of deciduous trees and shrubs, including box elder and buckthorn, are present along roads and in between fields within the Proposed Project area.

A 41-acre deciduous forest, located 0.4 miles north of the Proposed Project site in the northeastern corner of UMore Park, is classified by the Minnesota County Biological Survey (MCBS) as a Site of Biodiversity Significance. However, this site is categorized as "below" with regards to biodiversity significance (MNDNR, 2000), indicating that it lacks occurrences of rare species and natural features or does not meet MCBS standards for higher biodiversity ranks.

The 2,822-acre Vermillion Highlands Research, Recreation, and Wildlife Management Area, is located approximately 1.0 mile south of the Proposed Project area (MNDNR, 2010e). The Vermillion Highlands provides habitat for a variety of wildlife species; some of these species may travel through the Proposed Project area at times.

Wildlife

The Proposed Project area does not contain high-quality habitat for wildlife. Natural habitat is located only within the narrow grassland, scrub, and forest fragments which are scattered across the landscape and comprise less than 4 percent of the area. Common mammals such as the white-tailed deer (*Odocoileus virginianus*), squirrels (*Sciuridae*), and rabbits (*Leporidae*) are likely to visit the Proposed Project area. Fish, amphibians, and reptiles are unlikely to be present within the Proposed Project area due to the absence of wetlands, lakes, and streams.

During the mid-1800s, wildlife in the project vicinity likely included many prairie species that no longer regularly occur in the region, such as sharp-tailed grouse (*Tympanuchus phasianellus)*, western hognose snake *(Heterodon nasicus)*, and elk (*Cervus*) (University of Minnesota, 2010a). By the late 1800s, the site's wildlife consisted of species able to utilize cropland and farmsteads, including red-winged blackbird, American robin, house sparrow, and meadow vole.

Avian Species

Natural avian habitats within the Proposed Project area are limited to shrub/scrub, deciduous forest, and grassland herbaceous habitat. The area provides minimal suitable stopover habitat for migrating birds from the Mississippi River Corridor. The Mississippi River Corridor funnels more waterfowl to winter habitats than any other corridor in North America (Ducks Unlimited, Inc. 2010). The Mississippi River Corridor serves as the migratory corridor for approximately 40 percent of North America's waterfowl and shorebirds (MNDNR, 2010a).

Within the Mississippi River Corridor, the 38-mile section of the Mississippi River from Minneapolis to Hastings is designated as the Twin Cities Mississippi River Important Bird Area (IBA) (Natural Resources Consulting Inc, 2010). More than 200 species of birds, primarily waterfowl, have been recorded at the Lower Grey Cloud Island area (Figure 2), which is about 2.3 miles from the Proposed project area and is the portion of the IBA nearest the site (National Audubon Society, Inc., 2010). The IBA also contains a mixed-species heron rookery, at least eight bald eagle breeding territories, and six to eight pairs of peregrine falcons. At peak levels in the fall, the water bird population of the IBA is estimated to be more than 126,000 birds (National Audubon Society, Inc., 2010).

The MCBS has recorded a total of 96 breeding bird species for Dakota County (Natural Resources Consulting, Inc., 2010). This Dakota County list includes five state-listed species of special concern, two state-listed threatened species (loggerhead shrike and peregrine falcon [*Falco peregrinus*]), and 28 other Species in Greatest Conservation Need (SGCN).

Among non-migrating birds, generalist or fringe species such as mourning dove (*Zenaida macroura*), blue jay (*Cyanocitta cristata*), American crow (*Corvus brachyrhynchos*), American robin (T*urdus migratorius*), European starling (*Sturnus vulgaris*), common grackle (*Quiscalus quiscula*), brown-headed cowbird (*Molothrus ater*), house finch (*Carpodacus mexicanus*), and red-winged blackbird (*Agelaius phoeniceus*) are more likely to utilize the Proposed Project area than grassland or forest specialists or waterfowl, considering the landcover composition within the area. A complete list of bird species observed in the Proposed Project area, and a summary of the associated habitat, is provided in the Loggerhead Shrike Survey Report (Barr Engineering Company, 2010b).

An avian and bat screening analysis has been conducted for the Proposed Project (Natural Resources Consulting Inc., 2010). Below is a summary of the results of the screening analysis:

- A total of 103 breeding bird species have been identified in the Proposed Project area and vicinity (within approximately 5 miles), including two state-threatened species (loggerhead shrike and trumpeter swan [*Cygnus cygnus buccinators*]), two state-listed special concern species (bald eagle [*Haliaeetus leucocephalus*] and American white pelican [*Pelecanus erythrorhyn*]), and 19 other SGCN.
- It is possible that migrating birds using the Mississippi and Minnesota River corridors occasionally pass through the Proposed Project area as they make their way along the flyways associated with the rivers. However, given the lack of suitable stopover habitat, it is unlikely that migrant waterfowl would pass through the area at an altitude that would subject them to collision risk.
- There are no designated natural resource areas or other areas of concern located within the Proposed Project area.

Bat Species

The Proposed Project area is located in a region of moderate bat species diversity (Cryan, 2008). Based on a review of national range maps (BCI, 2010), six species of bats have geographic distributions that may include the Proposed Project area:

- Little Brown Bat (*Myotis lucifugus*)
- Big Brown Bat (*Eptesicus fuscus*)
- Hoary Bat (*Lasiurus cinereus*)
- Silver-haired Bat (*Lasionycteris noctivagans*)
- Eastern Red Bat (*Lasiurus borealis*)
- Eastern Pipistrelle (*Perimyotis subflavus*)

All of these species except the big brown bat require woodland habitat for feeding or roosting at some time during the year (BCI, 2010). Many of these species also forage along stream corridors or over water. The Proposed Project area provides very limited roosting or foraging habitat for these bat species. The eastern pipistrelle is listed as a Minnesota species of special concern and SGCN and has been recorded in several counties bordering Dakota County. However, the eastern pipistrelle has never been recorded in Dakota County (MNDNR 2010b).

The big brown bat is most abundant in deciduous forests, but this generalist species will also forage over agricultural fields (BCI, 2010). The Proposed Project area consists primarily of agricultural (corn) fields, which may be foraging habitat for the big brown bat.

Rare, Threatened, and Endangered Species

The MNDNR's Natural Heritage Information System (NHIS) database and USFWS list of federally threatened and endangered species in Minnesota were queried in May 2010 to identify rare and protected species that may occur within and near the Proposed Project area. The Higgins eye pearly mussel (*Lampsilis higginsii*) and the prairie bus clover (*Lespedeza leptostachya*) are the only federally listed threatened or endangered species that occur in Dakota County (USFWS, 2010c). Those species are not documented in the NHIS database as occurring within 1 mile of the Proposed Project area. The NHIS database also identified one state-threatened bird species, the loggerhead shrike, which has been documented within a 1.0-mile radius of the Proposed Project area.

Higgins Eye Pearly Mussel

The Higgins eye pearly mussel, an endangered species, is a freshwater mussel of larger rivers, where it is usually found in areas with deep water and moderate currents (USFWS, 2010b). Suitable habitat for the mussel is located in the entire reach of the Mississippi River within Dakota County. Since 1980, live Higgins eye pearly mussels have been found in the upper Mississippi River north of Lock and Dam 19 at Keokuk, Iowa, and in three tributaries of the Mississippi River (the St. Croix River between Minnesota and Wisconsin, Wisconsin River in Wisconsin, and lower Rock River between Illinois and Iowa). The nearest habitat for this species is more than 3 miles from the Proposed Project area in the Mississippi River.

Prairie Bus Clover

The prairie bus clover is a threatened prairie plant found only in the tallgrass prairie region of four Midwestern states (USFWS, 2010a). It is a member of the bean family and a Midwestern "endemic." The prairie bus clover requires tallgrass prairie for habitat. There is no tallgrass prairie on the Proposed Project site, and as a result, there is no suitable habitat for the plant on the site.

Loggerhead Shrike

The loggerhead shrike is a small gray, black, and white bird. Loggerhead shrikes live in open country areas where there is a mixture of short-grass vegetation and suitable perching sites, such as fence rows and old orchards with small trees and shrubs. The species occurs in native and nonnative grasslands. Nesting usually occurs in isolated small trees or large shrubs.

The Proposed Project is located in a region of Minnesota where loggerhead shrikes are consistently observed and known to nest. Dakota County is believed to have the highest concentration of shrikes in Minnesota (MNDNR, 2010c). With populations steadily declining throughout its breeding range, the loggerhead shrike is listed as a state threatened species in Minnesota. The loggerhead shrike is also categorized as a species of regional concern in the Midwest Region by the USFWS, but is not federally listed as threatened or endangered.

According to the NHIS database, juvenile loggerhead shrikes were observed in the Proposed Project area in 2006. As recently as 2009, a breeding pair was documented to the east of the UMore Park property. Based on the

recommendation of MNDNR, a comprehensive survey of the Proposed Project area for this species was conducted in early June 2010 (Barr Engineering 2010b). No loggerhead shrikes or evidence of the species were found in the Proposed Project area.

3.4.2 Environmental Consequences of the Proposed Project

Vegetation

The land disturbance for all components of the Proposed Project during construction would be approximately 1.0 acre within the project area. Of this disturbance, 0.4 acres would be temporary and 0.6 acres would be permanent. The 0.4-acre area of temporary disturbance would be regraded and reseeded with a native seed mixture once construction activities were complete. In addition, trees will be removed from an approximately 25-acre area, primarily directly north and south of the wind turbine, to reduce interference with operation of the wind turbine and met tower. Trees in that area occur at low density in narrow strips and small stands (Figure 4). This vegetation pattern is typical of that found throughout the project vicinity. Trees and shrubs would be cut to approximately 3 feet above ground level. Once trees and shrubs have been cut, the entire Proposed Project area would be maintained by mowing for the lifetime of the project. The trees and shrubs to be removed include elm (*Ulmus* sp.), hackberry (*Celtis occidentalis*), cottonwood (*Populus deltoides*), red pine (*Pinus resinosa*), aspen (*Populus tremuloides*), white oak (*Quercus alba*), red oak (*Quercus borealis*), eastern red cedar (*Juniperus virginiana*), green ash (*Fraxinus pennsylvanica*), and box elder. Shrubs include buckthorn, sumac (*Rhus sp*.), choke-cherry (*Prunus virginiana*), and prickly ash (*Zanthoxylum americanum*). No trees would be removed from the 41-acre deciduous forest located north of the Proposed Project site that is classified by the MCBS as a Site of Biodiversity Significance. The University has proposed the smallest area to be cleared of trees necessary to eliminate wind resistance effects on the research grade field site.

Due to the low quality and sparse distribution of vegetation proposed to be removed, and abundance of similar vegetation in the vicinity of the project area, the Proposed Project would result in only minor impacts to vegetation. As development occurs within UMore Park, a substantial number of trees would be planted for landscaping. Eventually, the number of trees planted would greatly exceed the number cut for the Proposed Project, but until that development and landscaping occurs there would be a temporary loss of tree cover in the area.

As stated in Section 2.2.6, removal of trees and all other clearing of potential nesting habitat would occur outside of the nesting season (April 15 to August 1). Thus, nesting migratory birds would not be harmed during construction.

Wildlife Species

The Proposed Project would not cause habitat fragmentation due to the low quantity and quality of wildlife habitat in the project area. Mobile wildlife species would disperse to adjacent property during construction activities. Some mobile species would be expected to re-colonize open land habitats within the Proposed Project area after the completion of all construction activities.

The Proposed Project would not directly impact the MCBS site located in the northeastern corner of UMore Park, nor would it impact the Vermillion Highlands area. In addition, the project would not indirectly impact these areas with noise or other disturbances due to the distance between the Proposed Project and these areas.

Due to the relatively small footprint of the Proposed Project area and the small acreage of trees being removed, there would be minimal impacts to most wildlife during construction and operation of the wind turbine. The remainder of this section focuses on the potential impacts to birds, bats, and protected species.

Avian Species

Wind energy facilities can impact birds in three ways: (1) loss of habitat; (2) avoidance of turbines and the surrounding habitat; and (3) fatalities resulting from collisions with turbines, power lines, and other project-related structures such as met towers and guy wires (Winegrad, 2004). The magnitudes of these impacts vary across bird types and geographic regions. Most research to-date has focused on the avian mortality associated with wind energy facilities; however, the other types of impacts may also affect avian populations and require consideration when assessing the potential consequences of a wind energy facility (The Ornithological Council, 2007).

Habitat Impact

Implementation of the Proposed Project would not cause a loss of high-quality avian habitat. The forested 41-acre area located east of the northern portion of the Proposed Project area would not be directly impacted by the Proposed Project.

Due to the small size of the stands of trees that would be removed, and the low density of the trees and shrub cover within those stands, the removal of trees from a 25-acre area surrounding the turbine would not have a detectable effect on the abundance of birds in the region surrounding the project area.

Avoidance of Turbines

Although the abundance of birds within the Proposed Project area is low, there is potential for birds to avoid the turbine and surrounding habitat. Avoidance impacts generally extend about 250 feet to 2,600 feet from a turbine, depending on the environment and the bird species affected (Strickland, 2004). Many Midwestern sites show small-scale avoidance impacts around turbines, particularly for grassland bird species (e.g. grasshopper sparrow [*Ammodramus savannarum*]; Strickland 2004, Shaffer and Johnson, 2008). Bird species adapted to human disturbances, such as those that are likely to use the agricultural areas surrounding the project site (e.g. killdeer [*Charadrius vociferus*]) are less likely to exhibit avoidance behavior near turbines (Shaffer and Johnson, 2008). Minimal avoidance impacts are anticipated because only one turbine is proposed for the project and the surrounding land cover is primarily cropland, which supports few avian species.

Collisions

It is likely that some birds would collide with and be injured or killed by the operating turbine. Nationally, wind turbines are responsible for 0.01to 0.02 percent of all avian fatalities due to human structures, averaging 0 to 3 birds killed per turbine per year (Erickson et al., 2002). Mortality rates at Midwest sites, particularly agricultural ones, are similar, generally averaging 1 to 2 birds killed per turbine per year (Erickson et al., 2002 and 2008). Studies have shown mortality rates to be very consistent among wind energy facilities, both nationally and within regional ranges. The number of avian fatalities at wind energy facilities is generally low compared to the total number of birds detected at these sites (Erickson et al., 2002).

Mortality reports from projects located on farmland in the Midwest are the most relevant to the Proposed Project. A four-year mortality study at the Buffalo Ridge wind energy facility in Minnesota, which is located in an agricultural landscape similar to the Proposed Project area, documented mortality rates ranging from 1 bird killed per turbine per year to 4.45 birds killed per turbine per year (Johnson et al., 2000). The birds killed consisted of 2 percent raptors, 76 percent passerines, 9 percent waterfowl, 6 percent waterbirds, 5 percent upland gamebirds, and 2 percent shorebirds (Johnson et al., 2000). A one-year study at a wind energy facility in Wisconsin reported 0.58 birds killed per turbine. Another one-year study of two turbines in Shirley, Wisconsin, reported 0.5 birds killed per turbine. Other studies at small wind facilities in Iowa and Kansas have reported no fatalities (Kerlinger, 2002).

Passerines, both resident and migrant, are the most likely species to be killed or injured by the University's proposed turbine. These species are the most commonly killed by turbines, comprising nearly 80 percent of avian fatalities at Midwest wind energy facilities (Erickson et al., 2008). Night-migrating passerines may be at a higher risk, accounting for more than 50 percent of avian fatalities at certain sites. However, no particular species or group of species has been identified as incurring greater numbers of fatalities (Erickson et al., 2002). No large scale night-migration related mortality events have been observed at wind farms, as have been seen at communications towers (Erickson et al., 2002).

The Proposed Project area is located near the Mississippi River Corridor and the Minnesota River Valley, and therefore may experience some waterfowl activity. However, impacts of wind energy facilities on waterfowl in the Midwest are generally low. Together, waterfowl, waterbirds, shorebirds, and rails/coots account for approximately 15 percent of avian fatalities at Midwest wind energy facilities (Erickson et al., 2008). The only sites experiencing regular waterfowl fatalities have been those located on the shores of large, open expanses of water. Risk to waterfowl may be increased in the Proposed Project area during the winter months if the croplands within the Proposed Project area attract large flocks of Canada geese (*Branta canadensis)* (Erickson et al., 2002). The Canada goose population in Minnesota has increased dramatically in recent years (MNDNR 2010d). Agricultural fields often attract flocks of geese, particularly during winter when other food sources are scarce (Erickson et al. 2002). Goose hunting is permitted on the Vermillion Highlands during December (Regents of the University of Minnesota, 2009), indicating that geese are present in the project area vicinity during the winter.

It is likely that most migrating waterfowl would pass through the Proposed Project area at a high enough altitude that they would be not subject to collision risk. The altitude of migrating waterfowl can be highly variable, depending on conditions and topography. The proposed wind turbine and met tower would be 426.5 feet high. Waterfowl flying over the Proposed Project area, which lacks nearby open water that would be used as stopover habitat, would most likely be flying at altitudes above these structures (Kerlinger, 1995). However, some migrating geese and other waterfowl may be at risk when landing to feed at nearby agricultural fields.

Raptor mortality at wind energy facilities has been a high-profile issue in the past, largely due to the high levels of mortality observed at the Altamont Wind Resource Area in California. New wind energy facilities, however, have greatly reduced their impacts to raptors, mostly as a result of changes in the design of wind turbines (Natural Resources Consulting Inc., 2010). Siting turbines outside of migratory flyways, breeding areas, and designated natural resource areas also reduce potential fatalities. New generation turbines, including the one to be installed by the University of Minnesota, have tubular support structures instead of lattice structures, which eliminate perching by raptors; they also have larger blades, which reduces motion blur. Risk to raptors from the Proposed Project is likely to be low. Outside of California, where rates are greatly influenced by the Altamont site, nationwide raptor mortality rates average 0.006 mortalities per turbine per year (Erickson et al., 2002). During four years of post-construction monitoring, only one raptor mortality was documented at the Buffalo Ridge site, which is located in habitat similar to that in the Proposed Project area (Johnson et al., 2000). It is unlikely that raptors commonly pass through the project area, or would be impacted by a single turbine. Therefore a collision risk to raptors is not anticipated and an overall impact to the local raptor population would not be observed.

According to the NHIS database, the closest documented bald eagle sighting was approximately 2.7 miles northeast of the Proposed Project area, adjacent to the Mississippi River. Because there are no bodies of water within the immediate vicinity of the Proposed Project area, bald eagles are not expected to frequent the area.

Met Tower

Other possible risks to birds may result from the met tower, which would be located approximately 600 feet south of the proposed turbine. Over a four-year study at the Foote Creek Rim Wind Plant in Wyoming, avian fatalities were found at all five met towers. Habitat at that project area consisted primarily of mixed grass prairie and sagebrush shrubland. An average of 8.09 birds were killed per met tower per year, including both resident and migrant species. On average, avian mortality was three times greater at met towers than at the turbines (Young et al., 2003). Over a one-year study at the Klondike Wind Project in Oregon, which included habitat more similar to that of the Proposed Project area than the Foote Creek Rim study, no avian fatalities were found at the single tower.

Given that there are only two studies, it is difficult to determine which (if either) may be more applicable to the Proposed Project area. There are not enough data to support conclusions about potential impacts to different avian groups. An overall estimate of avian mortalities based on the results of the two studies (8.09 birds per met tower per year and zero birds over a 1 year study) indicates that mortality at the Proposed Project area is likely to be low (0-20 birds/year). However, it would be important to consider the mortality events which periodically occur at similarly-lighted communications towers on cloudy nights. It would be possible for such an event to occur at the proposed met tower.

Impacts to birds from the met tower may be comparable to impacts caused by similar communications towers, for which more data are available. Direct avian mortality appears to be the primary impact associated with these structures. Avian mortality at communications towers varies greatly depending on tower height, lighting, color, structure, and the presence of guy wires. Mortality rates vary widely, ranging from 82 to 3,199 birds killed per tower per year (The Ornithological Council, 2007). Guyed towers 380-480 feet tall may have mortality rates ranging from 20 to 224 birds per tower per year, depending on the type of lighting on the tower – white strobe lighting typically results in the lowest mortality rate (The Ornithological Council, 2007). The proposed met tower would be 426.5 feet tall, with a tubular structure and guy wires. This tower may therefore result in single and small-scale bird fatality events, although the number of fatalities may be reduced through the use of strobe lighting on the tower.

Low-Voltage Transmission Lines

Birds may collide with the low-voltage transmission line to be installed for the Proposed Project. The proposed new line would run parallel to existing transmission lines, located less than a mile away. Waterfowl typically are more susceptible to transmission line collisions, especially if the line is placed between agricultural fields used as feeding areas, and wetlands or open water.

Most avian electrocutions occur on power lines with voltages less than 60 kV. Although this is not a unique risk, given the abundance of distribution lines in developed areas, additional avian mortality in the Proposed Project area may result from the above-ground distribution lines. Species at risk include most raptors and owls, as well as crows, ravens, magpies, jays, storks, herons, pelicans, gulls, woodpeckers, sparrows, kingbirds, thrushes, starlings, pigeons, and others. Large body size, open habitat, and wet conditions may all increase the risk of electrocution. Electrocution can occur when a bird simultaneously contacts electrical equipment either phase-to-phase or phase-to-ground.

Potential electrocution risks associated with the proposed above-ground low-voltage transmission lines could be mitigated by increasing the separation between energized and/or grounded lines, as well as through the use of ground-wire marking or devices which discourage perching on power structures. These measures are often highly successful at reducing electrocution hazards for birds (APLIC, 2006). For the Proposed Project, Xcel Energy's

transmission line design standards would be implemented to provide adequate spacing of the energized and grounded line components to eliminate the risk of raptor electrocution. As such, the risk of electrocution to birds from the Proposed Project would be minor.

Conclusion

Given the similarity of the Proposed Project to other Midwest wind energy facility sites, the lack of unique avian species, scarcity of avian habitat, and the consistency of mortality rates across regions, it is expected that the mortality rates during operation of the single wind turbine would be similar to or less than mortality rates observed at other Midwest sites (1-2 birds killed per year per turbine excluding the met tower) (Erickson et al., 2002 and 2008), and that there will be some additional mortalities caused by the met tower. These mortalities resulting from a single turbine and met tower should have negligible population-level effects on avian species.

Contingent on the availability of funding, the University plans to develop and implement a post-construction bird and bat fatality monitoring plan under the guidance of the USFWS and MNDNR. The University recognizes the potential for research studies related to this subject and, as a result, the Office for UMore Park Academic Initiatives has informed University faculty about this research opportunity. Depending on the availability of funding, regularly scheduled surveys would be conducted to find dead or injured birds and bats and methods to reduce mortalities of birds and bats at this and other wind energy projects would be developed and tested. These and other specific details would be included as part of the monitoring plan.

Bat Species

Wind energy facilities can have a variety of impacts on bats, including indirect impacts due to habitat loss as well as direct mortality from turbine collisions and barotrauma caused by rapid air-pressure reduction near moving turbine blades (Baerwalk et al., 2008). Wind turbine collisions and/or barotrauma may cause a greater magnitude of direct mortalities of the affected bat species than that resulting from any other human source of bat mortality (i.e. large buildings, met towers, etc.) (Cryan, 2008). Additional impacts may result from the loss of habitat for roosting and foraging, as well as the loss of habitat along migration corridors. Currently, there is no data available on indirect impacts to bats resulting from wind energy facilities. All studies are currently focused on attempting to understand and mitigate the direct mortalities occurring at these sites. Because the Proposed Project involves the installation of a single wind turbine, and requires the disturbance of primarily agricultural land which has little suitable bat habitat, indirect impacts from habitat loss to bat species would be minimal.

The risk of direct mortality of bats at wind energy facilities appears to vary greatly by species, season, and geographic region. Of the 45 North American bat species, three migratory tree bat species: the eastern red bat, hoary bat and silvered-haired bat, make up nearly 75 percent of all bat fatalities at wind energy facilities (Kunz et al., 2007). Other species frequently killed at wind energy facilities include the eastern pipistrelle, the little brown bat, and the big brown bat (Kunz et al., 2007). All of these species, except the big brown bat, require woodland habitat not found at the Proposed Project site for feeding or roosting at some time during the year (BCI, 2010).

Tree bat fatalities predominantly occur in late summer and autumn (Cryan, 2008). Mortalities appear to be primarily associated with migrating or dispersing bats, not residents, given the seasonality of the mortalities (Erickson et al., 2002). Studies indicate that most bat fatalities occur on low-wind nights and during thermal inversions following storm fronts, when insects are likely to be most active (Kunz et al. 2007). Larger turbines and those operating at lower cut-in speeds (below 5.0 meters per second) cause higher numbers of bat fatalities (Cryan 2008, and Arnett et al., 2009). Studies suggest that increasing cut-in speeds during periods of high-risk for bat mortalities could reduce nightly fatalities by 53-87 percent, with only marginal annual power loss (Arnett et

al., 2009). The proposed 2.5-megawatt turbine is moderate-to-large in size and has a cut-in speed of 3 to 5 meters per second.

Nationwide, bat mortalities have been highest at wind energy facilities located along forested ridge tops in eastern North America, and lowest at facilities sited in relatively open landscapes in the Midwest and West (Kunz et al. 2007). It is unclear, however, if this may partially be a result of less-stringent bat-mortality monitoring at facilities in the West (Kunz et al. 2007). The estimated mean-bat-fatality per turbine per year for Midwest sites is between 0.1 and 7.8 (Arnett et al. 2008).

The proposed met tower may also cause impacts to bats. However, no bat mortality data have been collected for met towers. Neither the Foote Creek Rim Wind Plant nor the Klondike Wind Project surveys reported any bat fatalities at met towers (Young et al. 2003; Johnson et al., 2003). The risk to bats from the proposed met tower would appear to be similar to the risk to birds, as bat mortalities at communications towers were often associated with avian mortalities in the few studies available (Osborn et al., 1996). Therefore, the met tower may be expected to cause single and small-scale bat mortality events. As with the proposed turbine, the potential risk to bats from the proposed met tower would be more likely to affect migratory bats, because migrants have made up the majority of mortalities found at similar man-made structures (93 percent of bat mortalities found at turbines during the Klondike Wind Project study were migratory species) (Johnson et al., 2000).

Although some bats could be killed by the operating wind turbine or the met tower, it is not anticipated that this project would have an impact on bat populations for the following reasons. First, none of the bat species known to occur in Minnesota is threatened, endangered or extremely rare in the region. Only one is classified as a species of concern and that species (eastern pipistrelle) has never been recorded in Dakota County. Second, this project includes installation of one wind turbine in an area where there are no other existing turbines or plans for additional turbines. Finally, the number of bats likely to be killed would be similar to that reported at non-forested sites elsewhere in the United States (that is, 1 to 19 bats per year), which would not result in a noticeable decline in the population of bat species in the Proposed Project area (Arnett et al. 2008). Based on this analysis, the Proposed Project is not expected to have more than a minor impact on wildlife populations present within the project area.

Following construction, and contingent on the availability of funding, the University could conduct monitoring and research on the impacts of their wind turbine and met tower on bats. The University recognizes the potential for research studies related to this subject and, as a result, the Office for UMore Park Academic Initiatives has informed University faculty about this research opportunity. Faculty may seek future funding opportunities to develop this research topic.

Rare, Threatened, and Endangered Species

The Higgins eye pearly mussel and the prairie bus clover are the only federally listed threatened or endangered species that occur in Dakota County (USFWS, 2010c). The prairie bus clover is a federally threatened prairie plant found only in the tallgrass prairie region of four Midwestern states (USFWS, 2010a). The Higgins eye is a freshwater mussel of larger rivers, where it is usually found in areas with deep water and moderate currents (USFWS, 2010b).

There is no tallgrass prairie or riverine habitat present within the Proposed Project area, and the University's Proposed Project would not either directly or indirectly affect those types of habitats. Thus, the Proposed Project would have no effect on any species listed as threatened or endangered under the Endangered Species Act.

Review of the NHIS database identified one state-threatened species, the loggerhead shrike, as the only state-protected species that is known to occur within 1.0 mile of the Proposed Project area (Natural Resources Consulting Inc., 2010). The Proposed Project could affect any loggerhead shrikes that may be living in the project area during construction activities. The turning turbine blades could also cause shrike mortality when the wind turbine is operating.

Surveys for loggerhead shrikes were conducted on June 8, June 11, and June 15, 2010, at the Proposed Project site and surrounding area. No shrikes were seen, and no evidence of their prey or nests was detected in the Proposed Project area (Barr Engineering Company, 2010b). Time also was spent surveying the area to the east of the Proposed Project site, where shrikes are known to have nested in 2009. Barbed wire fences along portions of the old patrol road were examined for any evidence of shrike activity (Barr Engineering Company, 2010b). The shrike is a predator known for its habit of impaling its prey on the thorns of shrubs or the barbs of barbed wire fences, providing evidence of its activity in an area. No prey was observed on any of the fences. Loggerhead shrikes migrate into the Proposed Project region in early March to late April and nest there from late April through mid-June (and sometimes slightly later).

The surveys for shrikes were conducted during periods of light mist and overcast sky. This may have caused birds in the area to reduce their activity during the surveys; however, during the breeding season birds often sing longer in the day (and are active longer) when it is cooler and overcast than when it is hot and clear. Numerous other species were observed or heard singing during the June 2010 surveys (Barr Engineering Company, 2010b).

The MNDR has identified a portion of UMore Park, and much of Dakota County, as potential loggerhead shrike habitat. However, the Proposed Project area and immediate vicinity have limited suitable habitat for shrikes because that species prefers grasslands with a shrub component (NatureServe, 2009). The Proposed Project area is predominantly cropland with scattered trees along old fence rows and roads. Although some cropland may be present in shrike territories, the presence of short grass is essential. Some studies have shown a direct correlation between the amount of grassland cover and the presence of shrikes (Gawlik and Bildstein, 1993; Smith and Kruse, 1992). The only grassland present in the Proposed Project area is a 3-acre site approximately 500 feet northeast of the proposed turbine area where hay is harvested (Barr Engineering Company, 2010b). During the June 2010 surveys, it was determined that the Proposed Project site and surrounding area do not have suitable habitat for, and no evidence of, loggerhead shrikes. Therefore, DOE has concluded that the Proposed Project would have a negligible impact on loggerhead shrikes, and that post-construction monitoring of impacts to loggerhead shrikes is not necessary.

3.4.3 Environmental Consequences of No Action

Under the No Action Alternative, DOE would not authorize the expenditure of federal funding, and the proposed wind turbine, met tower, and associated infrastructure would not be constructed. No vegetation would be removed and there would be no direct or indirect impacts to vegetation. The amount of cropland and undeveloped land would remain the same. There would be no increase in mortality to avian or bat species, and no other adverse impacts to biological resources.

3.5 CULTURAL RESOURCES

3.5.1 Affected Environment

In order for the Proposed Project to receive federal funding from DOE, the project must comply with Section 106 of the National Historic Preservation Act of 1966 (Section 106). As a first step in compliance, a determination has to be made of whether or not properties on or eligible for listing on the National Register of Historic Places

(NRHP) are present within the area of potential effect (APE) for the Proposed Project. The archaeological APE for this project consists of all areas of potential disturbance from the project, including the proposed turbine and met tower areas, the 34.5 kV interconnect line, and the data transfer line. The APE for historical architecture resources is the area within a 1.0 mile radius of the proposed turbine (see Figure 7).

In order to make the determination regarding the presence of eligible historic properties, multiple surveys were conducted, including:

- A Phase IA Archaeological and Architectural History Survey (May 2010)
- A Phase I and II Architectural History Survey (October 2010)
- A Phase I Architectural History Review of the Minnesota Agricultural Experiment Station (September/October 2010)
- A Cultural Resource Literature Review of Proposed Fiber Optic Lines (November 2010)

A discussion of the surveys and consultation is presented below.

Phase IA Archaeological and Architectural History Survey

In May 2010, a Phase IA archaeological and architectural history survey was conducted at the Proposed Project area (The 106 Group Ltd., 2010a). The purpose of the survey was to identify archaeological resources that could be directly affected by the Proposed Project and to determine whether the project area contains previously recorded cultural resources or has the potential to contain unrecorded cultural resources that may be eligible for listing in the NRHP.

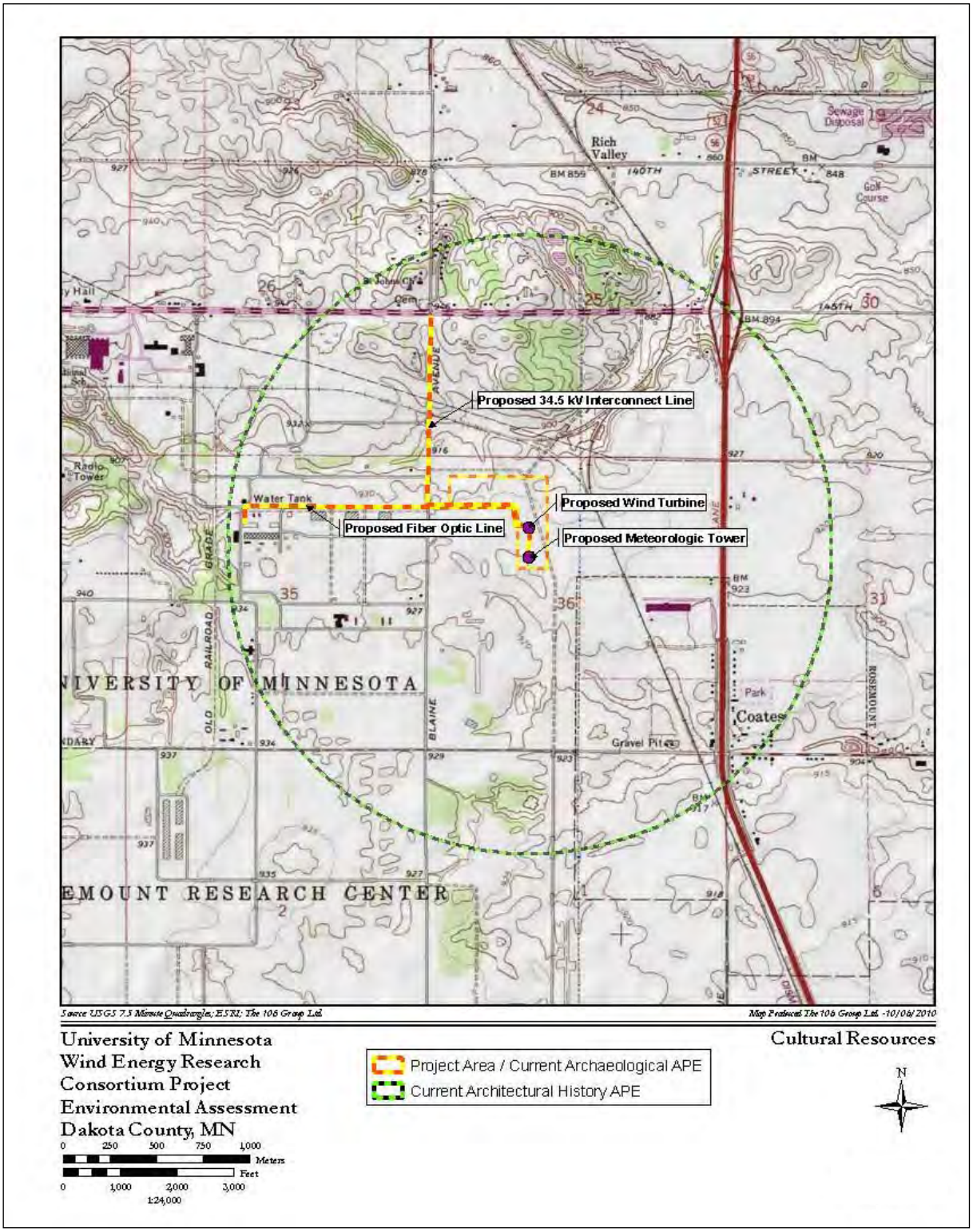
The archaeological survey included a review of documentation of previously recorded sites within 1.0 mile of the project area, and a review of surveys previously conducted within the Proposed Project area. Additionally, an archaeological field survey was conducted to identify areas with a high potential for containing intact archaeological sites. No archaeological sites were observed during a pedestrian survey, and it was determined that the potential for archaeological resources was low due to a lack of topographically prominent features or nearby water resources.

The reconnaissance architectural history survey identified 28 properties within 1.0 mile of the proposed turbine location that had been previously evaluated for eligibility for inclusion on the NRHP; 26 of the 28 had been recommended as not eligible, one had no recommendation, and the other, the Edmund H. Knodt Farm, had been recommended for additional investigation. Several other properties were identified that had not been previously evaluated.

Phase I and II Architectural History Survey

In September and October 2010, a second Phase I survey was conducted to determine whether the properties identified during the May 2010 Phase IA survey were eligible for listing on the NRHP. The second Phase I architectural history survey consisted of a review of documents of previously inventoried properties and of surveys previously conducted within the APE, as well as a field survey to document properties 50 years of age or older within the APE that had not been previously inventoried or evaluated for listing in the NRHP. The survey identified 36 properties 50 years in age or older within the APE that had not been previously inventoried or evaluated. Those 36 properties were determined to be not eligible for listing in the NRHP due to a loss of historic integrity and/or a lack of historical significance (The 106 Group Ltd, 2010b).

Figure 7. Cultural Resources



In addition, a Phase II evaluation of the Edmund H. Knodt Farm (DK-RSC-024) was completed to evaluate the eligibility of that property for listing in the NRHP. That property is located at 15102-15150 Clayton Avenue in Rosemount, 0.67 miles east of the proposed turbine location. The Edmund H. Knodt Farm is approximately 182 acres and is made up of two houses, two dairy barns, and numerous outbuildings. The first structure on the farmstead, the house, was built in 1867. The house was heavily modified in 1927 by Edmund H. Knodt. Some of the other key buildings on the farm were also constructed in 1927. The farmstead principally acquired its present form and buildings during the period in which it was associated with Edmund H. Knodt. For this period, the farm retains good integrity in terms of location, setting, feeling, and association. All of the buildings and structures on the farmstead, except for the original 1867 house, have generally good integrity in terms of design, materials, workmanship, feeling, and association.

The Edmund H. Knodt Farm is recommended as eligible for listing in the NRHP under Criterion A at the local level in the area of agriculture for its association with the Country Life Movement in Minnesota, which sought to improve conditions and the viability of Minnesota farms. Edmund H. Knodt was a pioneer in implementing the principals and practices promoted by this movement to improve the productivity of his farm, especially his dairy operation. The farm also has significance at the local level under Criterion B in the area of agriculture for its association with the significant contributions of Edmund H. Knodt to the advancement of the dairy industry in Minnesota in the early and mid-twentieth century (The 106 Group Ltd, 2010b).

Phase I Architectural History Review for the Minnesota Agricultural Experiment Station

In addition to the Phase I and II Architectural History Survey, a Phase I architectural history review of a portion of the Minnesota Agricultural Experiment Station (MAES) was conducted during September/October of 2010 (The 106 Group Ltd. 2010c). The purpose of this survey was to review structures and landscape features on UMore Park within 1.0 mile of the proposed turbine location to determine their association, if any, with the MAES. A review of historical MAES documents was conducted as part of that survey. Based on the survey results, it was concluded that no structures or landscape features on UMore Park within 1.0 mile of the proposed turbine location were used as part of the MAES (The 106 Group Ltd. 2010c).

During this review, two former Gopher Ordnance Works (GOW) structures (DK-RSC-031 and DK-RSC-032) were identified that were used as part of the Rosemount Aeronautical Research Laboratory (RARL) (The 106 Group Ltd. 2010c). These two structures have not been formally evaluated for listing in the NRHP for their association with RARL. However, the 2006 *Historical Interpretation and Preservation Plan for UMore Park* (Lauber, 2006) did conduct a baseline field survey to identify and inventory extant buildings, objects, and structures on the UMore Park site, and included a preliminary evaluation of the significance of those extant structures using National Register criteria. The report concluded that the RARL complex lacks historic integrity due to the loss of an associated building used as part of the RARL (GOW Building 302-A) and recommended that the complex was not eligible for listing in the NRHP (Lauber, 2006). DOE has reviewed the basis for this recommendation and agrees that the two remaining structures used as part of the RARL are not eligible for listing in the NRHP.

Cultural Resource Literature Review of Proposed Fiber Optic Lines

In November 2010, a literature review for potential cultural resources was conducted to address the likely area of disturbance for the proposed data transfer fiber optic line. The review determined that the proposed location of the data transfer line, which is primarily within an existing roadway right of way, had a low potential for intact archaeological sites, and no further investigation was recommended (The 106 Group Ltd. 2010d).

3.5.2 Environmental Consequences of Proposed Project

No archaeological sites listed on or eligible for listing on, the NRHP were identified in the Proposed Project area, and the area was determined to have a low potential for archaeological sites. Therefore the project would not have an adverse effect on any known archaeological resources. In the unlikely event that construction unearths archaeological materials or human remains during ground-disturbing activities, the University would halt such activities, notify the Minnesota SHPO and appropriate Indian Nations, and ask for direction on how to proceed.

One historical architecture site, the Edmund H. Knodt Farm (DK-RSC-024), was identified in the APE for the Proposed Project as eligible for listing on the NHRP. The construction of the UMore Park wind turbine may have an adverse affect on the farm. The proposed 2.5 MW wind turbine would be located 0.67 miles from the farm. The proposed turbine would be directly visible from the farm; the farm is separated from the Proposed Project site by a cornfield and Highway 52, neither of which would provide any screening for the turbine. The total height of the wind turbine would be a maximum of 426.5 feet. The met tower's height would also be 426.5 feet. The met tower and top of a vertical blade would be about 8 degrees above the horizon.

Given the height of the proposed turbine, construction of the turbine would introduce a visible and prominent feature into the landscape as viewed from the front (west) of the farm. Since the proposed turbine would be taller and its blades wider than other features found on the landscape, it would be out of scale with the surrounding landscape, which may potentially alter the setting and feeling of the landscape and the farm. Therefore, the construction of the proposed turbine has the potential to result in an indirect adverse visual effect to the Edmund H. Knodt Farm.

DOE, the University, and the Minnesota SHPO have developed and signed a Memorandum of Agreement to address mitigation for this potential adverse effect, as required by Section 106 of the National Historic Preservation Act. That Memorandum requires that the University arrange for photographic documentation of the Edmund H. Knodt farm following the Minnesota Historic Property Record Guidelines (Level II documentation). That documentation has been completed and the SHPO has concurred that the terms of the Memorandum of Agreement have been completed. DOE notified the Advisory Council on Historic Preservation that the Proposed Project may result in an adverse impact to an eligible historic property and invited that agency to participate in consultation to address that impact. The Advisory Council informed DOE that their participation in the consultation process was not necessary. See Appendix C for copies of the Memorandum of Agreement and correspondence between DOE and these agencies.

3.5.3 Environmental Consequences of No Action

Under the No Action Alternative, DOE would not authorize the expenditure of federal funds and the proposed wind turbine, met tower, and associated infrastructure would not be constructed. There would be no direct or indirect impacts to historic properties or other cultural resources under this alternative.

3.6 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.6.1 Affected Environment

The area of potential socioeconomic impacts considered for this EA includes the City of Rosemount and Dakota County, within which the Proposed Project would occur. Situated in the southeastern corner of the Twin Cities Metropolitan area, Dakota County is the third most populous county in the state of Minnesota (Dakota County,

2010a). Dakota County's mix of land use supports a diversity of industries ranging from construction and professional technical services to public administration, with no single industry dominating the mix.

The U.S. Census Bureau estimated that the 2009 Dakota County population was 396,500, which is an 11.4 percent increase from the 2000 population of 355,904 (U.S. Census Bureau, 2010). Between 1990 and 2000, Dakota County's population grew by nearly 30 percent. At an estimated 624.4 persons per square mile, average population density in Dakota County is an order of magnitude higher than the state average of 61.8 people per square mile (U.S. Census Bureau, 2010).

Based on the U.S. Census Bureau information, the City of Rosemount is made up of approximately 92.8 percent Caucasians, 1.8 percent Hispanic, 2.0 percent African Americans, 0.3 percent American Indians, 2.1 percent Asians, and 1.0 percent persons of more than two races. Dakota County is made up of approximately 85.1 percent Caucasians (not Hispanic), 4.6 percent Hispanic, 4.3 percent African Americans, 0.5 percent American Indians, 4.1 percent Asians, 0.1 percent Native Hawaiian and other Pacific Islander, and 1.8 percent persons of more than two races (U.S. Census Bureau, 2010). There are no known concentrations of minority or disadvantaged persons living near the Proposed Project area.

In 1999, the median household income in Rosemount was $65,916, with approximately 3.3 percent of the population living below the poverty level. In 2008, the median household income in Dakota County was $71,988, with approximately 4.6 percent of the population living below the poverty level.

By comparison, demographic information from the U.S. Census for the state of Minnesota indicates that the state is made up of approximately 85.4 percent Caucasians (not Hispanic), 4.1 percent Hispanic, 4.6 percent African Americans, 1.2 percent American Indians, 3.5 percent Asians, and 1.5 percent persons of more than two races. The median household income in Minnesota is $57,318, with approximately 9.6 percent of the population living below the poverty level (U.S. Census Bureau, 2010).

3.6.2 Environmental Consequences of Proposed Project

The Proposed Project would not have a direct influence on population growth and distribution in Dakota County. However, it could have a minor direct short-term economic benefit to the area during construction and may have longer term impacts on growth and development linked to the expansion of renewable energy research opportunities.

In anticipation of the development of UMore Park, the University has allowed leases on the land with third parties to expire in accordance with their terms. One tenant grew crops where the proposed turbine would be constructed, and was not offered a new lease for that area. After construction is completed, the University may again offer to lease parts of the site that don't interfere with access to or operation of the research facility for farming purposes.

The Proposed Project is expected to require about 2,000 hours to build the turbine and an additional 300 hours to build the met tower. This would result in temporary employment opportunities during design and construction. The employees of construction firms that erect wind turbines require lodging, food, and other daily amenities that are widely available in the Rosemount and Dakota County area. Thus, the construction and design phase of the Proposed Project would offer a temporary additional source of revenue to local businesses. Two full-time employees would maintain the Proposed Project facilities. The proposed research and educational agendas associated with the Proposed Project would also lead to short-term and long-term job creation opportunities.

Because UMore Park is University property and not on state, county, or municipal property tax rolls, no additional local tax revenue would be generated as a result of the Proposed Project.

Federal agencies are required by Executive Order 12898 to consider environmental justice during the NEPA process to ensure proposed projects do not present a disproportionate adverse environmental impact to minority or low-income populations. As described above in Section 3.6.1, the proportion of minority and low-income populations is low in the area surrounding the Proposed Project site relative to the state of Minnesota. In addition, no substantial adverse impacts would occur to any members of the communities in or near the project area; therefore, there would be no adverse and disproportional impacts to minority or low-income populations. Overall impacts from the Proposed Project on socioeconomics and environmental justice would be minor and beneficial.

3.6.3 Environmental Consequences of No Action

Under the No Action Alternative, DOE would not authorize the expenditure of federal funds; the proposed wind turbine, met tower, and associated infrastructure would not be constructed; and as a result, the beneficial economic impacts of the Proposed Project would not occur.

3.7 NOISE

3.7.1 Affected Environment

Noise "receptors" are places or areas where people live, work, or stay that may be affected by changes in sound level. Generally they are residential areas, churches, schools, recreation areas, hospitals, etc. The two occupied residences nearest to the proposed turbine site are located on UMore Park property and are owned by the University. Both are located more than 3,000 feet from the proposed turbine site (Figure 3 and **Error! Reference ource not found.**). The closer of these two residences, labeled R1 in **Error! Reference source not found.**, is located 3,186 feet southwest of the proposed turbine site.

The two closest residential receptors outside of UMore Park are located approximately 3,580 feet (0.68 miles) away from the proposed turbine location. One of these residences is located directly east of the turbine site along State Highway 52 (R2), and the other is on County Road 42 to the north of the preferred turbine location (R3).

In order to understand the current sound levels near these receptors, it is necessary to understand how sound is measured. Sound is usually measured in units of decibels. Decibels are measured on a logarithmic scale. On this scale, an increase of 10 decibels is perceived as a doubling of sound level. For applications where human hearing is the prime consideration, A-weighting is applied to yield A-weighted decibels (dBA). This weighting serves to better replicate the way the human ear perceives sound. The sound level in a quiet bedroom is approximately 40 dBA. The sound level in an active business office is generally about 70 dBA. Table 3 illustrates typical sound levels from various sources located 50-feet from a receptor.

Background sound near the residences within UMore Park are estimated to be approximately 35 to 40 dBA at night and 40 to 50 dBA during the day, based on general rural sound levels (USEPA, 1971). However, due to vehicle traffic on County Road 42 and Highway 52, sound levels near the residences to the north and east of the Proposed Project area are much higher.

Noise descriptors used in highway noise assessments are L_{10}, the noise level exceeded for 10 percent of the peak hour, and L_{50}, the sound level exceeded 50 percent of a specific time period. The sound levels along County Road 42 were measured recently near receptor R3 at 75 dBA (L_{10}) and 66 dBA (L_{50}) (University of Minnesota, 2010b). In nearby residential areas slightly farther away from County Road 42, background sound levels were 54 dBA (L_{10}) and 50 dBA (L_{50}). Based on these data, residential receptors R2 and R3, located adjacent to County Road 42

Figure 8. Noise Analysis Map

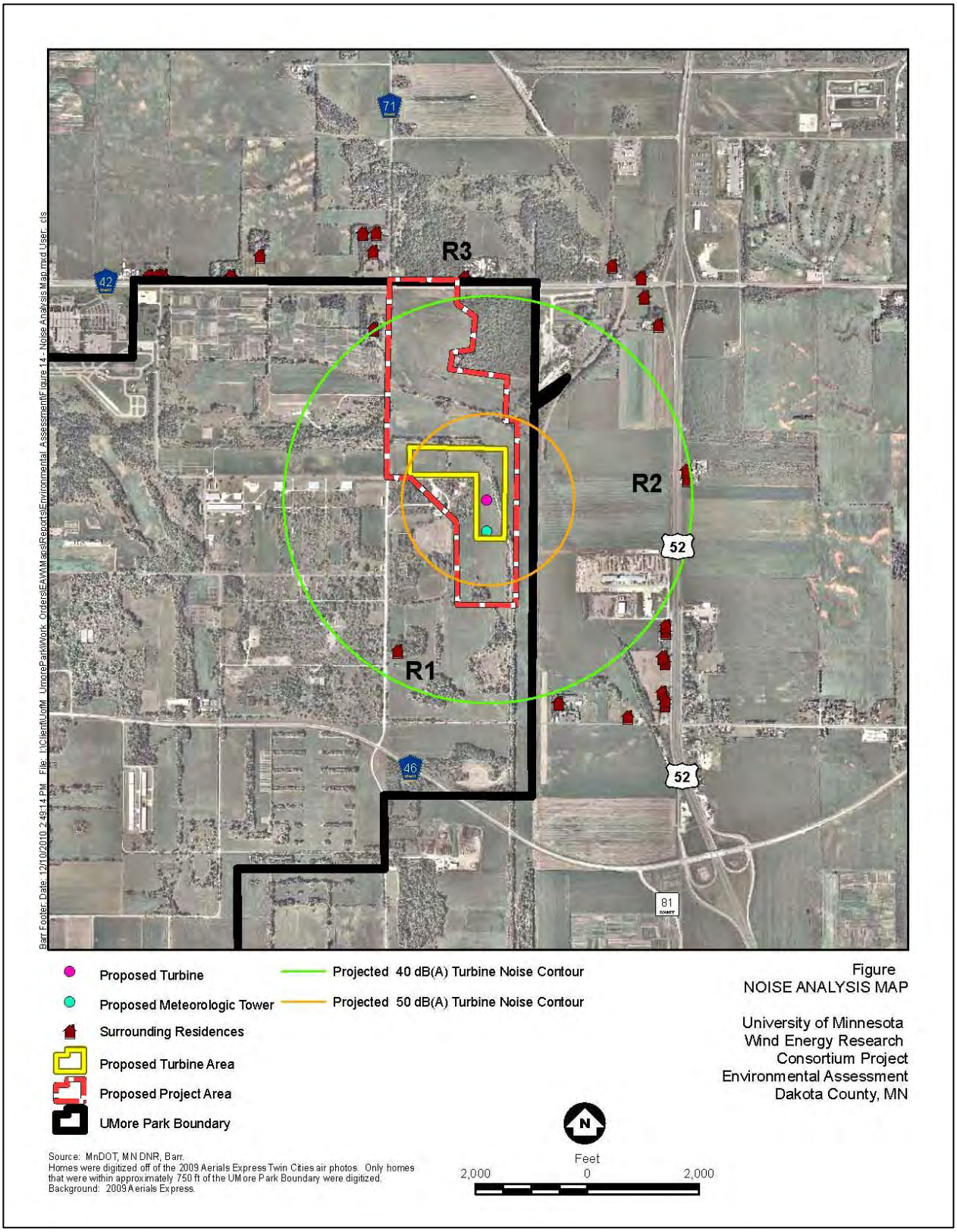


Table 3 – Typical A-weighted Sound Levels

Outdoor	dBA	Indoor
Rock Drill Jack Hammer Concrete Mixer Air Compressor Lawn Mower Lawn Tiller Air Conditioner		Shop Tools, in use Shop Tools, idling Food Blender Clothes Washer Air Conditioner Refrigerator
At 50 feet		At 50 Feet

Source: (FTA, 2006)

and Highway 52, respectively, are conservatively assumed to have daytime background L_{50} sound levels of at least 55 dBA. However, actual sound levels at the residence along Highway 52 would be higher because average daily traffic along Highway 52 is at least three times greater than that along County 42.

There are currently no local sound ordinances for the Proposed Project area. There are, however, state noise standards that apply. Minnesota Rules Part 7030.0040, Subpart 2 outlines the Minnesota state standards followed for noise. Under these rules, there are four Noise Area Classifications (NAC) based on land use. The applicable state standards for each classification were developed to demonstrate consistency with the requirements with respect to annoyance, hearing conservation, and sleep for all receptors within the area classified. NAC-1, which applies to the residential receptors evaluated below, applies to all household units, hospitals, religious services, correctional institutions, and entertainment gatherings. This is the most restrictive NAC. The daytime standards for noise in NAC-1 are 65 dBA (L_{10}) and 60 dBA (L_{50}). The nighttime standards for noise in NAC-1 are 55 dBA (L_{10}) and 50 dBA (L_{50}). As described in the next section, all modeled noise levels at the receptors are well below the applicable state noise standard.

In addition to the state noise standards, the Minnesota PUC has recently published general turbine siting guidelines. Although PUC guidelines are not applicable to single turbine projects such as this one, the proposed turbine would be located farther from residences than normally required by PUC for projects requiring a state

wind project permit. The PUC standards recommend "500 feet + distance to meet state noise standard," and note that 750 to 1,500 feet is a common distance. The nearest receptor to the proposed turbine is well outside this distance (MPUC, 2010).

3.7.2 Environmental Consequences of Proposed Project

Because sound is measured on a logarithmic scale, two sources of equal sound added together result in an increase of 3 dBA. For example a 40 dBA sound level added to an existing 40 dBA sound level does not result in a sound level of 80 dBA. Instead, it results in a total sound level of 43 dBA. A 3 dBA change in sound levels is not typically perceived by persons with average hearing. Some people can detect a change in sound levels between 3 dBA and 5 dBA. Changes greater than 5 dBA are readily perceived by people with average hearing.

The sound from the proposed turbine was modeled with the OpenWind wind farm design program. Within OpenWind, the A-weighted octave band sound calculation option implementing ISO 9613 was selected for calculating turbine sound impacts. ISO 9613 is the standard method for calculating outdoor sound propagation. Accuracy of plus or minus 3 dB is generally assumed with this sound model.

Sound test data provided by Clipper (the turbine manufacturer) was used as input. The proposed turbine would run continuously except when down for repairs, research, or when winds are outside the operating range. Therefore modeled sound levels from the turbine can be directly compared with background L_{10} or L_{50} sound levels described above. No sound attenuation was assumed for vegetation or trees.

Modeled sound levels from the proposed turbine are shown in Table 4, below, for the UMore Park receptor (R1) and at the two nearest off-site receptors (R2 and R3) (Figure 8). The second nearest UMore Park receptor is approximately the same distance as R3, located along County 42 (#3), so it was not modeled separately.

Table 4 – Nighttime Sound Modeling Results

Receptor	Assumed Ambient (L_{50} dBA)	Modeled Turbine Sound Level (dBA)	Ambient plus Modeled (dBA)	Modeled Increase over Assumed Background	MN State Noise Standards (L_{50} dBA)
UMore Park SW #R1	40	42	44	4	50
Off-site E of Hwy 52 #R2	55	41	55	0	50
County 42 #R3	55	39	55	0	50

Overall, as shown in Table 4, predicted sound levels from the proposed turbine at the three residences modeled are well below the state standard of 50 dBA. More specifically, sound levels from the proposed wind turbine at the nearest residence (R1, which is 3,186 feet southwest of the Proposed Project site), are projected to be 42 dBA. If the assumed nighttime background sound level is 40 dBA, the proposed turbine sound (when added to background) is projected to raise overall nighttime sound levels by 4 dBA, to 44 dBA. The modeled 4 dBA increase at this receptor is just over the 3 dBA threshold at which a sound level change generally is noticeable. However, the sound attenuation due to the trees surrounding this house was not accounted for in this modeling, so actual sound levels would be less. Although meeting applicable standards, on quiet nights, when the background sound may be as low as 35 dBA, the sound from the turbine could be audible at R1 at times.

The modeled sound level at the nearest residence (R2) located off of UMore Park property is 41 dBA, which is slightly higher than that modeled at receptor R3 along County Road 42 to the north. Background sound levels at

both residences are assumed to be 55 dBA for the reasons described above. With this background noise level due to traffic, the resulting noise levels at these two receptors would not change and the turbine sound would not be audible over the existing traffic noise. Other residences in the area are farther away than those considered here and would be expected to have noise impacts less than or equal to those described.

While detectable changes in sound levels are expected to be minimal, the different frequency distributions of the turbine sound compared to existing sounds in the area (e.g. traffic) may result in audibility of the turbine even in areas with no increase in overall sound level. Given the low sound levels projected, determination of potential annoyance is likely to be highly subjective. The proposed turbine would blend into the background for many, but may be noticed by sensitive individuals. Overall adverse noise impacts from the Proposed Project would be minor.

3.7.3 Environmental Consequences of No Action

Under the No Action Alternative, DOE would not authorize the expenditure of federal funding. The wind turbine would not be constructed and therefore the Proposed Project would not contribute to any increase in noise in the vicinity of the project area.

3.8 AESTHETICS AND VISUAL RESOURCES

3.8.1 Affected Environment

The views looking toward the Proposed Project site from Highway 52 and the surrounding area are currently dominated by five remnant chimney stacks, which were once part of the GOW's power plants; the Flint Hills Resources Pine Bend Refinery located to the north of the project area; and businesses and buildings located within or near the City of Coates to the east of the Proposed Project area. Views from the residential areas in Rosemount along County Road 42 are mostly of trees and open land within UMore Park. Photographs of the area and the locations from which the photographs were taken are provided in the *Visual Simulation Methodology Report* (Truescape, 2010).

A description of the single historic property near the proposed turbine location that is eligible for listing on the National Register of Historic Places, and a discussion of the potential visual impacts of the University's proposed Project on that property, are included in Section 3.5.

3.8.2 Environmental Consequences of Proposed Project

The proposed wind turbine and met tower would each be 426.5 feet tall. As a result, these structures would be visible from surrounding communities such as the cities of Coates and Rosemount, and Empire Township. The turbine and tower would be visible from Highway 52 and the City of Coates to the east, from County Road 42 and nearby residential areas to the north, and from the Vermillion Highlands to the south.

Figure 8 contains photo-realistic simulations of the views of the proposed turbine from residential areas off of County Road 42 in the City of Rosemount and from State Highway 52 in the City of Coates, respectively. These, and other wide-view visualizations used in this analysis, were designed to portray the view as it would be perceived from common public viewpoints such as major intersections surrounding the Proposed Project area. A detailed summary of the methods used to develop these simulations is provided in the *Visual Stimulation Methodology Report*.

Figure 8. Photosimulations

As illustrated in Figure 8, the turbine and met tower would be visible from those viewpoints, but would not dominate the landscape. Depending upon the distance between the turbine and the viewer, atmospheric conditions may cause the turbine to blend into the skyline due to its white, non-reflective color.

FAA requires that the turbine be lit to provide for aviation safety. FAA currently recommends red strobe lights with a pulse rate of 24 per minute on wind turbines; when turbines are painted a neutral color (as proposed here), the FAA does not require any daytime lighting. The turbine light could be visible for several miles at night due to the red flashing nighttime lights, but particularly east and west of the turbine because the views of the turbine from many areas to the north and south are blocked by topography and tree cover. However, the FAA-required turbine lighting would be no more visible to nearby residences in Rosemount or Coates than cell towers and other similar vertical structures in the area that are lit at night.

A discussion of the aesthetic effect of the proposed turbine is based on subjective human response. The turbine may be perceived by some as a visual intrusion on the natural agricultural aesthetic value of the landscape, but the same could be said of any human habitation or activity in the vicinity. On the other hand, the turbine may have its own aesthetic quality, distinguishing it from other non-agricultural land uses. The addition of the turbine and met tower would not create a substantial change in the view of the region, since there are numerous tall, modern structures in the surrounding area, including water towers, antennae, power lines, and the towers and stacks at a nearby refinery. The impacts of the Proposed Project on aesthetics and visual resources would be minor.

3.8.3 Environmental Consequences of No Action

Under the No Action Alternative, DOE would not authorize the expenditure of federal funding for the University's Proposed Project. The wind turbine, met tower, and associated infrastructure would not be constructed and there would be no change to the view surrounding the project area.

3.9 TRANSPORTATION

3.9.1 Affected Environment

Tall structures like the met tower and wind turbine can effect air navigation, air traffic control radar, and navigational aids, as well as other radar or communication systems if the structures are located within or extend into communication corridors, flight approach paths to airports, or very high frequency (VHF) radio signal lines of sight.

A privately owned air strip with one runway called the Turkey Track Airport in the City of Coates is located approximately 0.6 miles southeast of the proposed turbine location. The approximate elevation of the airport is 923 feet. There are four additional public airports or seaplane bases within 15 miles of the Proposed Project area. The Wipline seaplane base is nearest, located approximately 5.9 miles northeast of UMore Park. Airlake is the next nearest airport and is located 11.25 miles to the southwest. The Minneapolis-St. Paul International Airport is located approximately 12.5 miles to the northwest and Holman Field (downtown St. Paul) is located approximately 13.5 miles northeast of the Proposed Project area. The nearest VHF omnidirectional range (VOR) radio navigational station is the Farmington VOR, approximately 10 miles southwest.

The Proposed Project area, like much of the Minneapolis/St. Paul metropolitan area, has been designated a mandatory review area by the Department of Defense (DOD). Wind turbines and other tall structures within the mandatory review area have the potential to impact a DOD long-range radar facility. New structures that exceed 200 feet above ground level or exceed obstruction standards are required to be reviewed by the FAA to determine

if they present a hazard to air navigation. The FAA coordinates their review with the DOD to ensure potential impacts with the DOD long-range radar are addressed.

3.9.2 Environmental Consequences of Proposed Project

The Proposed Project would not result in a detectable increase in vehicular traffic on any public roads or require a change in traffic circulation. No new roads are required except for two short gravel access roads on the Proposed Project site (shown on Figure 4). A temporary increase in vehicle traffic would occur on local roadways during transportation of the tower, blades, and other equipment to the site, and during installation of the turbine; however, this increase would result in negligible impacts to traffic as only a maximum of 20 construction workers would access the site at any given time.

Notices of proposed construction for a 427-foot-tall turbine and met tower, respectively, were submitted to the FAA on June 3, 2010. The FAA determined that neither the turbine nor the met tower would present an obstruction to air navigation and would not interfere with DOD long range radar, and therefore issued a No Hazard Notification on June 15, 2010. The FAA notice for the turbine was resubmitted on July 2, 2010, to reflect a slight change of siting within the project area, and a No Hazard Notification for a turbine in the revised location was received on September 10, 2010. Copies of relevant FAA No Hazard Notifications are included in Appendix B. The Minnesota Department of Transportation has also confirmed that the proposed turbine and meteorological structures would not impact the operation of the nearest VOR, which is located in Farmington, Minnesota. Therefore, it is anticipated that the Proposed Project would have negligible impacts on transportation.

3.9.3 Environmental Consequences of No Action

Under the No Action Alternative, DOE would not authorize the expenditure of federal funds and the proposed wind turbine, met tower, and associated infrastructure would not be constructed. No structures that could affect air navigation or air traffic safety would be constructed. As a result, no impacts to transportation would occur.

3.10 UTILITIES

3.10.1 Affected Environment

There are no known sewer lines or active or unsealed wells within the construction footprints of the Proposed Project. Four monitoring wells that were originally installed in the proposed turbine area to evaluate groundwater contamination resulting from historical releases from the University's Rosemount Research Center were sealed in December of 1998 (Dakota County, 2010b). There is a 30-inch concrete conduit within the project area that was used for the GOW, but has not been used since the 1940s. The conduit was buried when the GOW shut down operations (see Section 3.11.1 and Figure 10 for more information and the location of the conduit). No construction activities would occur near the abandoned conduit.

An existing 34.5 kV low-voltage transmission line is located north of the Proposed Project area on 145th Street East and travels in an east-west direction. An existing 115 kV transmission line that travels north-south and connects to the 115 kV transmission line is located approximately 375 feet east of the Proposed Project area boundary and approximately 500 feet east of the proposed turbine area boundary. An existing fiber-optic line extends from the DCTC to County Road 42.

3.10.2 Environmental Consequences of Proposed Project

The Proposed Project would have no impact on public services such as water distribution or sanitary sewer facilities. Pending final design, the turbine's output would be connected from the pad mounted transformer to the

Xcel Energy 34.5-kV distribution system. That connection would be via a new, 34.5-kV underground feeder (approximately 450 feet in length) from the transformer to 152nd Street East, and then via a new, aboveground low-voltage transmission line for approximately 1,750 feet from the north side of 152nd Street East to Blaine Avenue and 3,375 feet along the east side of Blaine Avenue, where it would interconnect with an existing 34.5-kV feeder owned by Xcel Energy at County Road 42 (Figure 4). The University would comply with the "Call Before You Dig" law (Minnesota Statute 216D) which requires that any excavator must call the state-wide notification center at least 48 hours prior to the start of digging.

A study was performed to locate existing communication corridors that traverse the UMore Park property (Comsearch, 2010). A total of 14 microwave paths were identified. Microwave paths can be obstructed physically by structures such as turbines and met towers. However, none of the communication corridors and paths that cross the Proposed Project area would be obstructed by the turbine or met tower. Because the turbine and the met tower are located outside of communication corridors and would not emit any electromagnetic interference, no impacts on private communication in the area are expected.

A request was sent to the U.S. Department of Commerce (DOC) to review the Proposed Project to ensure it would not interfere with any federal communication systems. That Department coordinated an internal review with all of the various U.S. government agencies that have communication systems that could potentially be impacted. On September 7, 2010, correspondence was received from the Department of Commerce indicating that after a 45 day period of review, no federal agencies identified any concerns regarding blockage of their radio frequency transmissions as a result of the Proposed Project. Refer to Appendix C for a copy of this correspondence. As a result, the Proposed Project would have negligible impacts on utilities.

3.10.3 Environmental Consequences of No Action

No changes to the existing infrastructure and utility systems in the UMore Park vicinity would occur under the No Action Alternative. Under the No Action Alternative, DOE would not authorize the expenditure of federal funding and the proposed wind turbine, met tower, and associated infrastructure would not be constructed.

3.11 HAZARDOUS MATERIALS

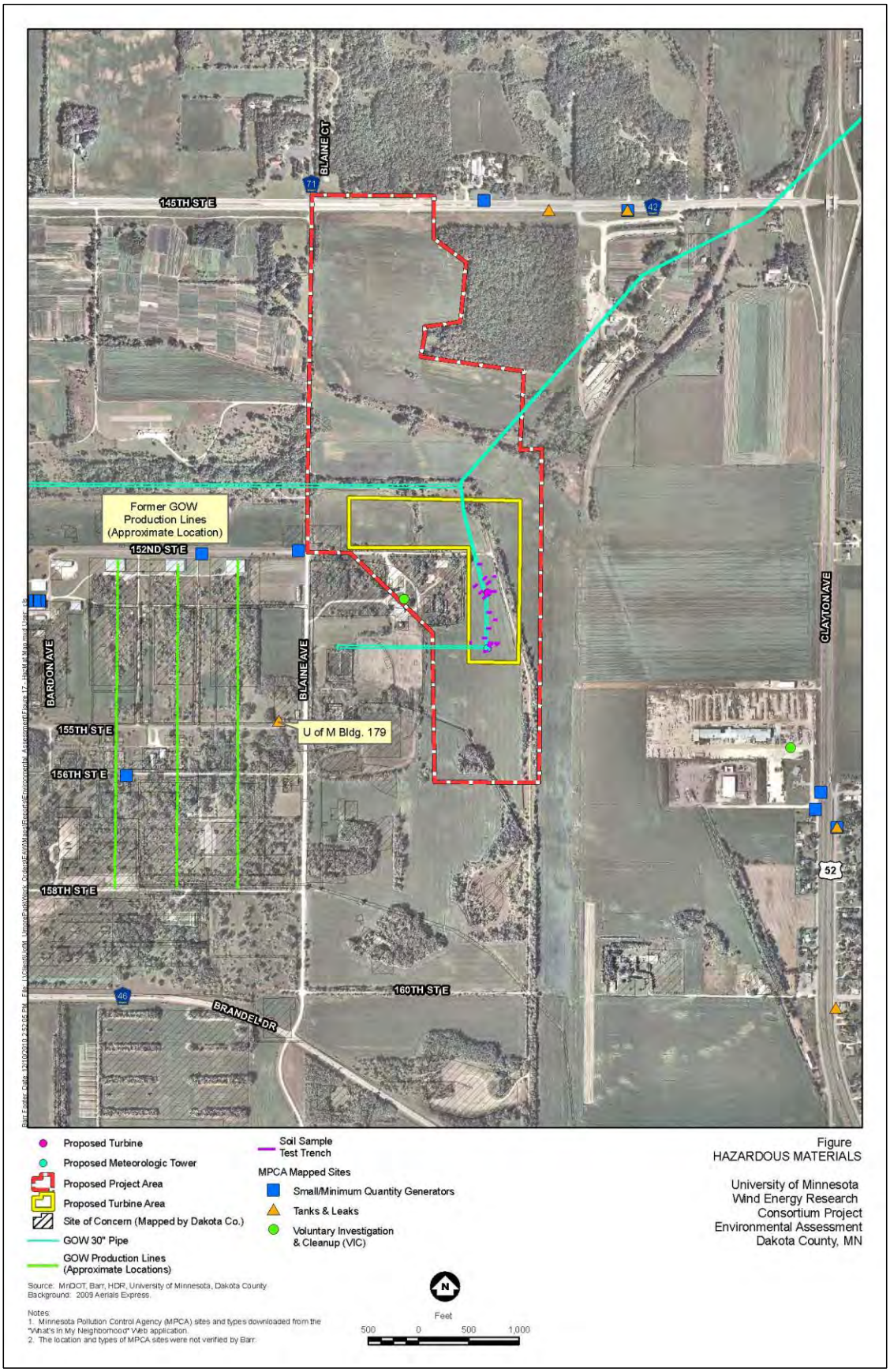
3.11.1 Affected Environment

The GOW was located in the eastern part of UMore Park near the Proposed Project area. Several of the GOW-era buildings were constructed with transite siding, which contains asbestos. Transite has been observed on the ground in the vicinity of some GOW-era buildings and is likely buried in some places (Barr Engineering Company, 2009a).

The proposed turbine site within UMore Park was chosen in part because it is outside the GOW buildings historical footprint. Nevertheless, a Limited Phase I Environmental Site Assessment of the Proposed Project area was conducted to identify potential environmental concerns (Barr Engineering Company, 2010d). A review of historic photographs indicated the Proposed Project area had been used for agricultural activities prior to 1940. In 1942, the Proposed Project area and surroundings were seized by the government for construction of the GOW.

The proposed turbine area is located at the intersection of 152nd Street East and the former GOW Patrol Road. This area is immediately adjacent to the former location of the GOW oleum plant, which was constructed in 1942-1943 (Figure 10). Oleum, sometimes referred to as fuming sulfuric acid, was manufactured in the plant for approximately one year between November 1944 and September 1945. After the GOW was decommissioned,

Figure 9. Hazardous Materials



most of the structures were decontaminated or demolished by the federal government. After August 1945, the GOW was closed and the majority of the equipment, materials, and supplies were sold as surplus and the rest were left with the buildings or structures, or disposed of on-site. The University leased some of the cropland to area farmers. The remaining intact buildings were leased to businesses and used for academic research. Between the years 1984 and 1999, Superfund investigations were conducted of post-WW II tenants and activities, but not the GOW. Beginning in the 1950s the University arranged with a single tenant, the International Operating Engineers Local 49, to raze the buildings, structures, and unused utilities and to dispose of waste at sites located on the UMore Park property, of which there is no specific record or information.

In June 2010, the University conducted a focused environmental investigation to confirm that releases of hazardous substances associated with GOW were not present in the vicinity of the proposed turbine location, turbine laydown area, and met tower location. Samples were collected at the ground surface and at-depth in the proposed foundation areas (Figure 10). Also, test trenches were excavated and samples were collected along the access road alignment to the turbine and met tower.

No evidence of contaminants was found in the Proposed Project area during the investigation; therefore, the soil is considered unregulated by the MPCA and can be managed as such (Barr Engineering Company, 2010a). The report summarizing the results of the investigation is available for review on the DOE Golden Field Office Public Reading Room web site.

The MPCA "What's In My Neighborhood" database (MPCA, 2010) was used to identify locations of environmental sites mapped by the MPCA in the vicinity of the Proposed Project area. According to the MPCA database, there are no hazardous waste generation or storage locations present within the Proposed Project area. Several small-quantity generators of hazardous waste, however, are located within 0.5 miles of the area, including one hazardous waste generator located immediately west of the proposed turbine site (Figure 10). The MPCA database also indicates that an oil leak occurred at University Building 179, located west of the Proposed Project area, in 2000 (Figure 10).

Asbestos-containing materials (ACM) may have been used in the construction of GOW structures and infrastructure, including transite, asbestos pipe insulation, and asbestos-containing tars and adhesives. Although there are no records of GOW structures in the Proposed Project area, ACM may have been transported or dispersed within this area. Therefore, in accordance with a UMore Park stipulation agreement between the MPCA and the University, an asbestos hazard assessment was performed by a certified asbestos inspector. The inspection included the turbine area and areas to be cleared of brush, trees, and shrubs.

A limited amount of miscellaneous surficial debris was observed in the Proposed Project area. Upon inspection, it was determined that this debris was not ACM, and the inspector recommended that the debris should be properly collected and disposed of prior to the clearing of trees and shrubs. No ACM was observed within the Proposed Project area (Barr Engineering Company, 2010a).

3.11.2 Environmental Consequences of Proposed Project

The exact locations of power poles for the aboveground portion of the low-voltage interconnect line, and the locations of the underground portion of the transmission and data transfer lines, would be determined during final project design. Soil sampling at the power pole and underground low-voltage transmission line trenching locations is not likely to be necessary because all soil samples taken in the area were below Tier I Soil Reference Values established for residential settings. Also, the power poles would be placed along roadways at UMore Park and the installation crew would undergo site-specific inspection training prior to working at the site. Construction

would be stopped if evidence of contamination is found during construction. Any additional testing required for the aboveground or underground installation of the low voltage transmission line would be determined and completed according to MPCA protocol once final transmission line design is completed.

During construction, lubricants, fuel, coolant, antifreeze, and other hazardous materials would be used to maintain and operate heavy equipment. BMPs would be used to minimize the possibility of a release or spill of hazardous materials, and any spill would immediately be cleaned up. During operation of the wind turbine, lubricants and coolants would be used. The University would follow the turbine manufacturer's recommended procedures in performing any routine maintenance or repairs that involve handling or disposal of such materials. During both construction and operation of the proposed wind turbine, all solid and liquid wastes would be removed from the site in accordance with all applicable regulations.

Although asbestos was not identified during survey activities conducted within the Proposed Project area, trained asbestos abatement personnel would be present during tree and shrub removal activities to remove any ACM that is uncovered during that process. A representative from the University's Hazardous Material Program would also be present during the tree and shrub removal to document procedures and address any ACM that may be uncovered.

Prior to conducting any work on the UMore Park property, all workers affiliated with the Proposed Project would be required to take asbestos awareness training. The UMore Park Asbestos Emission Control Plan (Barr Engineering Company, 2009a) would be used as a guideline for dealing with asbestos if it is encountered during any phase of the project. These procedures to identify and, if necessary, handle and remove ACM would minimize the risks to workers and the public from the presence of any asbestos that may remain in the area. In addition, a courtesy asbestos notification would be filed with the MPCA 14 working days prior to disturbance of the area to prevent a prolonged work stoppage if ACM is discovered.

Based on the information reviewed during the Limited Phase I Environmental Site Assessment and focused environmental sampling, DOE concludes that there are few or no contaminated sites or hazardous materials within the Proposed Project site and the University's Proposed Project would not disturb or result in the release of hazardous substances or petroleum products. Accordingly, the Proposed Project is anticipated to have a negligible impact on hazardous materials.

3.11.3 Environmental Consequences of No Action

Under the No Action Alternative, DOE would not authorize the expenditure of federal funding and the proposed wind turbine, met tower, and associated infrastructure would not be constructed. No hazardous materials that may exist in the project area would be disturbed and no new hazardous materials would be used in the area.

3.12 HEALTH AND SAFETY

3.12.1 Affected Environment

Existing health and safety hazards within the Proposed Project area include the potential for workers and visitors to come into contact with asbestos in the area. As discussed above in Section 3.11, Hazardous Materials, asbestos from transite siding on GOW-era buildings may be present within the Proposed Project area. In addition, there is a general trip-and-fall safety hazard associated with past excavations in the area. There is a risk that unwary visitors and workers can trip over or fall into these excavations. Therefore, awareness training and safety procedures for all onsite visitors and staff are mandatory.

Occupational health and safety is concerned with occupational and worker hazards during routine operations. Statistics on workplace injuries, illnesses, and fatalities are maintained by the U.S. Department of Labor, Bureau of Statistics. These statistics consider the potential for total recordable cases; days away from work, days of restricted work activity or job transfer; and worker fatalities in the work environment. The incidence rates the Bureau of Labor Statistics maintains (cases per 100 full-time workers for non-fatality statistics and cases per 100,000 full-time workers for fatality statistics) are calculated separately for different industries based on the reported health and safety cases for that particular industry. A full-time worker is assumed to work 2,000 hours per year. The health and safety incident categories are defined as follows:

- Total recordable cases – The total number of work-related deaths, illnesses, or injuries that result in the loss of consciousness, days away from work, restricted work activity or job transfer, or required medical treatment beyond first aid.
- Days away from work, or days of restricted work activity or job transfer – Cases that involve days away from work, or days of restricted activity or job transfer, or both.
- Worker fatality – Cases that involve the death of a worker.

In order to minimize the effect of industrial health and safety hazards, industries must comply with all applicable regulations that relate to industrial health and safety, including Occupational Safety and Health Administration (OSHA) requirements to have a health and safety plan in place before starting work.

3.12.2 Environmental Consequences of Proposed Project

During construction activities for the Proposed Project, contractors would be responsible for providing and following a Health and Safety Plan that addresses issues related to construction of the project elements such as confined space entry, hoisting and rigging operations, and proper handling and disposal of hazardous substances including ACM. In addition, contractors would be expected to comply with all OSHA regulations. The University would ensure the contractor hired for construction has a health and safety plan that protects its workers. Additional applicant-committed practices related to health and safety during construction are listed in Section 2.2.6 and include providing clean, safe drinking water; waste disposal; portable toilets; fencing of open pits; and limiting site access to contractors and other necessary personnel.

During construction activities, anticipated health and safety incidents and fatalities would be extremely low. To estimate the probabilities associated with worker incidents, days lost, and fatalities, the Bureau of Labor Statistics incident rates from the year 2008 were used in the category of *heavy and civil engineering construction, utility systems,* and *power and communication line and related structures construction*. For 2008, the total incidence rate was 4.0 injuries per 100 full-time employees (each working 2,000 hours during the year), and the days away from work, days of restricted work activity, or job transfer incidence rate was 2.4 injuries per 100 full-time employees (BLS, 2009a). In other words, the incident rate was 4.0 per 200,000 hours worked. The days away from work, days of restricted work activity, or job transfer incidence rate was 2.4 per 200,000 hours of work. The Proposed Project would have an estimated work effort of 20 full-time construction workers for nine weeks (7,200 hours of labor per construction worker). Using the Bureau of Labor Statistics rates, this equates to an estimated projected average of 0.14 incident cases and 0.09 days of labor loss for the Proposed Project.

Further validation that the Proposed Project would likely have an extremely low incident rate is made by examining a completed project of similar scope. The University of Delaware recently completed a wind turbine project, with similar tower and electrical components (DOE, 2010). Prior to construction, it was estimated that there would be 20 construction workers at the University of Delaware site at any given time during two months of construction. It is noted that this is identical to the estimated effort required for the Proposed Project. Assuming

nine 40-hour weeks for 20 workers, DOE estimated there would likely be no recordable cases (calculated at 0.14 cases) and no days away from work (calculated at 0.09 day) during the construction phase. As with the Proposed Project, standard BMPs for the construction industry were implemented to reduce risks to workers. This included, but was not limited to, complying with the OSHA regulation "Safety and Health Regulations for Construction" (29 CFR Part 1926). The pre-project estimates of project incidents and days lost were good predictors of the actual construction, as no incidents or lost days were reported (DOE, 2010).

The fatality incident rate would be even lower than the rates discussed above. The U.S. Bureau of Labor Statistics reports the fatality incidence rate for construction activities in 2008 (preliminary data) was 9.6 fatalities per 100,000 full-time employees (BLS, 2009b). Assuming nine 40-hour weeks for 20 workers, a fatality during construction was very unlikely because the calculated number of fatalities is about 0.0003. Similarly, estimated probability of a fatality associated with the Proposed Project would be extremely low.

During operations, the only activities that would be different from those normally occurring at the Proposed Project area would be those associated with periodic maintenance and research of the wind turbine and its associated infrastructure. It is estimated that there would be two major maintenance events each year and each would involve two workers for two days. That is, each event would require a total of 32 hours of labor, so there would be 64 hours of labor per year. For these activities, DOE used the Bureau of Labor Statistics incidence rates from the category "other services, repair and maintenance, commercial and industrial machinery and equipment repair and maintenance" for 2008. The total recordable cases incidence rate was 4.8 injuries per 100 full-time employees, and the days away from work, days of restricted work activity, or job transfer incidence rate was 2.5 injuries per 100 full-time employees (BLS, 2009a). Assuming a 15-year working life for the wind turbine and 64-hours of labor per year, DOE estimates that there likely would be no total recordable cases (calculated at 0.031 case) and no days away from work (calculated at 0.016 day) during wind turbine operations. Other than the tall heights involved, there would be no unusual or potentially unacceptable hazards or risks to workers. Workers would be trained to operate under a site-specific safety program and procedures, which would account for the heights involved in the work.

The fatality incidence rate for wind turbine maintenance activities is assumed to be similar to "automotive repair and maintenance" because this is the closest available category in the preliminary 2008 data. The reported fatality incident rate for this category was 5.6 fatalities per 100,000 full-time employees (BLS, 2009b). Assuming a 15-year working life for the wind turbine and 64-hours of labor per year, a fatality during wind turbine operation would be very unlikely because the calculated number of fatalities is about 0.00004. There would be increased risks involved in the performance of these maintenance activities "at elevation." This increase, however, would likely increase the incident rate by a few percentage points, which would still result in very low impact values.

There have been recorded incidents of wind turbines collapsing due to mechanical failure, extreme weather, or other events, or throwing blades during operation (DOE, 2010). A potential cause of collapse would be an electrical or mechanical failure that allowed the rotor to gain too much speed during high winds. Therefore, it is not practical to design either the electronics or the structure of a wind turbine to accommodate an extremely high rotor velocity. Accordingly, wind turbines are designed for a maximum rotor speed and include controls and brakes to prevent the maximum safe speed from being exceeded. In the highly unlikely event of a catastrophic failure and collapse of the wind turbine, it is equally unlikely that any person would be impacted. The turbine would not be located near residences or other occupied structures and therefore there would be very little risk of harm from the collapse of the turbine or from a blade being thrown.

Because no fuel would be burned to power the proposed wind turbine, there would be no spent fuel, ash, sludge, or other process waste generated during operation of the wind turbine that could cause health and safety concerns. However, some lubricants would be used during routine operation of the proposed wind turbine, including gearbox oil, hydraulic fluid, and gear grease. The University would ensure that the turbine maintenance workers would be knowledgeable in the proper handling and disposal of these lubricants, as well as general health and safety issues related to wind turbine work. During operation, access to the turbine would be limited to maintenance workers and University staff and researchers; therefore no public health and safety issues are anticipated. Overall, impacts from the Proposed Project are anticipated to have a negligible impact on health and safety.

3.12.3 Environmental Consequences of No Action

Under the No Action Alternative, DOE would not authorize the expenditure of federal funds and the proposed wind turbine, met tower, and associated infrastructure would not be constructed and any risks associated with implementation of the Proposed Project would not occur.

3.13 Unavoidable Adverse Impacts

Construction and operation of the Proposed Project would involve the following unavoidable potentially adverse impacts:

- Vegetation –Approximately 0.4 acres of land currently used for agricultural production would be temporarily disturbed, and 0.6 acres of land would be permanently lost to construct the turbine, met tower, and access roads. Trees would be removed from a 25-acre area surrounding the turbine; trees in that area occur at low density in narrow strips and small stands (Figure 4).
- Biological Resources – Some passerine and other birds would be expected to be killed per year by the operating turbine. The met tower and low-voltage transmission line may result in single and small-scale, but regular, bird fatality events. The number of fatalities may be reduced through the use of strobe lighting on the met tower. Due to the small scale (one turbine) and agricultural setting of the Proposed Project, the loss is not expected to be notable for the species affected.
- Aesthetics and Visual Resources – The views from a nearby historic property, nearby residential areas, and roadways would be altered because of the height of the proposed turbine and met tower.

The proposed commitment of natural, physical, human, and fiscal resources to complete the Proposed Project would result in increased research and use of renewable energy production.

3.14 Relationship Between Local Short-Term Uses of the Human Environment and the Maintenance and Enhancement of Long-Term Productivity

The University proposes to operate the wind turbine for 15 or more years. After completion of their Proposed Project, the turbine and other equipment would be removed, the site would be decommissioned as described in Section 2.2.4, and the area would be available for other uses. Thus, the short-term use of the environment for the Proposed Project would have a negligible effect on long-term productivity of the human environment.

3.15 Irreversible and Irretrievable Commitment of Resources

There would be an irretrievable commitment of land required for construction and operation of the Proposed Project because other uses would be precluded during the 15-year timeframe during which the land would be used for the project. There would also be an irreversible commitment of energy and materials used to fabricate the

wind turbine components, as well as to construct and operate the facility. The materials used for the Proposed Project would include those necessary for the fabrication of the wind turbine and met tower components, for construction of the foundations and access roads, and for the transformer and electrical and data transfer lines. DOE would also have expended the finances associated with the funding for the Proposed Project.

4.0 CUMULATIVE IMPACTS OF PROPOSED PROJECT

CEQ regulations (40 CFR 1508.7) require an analysis of the cumulative impacts resulting from the incremental impact of a Proposed Project when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes these other actions. Cumulative impacts can result from individually minor, but collectively significant, actions. This cumulative impacts section of the EA addresses only the cumulative effects arising from considering the Proposed Project in combination with other ongoing actions in the vicinity of the UMore Park property. The following factors were taken into account in the analysis of the potential for cumulative impacts:

- Existing condition of each potentially affected resource (described in Chapter 3 of this EA);
- Impacts from the Proposed Project on the resources described in the previous chapters;
- Past, present, and reasonably foreseeable future actions and their possible impacts on the resource; and,
- Potential for cumulative impacts on the resource.

4.1 EXISTING CONDITIONS AND DEVELOPMENT TRENDS

The City of Rosemount (city) is working in cooperation with the University and the other interested parties to ensure that the plans for the development of UMore Park are compatible with the goals of the city's Comprehensive Plan. The city anticipates that a major Comprehensive Plan amendment would be submitted to the Metropolitan Council following the completion of the UMore Park Master Plan. The city expects that the UMore Park Master Plan would present a unique development that would have its own resources and marketing that is beyond that available to the typical urban developer. For that reason, the city anticipates that the potential future development of UMore Park would be in addition to the growth depicted within the city's 2030 Land Use Plan. The city expects that the population, households, and employment forecasts would need to be increased due to the magnitude of this development.

The City of Rosemount's Comprehensive Plan outlines five environmental and natural resources goals. One of the goals is to, "Create a livable community where future development respects and integrates the natural, cultural, and historic resources of the community while maintaining or enhancing economic opportunity and community well-being." The Comprehensive Plan also states, "One strategy to attempt this would be to promote the development of „Clean Industry' or „Green Collar' jobs including biomass/biofuel, solar, and wind production. Development of these industries could serve to compliment and diversify Rosemount's existing agriculture and fuel refining industries." UMore Park is consistent and compatible with the city's goals.

Based on current land use plans, the section of UMore Park near the proposed turbine is slated to be developed as open space and for commercial and light industrial uses, including an eco-industrial park. Therefore, based on current information for this part of UMore Park, the proposed turbine is compatible with University long-term land use plans. The University, in cooperation with the City of Rosemont, would evaluate all proposed land uses for UMore Park property in the vicinity of the wind turbine to ensure that those proposals are compatible with operation of the turbine. Construction of the wind turbine would likely act as a catalyst for the planned energy innovation and development of a sustainable community within UMore Park.

4.2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Past, present, and reasonably foreseeable future actions relevant to the Proposed Project were identified based on existing capital improvement plans, current comprehensive plans, and area master plans. Past actions include the

past uses of the Proposed Project area. Present actions include vicinity development that has had a formal application for entitlements submitted to a local governmental unit. These entitlements include rezoning, preliminary or final plats, site plans, conditional use permits, etc. Future actions are projects that have been considered and presented in concept form with sufficient detail to be able to quantify development-related impacts. These include concept plan submittals, environmental reviews, or comprehensive plan amendments.

4.2.1 Past Actions

- Use of property as a GOW facility (see Section 3.11 for more information)
- Use of property as the Rosemount Agricultural Experiment Station
- Cultivation and other agricultural activities
- Increased urban and suburban development in the region

4.2.2 Present Actions

- Increased urban and suburban development in the vicinity of the property, including the Glendalough Residential Development, Harmony Mixed Use Development, and Rosewood Villas Development

4.2.3 Reasonably Foreseeable Future Actions

- Development of the County Road 42/Akron Avenue area in accordance with the 2006 Alternative Urban Areawide Review
- UMore Park Concept Master Plan development
- UMore Park gravel mining area
- Empire Township Gravel Mining Overlay District
- Highway 52/42 Interchange Project
- 2011 street improvement projects
    - 145th Street from Diamond Path to Cameo Avenue
    - Shannon Parkway from CSAH 42 to 145th Street

Impacts from past actions are inherently included in the affected environment descriptions for resource areas in Chapter 3. However, all past, present, and future actions have the potential to contribute to cumulative impacts. The effects of past, present, and future actions are incorporated in the analysis of impacts on individual resources in Table 5. The overall cumulative impacts to resources resulting from the Proposed Project and the contribution of incremental effects from other past, present, and reasonably foreseeable future actions within the project area are anticipated to be negligible to minor.

Table 5 – Potential for Cumulative Impacts

Resource	Existing Condition and How It Has Been Affected by Other Actions	Impacts from the Proposed Action	Impacts from Past, Present, and Reasonably Foreseeable Future Actions	Potential for Cumulative Impacts on the Resource
Geology/ Soils	The geology at the project site consists of glacial outwash deposited over discontinuous glacial clay till and older outwash deposits. The soils across the project site are deep, well drained, and have negligible to medium surface runoff potential. Impacts to soil resources in the area from other projects include the conversion of farmland soils to other uses and the increase of erosion and runoff from other construction activities.	Construction activities associated with the Proposed Project would temporarily impact 0.4 acres of soil. Approximately 0.6 acres of soil would be permanently impacted by the access road and the turbine and met tower footprints. A total of 0.05 acres of the Proposed Project would be located on soils designated as prime farmland.	Construction of other projects in the region could cause increased impervious surface area, increased stormwater runoff, and increased erosion. The proposed UMore Park Sand and Gravel mining project would remove substantial aggregate resources from the project site; however, the development of the sand and gravel mine would require mitigation of impacts to soil and geological resources. Impacts to geology and soil from continued development is long-term, adverse, and moderate.	The Proposed Project would contribute minute, incremental impacts to an overall moderate impact in the region.
Land Use	Project site is primarily used for agriculture. Adjacent areas of residential growth have been increasing in past decade. On a regional scale, this development pattern is consistent with much of central Dakota County.	Negligible impacts related to land use patterns and designations are anticipated. Existing and currently planned land uses of the project site are compatible with the proposed UMore Park Master Plan. No land use conflicts are anticipated.	Continued construction and development of other projects in the region would cause the continued conversion of agricultural land to residential and commercial uses. These impacts would be long-term, adverse, and moderate.	The Proposed Project would contribute minutely, but nonetheless incrementally, to a moderate impact in the region.

Resource	Existing Condition and How It Has Been Affected by Other Actions	Impacts from the Proposed Action	Impacts from Past, Present, and Reasonably Foreseeable Future Actions	Potential for Cumulative Impacts on the Resource
Vegetation	Project area is primarily cultivated with little native vegetation. Substantial forest, woodland, grassland, and edge habitat is generally not present within the project area; vegetation is generally fragmented adjacent to the project limits.	Construction of the Proposed Project would result in minor permanent impacts to existing vegetation (mainly cropland). Approximately 0.6 acres of cultivated land and some land occupied by trees and shrubs would have to be permanently cleared for roadway construction and the turbine and met tower foundations. In addition, trees would be removed from a 25-acre area surrounding the turbine. The Proposed Project would result in minor impacts to vegetation.	Development and construction of other projects would result in similar vegetation impacts as the Proposed Project, depending on the size and location of other projects. Some of the street improvement projects would not have any impact on vegetation because project limits are within previously disturbed areas. Conversely, large developments in forested or riparian areas could have moderate impacts on native vegetation in the region.	The Proposed Project, in concert with other actions would have limited cumulative impacts on vegetation. These impacts include the loss of some cropland, trees, and shrubs. Trees would be planted as part of the landscaping and development of UMore Park and the City of Rosemount has commitments to plan a greenway system in the region to maintain and in some cases improve habitat connectivity. This would offset some of the loss of native vegetation in the region.
Wildlife	The project area is predominately cropland, which has limited wildlife habitat value. However, various bird species and the big brown bat may use the site. Actions in the area, in particular conversion of undeveloped land to cultivated land, have resulted in impacts to wildlife due to the loss of habitat.	The Proposed Project would likely cause minor impacts to wildlife through conversion of cropland and small non-agricultural vegetated areas (habitat). The Proposed Project would likely cause the fatality of a small number of birds and bats from the proposed met tower and turbine.	Development and construction of other projects would likely cause impacts to wildlife primarily through conversion of small areas of non-agricultural vegetation; these changes would be minor compared to the availability of habitat in the area. Many of the other projects are proposed in relatively developed areas that have limited wildlife.	The Proposed Project, in concert with other actions, would contribute limited cumulative impacts on wildlife, including birds and bats.

Resource	Existing Condition and How It Has Been Affected by Other Actions	Impacts from the Proposed Action	Impacts from Past, Present, and Reasonably Foreseeable Future Actions	Potential for Cumulative Impacts on the Resource
Rare, Threatened, and Endangered Species	Consultation with the MNDNR identified the state-threatened loggerhead shrike as the only known occurrence of a state or federally listed species within one mile of the project area.	The Proposed Project is anticipated to have a negligible effect on any loggerhead shrikes living in the project area, as quality loggerhead shrike habitat is not present in the project area.	Development and construction of other projects could affect loggerhead shrikes living in the area as suitable habitat for the shrikes and other protected species decreases. These impacts could be minor to moderate.	The proposed Project Area and immediate vicinity has limited suitable habitat for loggerhead shrikes; therefore, cumulative impacts are not anticipated from the Proposed Project.
Cultural Resources	There are no known archaeological resources within the project area. However, there is one historic property (the E.H. Knodt Farm) in the immediate vicinity of the project area that is eligible for listing on the NRHP.	The Proposed Project may have the potential to adversely impact a historic property (the Knodt Farm) by affecting the viewshed of the property. DOE has developed a Memorandum of Agreement with the Minnesota SHPO to address mitigation for this potential adverse impact.	Continued development in the area would have a similar likelihood of potentially impacting historic resources as the Proposed Project. No other known vertically intrusive structures are planned in the surrounding landscape of Knodt Farm.	The Proposed Project in concert with other actions could have a cumulative effect on cultural resources. However, this impact is anticipated to be small.
Socioeconomics	Dakota County is the third most populous county in Minnesota, with a population of 396,500. The area is growing and has lower poverty rates, unemployment rates, and minority populations than the state averages.	The Proposed Project is anticipated to have beneficial temporary impacts caused by construction employment and spending. Beneficial permanent impacts would be caused by increased development linked to the expansion of renewable energy opportunities.	Other projects could have beneficial temporary impacts to socioeconomics caused by construction activities. Long-term beneficial impacts include an increase in jobs and revenue from spending, and increased tax base.	The Proposed Project would likely contribute a minute, beneficial cumulative impact on employment in the region.

Resource	Existing Condition and How It Has Been Affected by Other Actions	Impacts from the Proposed Action	Impacts from Past, Present, and Reasonably Foreseeable Future Actions	Potential for Cumulative Impacts on the Resource
Noise	The two nearest residences to the project site are located more than 3,000 feet from the proposed turbine site. Background sound near the residences within UMore Park are estimated to be approximately 35-40 dBA at night and 40-50 dBA during the day. However, due to vehicle traffic on County Road 42, sound levels near the residences to the north of the project area are much higher.	Noise generated from operation of the turbine would be well below state standards at all receptors (residences). Any increase in sound levels at the two nearest receptors would be small (4 dBA or less) and may not be audible over the existing traffic noise. Noise levels at other residences would be less than ambient levels in the area.	Traffic is currently the largest contributor to noise in the area. Any additional road construction or increase in traffic would increase traffic noise. These impacts are anticipated to be minor.	Cumulative noise impacts from the Proposed Project area are expected to be negligible to minor, but are recognized as being very subjective and dependent on the individuals exposed to the sounds.
Aesthetic and Visual	The views looking toward UMore Park from Highway 52 and the surrounding area are currently dominated by the remaining five chimney stacks from the GOW power plants; the Flint Hills Resources Pine Bend Refinery located to the north; and businesses and buildings located within or near the City of Coates to the east of the Proposed Project area.	The proposed wind turbine would be visible from surrounding communities such as the cities of Coates and Rosemount, and Empire Township. The turbine and met tower would be visible from Highway 52 and Coates, from County Road 42 and nearby residential areas to the north, and from the Vermillion Highlands to the south.	Construction of foreseeable future projects in the area would alter the visual landscape from exurban/agricultural to suburban.	The Proposed Project, in concert with other actions, would likely have a minor cumulative impact on the aesthetic and visual character in the project area.

Resource	Existing Condition and How It Has Been Affected by Other Actions	Impacts from the Proposed Action	Impacts from Past, Present, and Reasonably Foreseeable Future Actions	Potential for Cumulative Impacts on the Resource
Transportation	Transportation improvement projects have expanded the capacity and durability of the transportation system in the area. There are four public airports or seaplane bases, as well as one privately owned air strip (Turkey Track Airport) within 15 miles of the Proposed Project area.	The Proposed Project would not result in a detectable increase in vehicular traffic on any public road or require a change in traffic circulation. A negligible increase in vehicle traffic would occur during construction on local roadways. The Proposed Project would not adversely affect existing air navigation or air traffic safety. The FAA has issued a No Hazard Notification for both the proposed turbine and met tower.	Additional construction and development in the area has the potential to impact the roadway system due to an increased number of vehicles caused by new development. However, proposed development projects generally include improvements to the overall transportation system, including new roadways and trails.	The Proposed Project would contribute negligible cumulative impacts on transportation.
Utilities	There are no known sewer lines or active or unsealed wells in the turbine area. Existing transmission lines are located north of the project area and east of the project area boundary. The project area and surroundings have been subject to utility infrastructure improvements in anticipation of future development. These improvements include additional sanitary sewer and water conveyance systems, and increased wastewater treatment capacity.	The Proposed Project would have no impact on public services such as water distribution or sanitary sewer facilities. Because the turbine and the met tower are located outside of identified communication corridors, no impacts on private communication in the area are expected. Electric utility modifications would be limited to the equipment necessary to interconnect to the existing electrical distribution system.	Development of other projects in the area could include sanitary sewer, water, electrical, gas, and communication utility infrastructure. Comprehensive planning for the area includes discussion of the need for expanded utility service for commercial and residential development.	The Proposed Project would contribute negligible cumulative impacts to utilities. The project would, however, be able to provide renewable electricity to the area, and minutely contribute to the reduction in the reliance on non-renewable sources of electricity.

Resource	Existing Condition and How It Has Been Affected by Other Actions	Impacts from the Proposed Action	Impacts from Past, Present, and Reasonably Foreseeable Future Actions	Potential for Cumulative Impacts on the Resource
Hazardous Materials	A focused environmental investigation in the project area has confirmed that releases of hazardous substances associated with the GOW are not present in the vicinity of the Proposed Project. As a result of the investigation, no evidence of contaminants was found in the project area.	There is little or no likelihood that ACM or other contaminants would be encountered and disturbed, or that hazardous materials would be released, during implementation of the Proposed Project.	Some contamination in the vicinity of the Proposed Project area may exist as a result of past industrial activities in the area. Development of present and future projects in the area is not anticipated to impact hazardous materials.	The Proposed Project, in concert with other actions, would likely not have a cumulative impact on hazardous materials.
Health and Safety	Existing health and safety hazards within the Proposed Project area include the potential for visitors to come into contact with asbestos in the area. In addition, there is a general trip and fall safety hazard associated with past excavations in the area. There is a risk that unwary visitors and workers can trip over or even fall into these excavations.	Health and safety issues are primarily related to project construction. During construction, contractors would be responsible for providing and following a Health and Safety Plan that addresses issues related to construction of the Proposed Project. In addition, contractors would be expected to comply with all OSHA regulations. . The risk of harm from turbine failure or a blade being thrown is very low.	Development of other projects in the area would potentially have health and safety impacts due to the established (though low) risks associated with construction activities.	The Proposed Project would contribute a negligible cumulative impact on health and safety.

5.0 REFERENCES

Arnett, E.B., M. Schirmacher, M. M. P. Huso, and J. P. Hayes. 2009. Effectiveness of changing wind turbine cut-in speed to reduce bat fatalities at wind facilities. An annual report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas, USA.

Arnett, E. B., W. K. Brown, W. P. Erickson, J. K. Fiedler, B. L. Hamilton, T. H. Henry, A. Jain, G. D. Johnson, J. Kerns, R. R. Koford, C. P. Nicholson, T. J. O'Connell, M. D. Piorkowski, and R. D. Tankersley, Jr. 2008. Patterns of Bat Fatalities at Wind Energy Facilities in North America. Journal of Wildlife Management 72 (1):61-78.

Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D. C. and Sacramento, CA.

Baerwalk, Erin F., Genevieve H. D'Amours, Brandon J. Klug, and Robert M.R. Barclay. August 2008. "Barotrauma is a significant cause of bat fatalities at wind turbines." *Current Biology* (Department of Biological Sciences, University of Calgary, Calgary, AB Canada) vol.18, no. 16: R695-R696.

Barr Engineering Company. 2009a. Asbestos Emission Control Plan. UMore Park, Dakota County, Minnesota. Published by Barr Engineering Company, Minneapolis, Minnesota.

Barr Engineering Company. 2009b. Groundwater Assessment Report, Resource Document for Environmental Impact Statement, UMore Mining Area, Dakota County, Minnesota. Prepared for the University of Minnesota by Barr Engineering Company, Minneapolis, Minnesota.

Barr Engineering Company. 2010a. Environmental Soil Data, Proposed Turbine Area, UMore Park. Technical Memorandum from Jim Eidem. October 1, 2010. Published by Barr Engineering Company, Minneapolis, Minnesota.

Barr Engineering Company. 2010b. UMore Park Wind Turbine Project Loggerhead Shrike Survey. Report Author Lee A. Pfannmuller. June 15, 2010. Report Prepared for Barr Engineering Company, Minneapolis, Minnesota.

Barr Engineering Company. 2010c. Geotechnical Engineering Report. UMore Park Research Wind Turbine. Prepared for University of Minnesota and Ryan Companies US, Inc. August, 2010. Published by Barr Engineering Company, Minneapolis, Minnesota.

Barr Engineering Company. 2010d. Limited Phase I Environmental Site Assessment, Preliminary Turbine Area, UMore Park, Dakota County, Minnesota. May 10, 2010. Prepared for University of Minnesota by Barr Engineering Company, Minneapolis, Minnesota.

Bat Conservation International, Inc (BCI). 2010. Species Profiles. Available online at: http://www.batcon.org/index.php/all-about-bats/species-profiles.html. Accessed, May 2010.

BLS (Bureau of Labor Statistics) 2009a. "Table 1. Incidence rates of nonfatal occupational injuries and illnesses by industry and case types, 2008." Available online at: http://www.bls.gov/iif. Accessed March 15, 2010.

BLS (Bureau of Labor Statistics) 2009b. "Fatal occupational injuries, total hours worked, and rates of fatal occupational injuries by selected worker characteristics, occupations, and industries, civilian workers, 2008." Available online at: http://www.bls.gov/iif/oshcfoil.htm. Accessed March 15, 2010.

Comsearch. 2010. Wind Power GeoPlanner Licensed Microwave Report. July 8, 2010. Prepared on behalf of Barr Engineering for the University of Minnesota, UMore Park. Published by Comsearch, a CommScope Company, Ashburn, Virginia.

Cryan, P. 2008. Overview of Issues Related to Bats and Wind Energy. Web Version of Presentation to the Wind Turbine Guidelines Advisory Committee Technical Workshop & Federal Advisory Committee Meeting, Washington, D.C., 26 February, 2008: U.S. Geological Survey General Information Product. 71 pp.

Dakota County, Minnesota. 2010a. County Overview. Available online at: http://www.co.dakota.mn.us/About/Overview/default.htm. Last Updated July 21, 2008. Accessed in May of 2010.

Dakota County, Minnesota. 2010b. Property Environmental Audit of Preliminary Turbine Area (PTA) UMore Park, Dakota County, Minnesota. Dakota County Water Resources Environmental Management Department – Site Assessment.

Danish Wind Industry Association. 2007. Shadow Variations from Wind Turbines. Available online at: http://guidedtour.windpower.org/en/tour/env/shadow/index.htm. Frederiksberg, Denmark.

Department of Energy (DOE). 2010. Final Environmental Assessment of the University of Delaware Lewes Campus Onsite Wind Energy Project. U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. December 2010.

Ducks Unlimited, Inc. 2010. Conservation Priority Area: Upper Mississippi River. Available online at: http://www.ducks.org/conservation/initiative19.aspx. Accessed 30 March 2010.

Erickson, W. G., D. Strickland, D. Young, and G. Johnson. 2008. A Summary of Avian and Bat Fatality at Wind Facilities in the U.S. In *Proceedings of the NWCC Wind Wildlife Research Meeting VII.* Milwaukee, WI. October 28-29, 2008.

Erickson, W., G. Johnson, D. Young, D. Strickland, R. Good, M. Bourassa, K. Bay, and K. Sernka. 2002. Synthesis and Comparison of Baseline Avian and Bat Use, Raptor Nesting and Mortality Information from Proposed and Existing Wind Developments. Bonneville Power Administration c/o WEST, Inc. Cheyenne, WY.

Federal Transit Authority (FTA). May, 2006. Office of Planning and Environment Federal Transit Administration. "Transit Noise and Vibration Impact Assessment" p. 2-16. Accessed online at: www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf.

Garrad Hassan Canada, Inc. 2007. Recommendations for Risk Assessments of Ice Throw and Blade Failure in Ontario. Author M.P. LeBlanc. Prepared for Canadian Wind Energy Association. Document 38079/OR/01.

Gawlik, D. E. and K. L. Bildstein. 1993. Seasonal habitat use and abundance of Loggerhead Shrikes in South Carolina. J. Wildl. Manage. 57:352-357.

Johnson, G. D., W. P. Erickson, M. D. Strickland, M. F. Shepherd, and D. A. Shepherd. 2000. Final Report. Avian Monitoring Studies at the Buffalo Ridge, Minnesota Wind Resource Area: Results of a 4-Year Study. Northern States Power Company c/o WEST, Inc. Cheyenne, WY.

Johnson, G., Erickson, W., White, J., and R. McKinney. 2003. Avian and Bat Mortality During the First Year of Operation at the Klondike Phase I Wind Project, Sherman County, Oregon. Northwestern Wind Power c/o WEST, Inc. Cheyenne, WY.

Kerlinger, P. 1995. How Birds Migrate.1st edition. Stackpole Books. ISBN 0-8117-2444-1. Mechanicsburg, PA. 228pp.

Kerlinger, P. 2002. Phase I Avian Risk Assessment for the Arrowsmith Wind Farm, McLean County, Illinois. Zilkha Renewable Energy Corporation c/o Curry & Kerlinger, L.L.C. Cape May Point, NJ. 39 pp.

Kunz, T.H., E.B. Arnett, W.P. Erickson, A.R. Hoar, G.D. Johnson, R.P. Larkin, M.D. Strickland, R.W. Thresher and M.D. Tuttle. 2007. Ecological impacts of wind energy development on bats: questions, research needs and hypotheses. August 6, 2007. Frontiers of Ecology and the Environment 2007; 5(6): 315–324.

Lauber, John. 2006. A Historical Interpretation and Preservation Plan for UMore Park. John Lauber and Denis Gardner, Minneapolis, Minnesota. Prepared for and on file at the University of Minnesota, Center for Rural Design, Minneapolis, Minnesota.

Marshner, F.J. 1974. Frontiers in Ecology and the Environment 5;315-324. The Original Vegetation of Minnesota. United States Forest Service, North Central Forest Experiment Station, St. Paul, MN

Meridian Energy. 2005. *Project West Wind: Shadow Flicker Assessment Report*, Meridian Energy, June 22, 2005. Published by Meridian Energy Limited, Wellington, New Zealand.

Minnesota Department of Natural Resources (MNDNR). 2000. Minnesota County Biological Survey, Sites of Biodiversity Significance., Distribution Information. Available online at: http://deli.dnr.state.mn.us/metadata/mcbs_sbspy3.html.

Minnesota Department of Natural Resources (MNDNR). 2005. Field Guide to the Native Plant Communities of Minnesota: The Eastern Broadleaf Forest Province. Ecological Classification Program, Minnesota County Biological Survey, and Natural Heritage and Nongame Research Program. MNDNR, St. Paul, Minnesota.

Minnesota Department of Natural Resources (MNDNR). 2010a. Twin Cities Mississippi River Important Bird Area. Available online at: http://www.dnr.state.mn.us/twin_cities_iba.html. Accessed May, 2010.

Minnesota Department of Natural Resources (MNDNR). 2010b. Rare Species Guide: Filtered Search; Eastern Pipistrelle. Available online at: http://www.dnr.state.mn.us/rsg/filter_search.html. Accessed May, 2010.

Minnesota Department of Natural Resources (MNDNR). 2010c. Bird Fact Sheet: Loggerhead Shrike (*Lanius ludovicianus*). Available online at: http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABPBR01030. Accessed June, 2010.

Minnesota Department of Natural Resources (MNDNR). 2010d. Bird Fact Sheet: Canada Goose (*Branta Canadensis)*. Available online at: http://www.dnr.state.mn.us/birds/canadagoose.html. Accessed September 30, 2010.

Minnesota Department of Natural Resources (MNDNR). 2010e. WMA detail report. Vermillion Highlands Research Recreation and WMA Available online at: http://www.dnr.state.mn.us/wmas/detail_report.html?map=COMPASS_MAPFILE&mode=itemquery&qlayer=bdry_adwma2py3_query&qitem=uniqueid&qstring=WMA0184300. Accessed October 5, 2010.

Minnesota Pollution Control Agency (MPCA). 2010. What's in My Neighborhood? Available online at: http://www.pca.state.mn.us/WIMN/index.cfm. Accessed May, 2010.

Minnesota Public Utilities Commission (MPUC). 2010. Application Guidance for Site Permitting of Large Wind Energy Conversion Systems in Minnesota. Minnesota Department of Commerce, Office of Energy Security-Energy Facilities Permitting. August 2010. Available online at: http://energyfacilities.puc.state.mn.us/documents/LWECS_APP_Guide_AUG2010.pdf. Accessed September, 2010.

National Audubon Society, Inc. 2010. Important Bird Areas in the U.S.: Mississippi River Twin Cities Important Bird Area. Available online at: http://www.audubon.org/bird/iba. Accessed 24 May 2010.

NatureServe. 2009. Comprehensive Report Species-Loggerhead Shrike (*Lanius ludovicianus*). NatureServe Explorer: An online encyclopedia of life. Version 7.1. NatureServe, Arlington, Virginia. Available online at: http://www.natureserve.org/explorer. Accessed 7 April 2010.

Natural Resources Consulting, Inc. June, 2010. Avian and Bat Screening Analysis and Habitat Characterization for the UMore Park Research Wind Turbine, Dakota County, Minnesota. NRC Project No 0010-0110-01. Prepared for Barr Engineering Company, Minneapolis, Minnesota.

Office of Deputy Prime Minister. 2004. *Planning for Renewable Energy, A Companion Guide to PPS22*, Office of Deputy Prime Minister, Queen's Printer and Controller of Her Majesty's Stationary Office, Norwich, United Kingdom. ISBN 9781851127542. December 16, 2004.

Ornithological Council, The. 2007. Critical Literature Review: Impact of Wind Energy and Related Human Activities on Grassland and Shrub-steppe Birds. Prepared for the National Wind Consulting Council. Literature Review by Sarah Mabey and Ellen Paul. October 2007.

Osborn, R. G., Higgins, K. F., Dieter, C. D., and R. E. Usgaard. 1996. Bat Collisions with Wind Turbines in Southwestern Minnesota. Bat Research News. Vol 37: 4. pp 105-108.

Regents of the University of Minnesota. 2009. Wildlife Management at Vermillion Highlands. Available online at: http://www.umorepark.umn.edu/Wildlife_Management_at_Vermillion_Highlands. Accessed May 20, 2010.

Shaffer, J. A. and D. H. Johnson. 2008. Displacement Effects of Wind Developments on Grassland Birds in the Northern Great Plains. In *Proceedings of the NWCC Wind Wildlife Research Meeting VII.* Milwaukee, WI. October 28-29, 2008.

Smith, E. L. and K. C. Kruse. 1992. The relationship between land-use and the distribution and abundance of Loggerhead Shrikes in south-central Illinois. J. Field Ornithol. 63:420-427.

Strickland, D. 2004. Overview of Non-Collision Related Impacts from Wind Projects. In *Proceedings of the Wind Energy and Birds/Bats Workshop: Understanding and Resolving Bird and Bat Impacts.* Washington, DC. May 18-19, 2004. Prepared by RESOLVE, Inc., Washington, D.C., Susan Savitt Schwartz, ed. September 2004.

The 106 Group Ltd. 2010a. Phase IA Archaeological and Architectural History Survey for the UMore Park Research Wind Turbine Project, Dakota County, Minnesota. Report Authors Mark Doperalski and Miranda Van Vleet. June, 2010. Amended in July 2010. Published by The 106 Group, St. Paul, Minnesota.

The 106 Group Ltd. 2010b. Phase I and II Architectural History Survey for the UMore Park Research Wind Turbine Project, Dakota County, Minnesota. Report Authors Greg Mathis and Saleh Van Erem. October, 2010. SHPO File No 2010-3249. The 106 Group Project No 10-18. Published by The 106 Group, St. Paul, Minnesota.

The 106 Group Ltd. 2010c. Phase I Architectural History Review for the Minnesota Agricultural Experiment Station (AES) for the UMore Park Research Wind Turbine Project, Dakota County, Minnesota. Report Author Saleh Van Erem. October, 2010. SHPO File No 2010-3249. Published by The 106 Group, St. Paul, Minnesota.

The 106 Group Ltd. 2010d. Cultural Resources Literature Review of Proposed Fiber Optic Lines for the UMore Park Research Wind Turbine Project, Dakota County, Minnesota. Report Authors Mark Doperalski and Saleh Van Erem. November, 2010. SHPO File No 2010-3249. The 106 Group Project No 10-18. Published by The 106 Group, St. Paul, Minnesota.

Truescape. 2010. Statement of Methodology, Rosemount Wind Turbine Simulations, for Barr Engineering. July, 12, 2010. Published by Truescape Visual Reality, Albany, New York.

United States Census Bureau (USCB). 2010. State and County QuickFacts – Dakota County, Minnesota. Available online at: http://quickfacts.census.gov/qfd/states/27/27037.html. Accessed in May of 2010.

United States Department of Agriculture, Natural Resource Conservation Service (USDA NRCS). 1983. Soil Survey Geographic Database for Dakota County, Minnesota. Available online at: http://SoilDataMart.nrcs.usda.gov.

United States Department of Agriculture (USDA) 2005. Soil Resource Management. National Program 202: Soil Resource Management Assessment Team Meeting. USDA-ARS. Available online at: http://ars.usda.gov/sp2UserFiles/Program/202/202Assessment2004/202AssessmentReportFinal.pdf.

United States Environmental Protection Agency (USEPA). 1971. Office of Noise Abatement and Control. Community Noise. (NTID300.3). Washington, D.C.: National Technical Information Service, 1971.

United States Fish and Wildlife Service (USFWS). 2010a. Prairie Bush Clover (*Lespedeza leptostachya*) Fact Sheet. Available online at: http://www.fws.gov/midwest/endangered/plants/prairieb.html. Accessed on September 26, 2010.

United States Fish and Wildlife Service (USFWS). 2010b. Higgins Eye Pearly Mussel (*Lampsilis higginsii)* Fact Sheet. Available online at: http://www.fws.gov/midwest/Endangered/clams/higginseye/higgins_fs.html. Accessed on September 26, 2010.

United States Fish and Wildlife Service (USFWS). 2010c. Endangered Species in Minnesota. County Distribution of Federally-Listed Threatened, Endangered, Proposed and Candidate Species. Available online at: http://www.fws.gov/midwest/endangered/lists/minnesot-cty.html. Accessed on October 5, 2010.

University of Minnesota (U of M). 2009, UMore Park: Concept Master Plan Book, January 2009. Available online at: http://www.umorepark.umn.edu/planning/concept/cmpbook/index.htm Accessed in September, 2010.

University of Minnesota (U of M). 2010a, UMore Park: Gopher Ordnance Works. Available online at http://www.umorepark.umn.edu/about/GopherOrdnanceWorks/index.htm. Accessed on September 26, 2010.

University of Minnesota (U of M). 2010b. UMore Park Sand and Gravel Resources Project Draft EIS. June, 2010. Prepared by SEH Incorporated, St. Paul, Minnesota.

Winegrad, G. 2004. Wind Turbines and Birds. In *Proceedings of the Wind Energy and Birds/Bats Workshop: Understanding and Resolving Bird and Bat Impacts.* Washington, DC. May 18-19, 2004. Prepared by RESOLVE, Inc., Washington, D.C., Susan Savitt Schwartz, ed. September 2004.

Young, D.P., Jr., Erickson, W. P., Good, R. E., Strickland, M. D., and G. D. Johnson. 2003. Avian and Bat Mortality Associated with the Initial Phase of the Foote Creek Rim Windpower Project, Carbon County, Wyoming: November 1998-June 2002. Pacificorp, Inc., SeaWest Windpower, Inc., and BLM Rawlins District Office c/o WEST, Inc. Cheyenne, Wyoming.

Appendix A
Scoping Distribution List

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Table A-1: Scoping Distribution List

Agency/Organization	Last Name	First Name	Title	Address	City, State and Zip
Federal Stakeholders					
U. S. Army Corps of Engineers	Wingert	Sarah	Project Manager	Sibley Square at Mears Park, 190 5th Street East, Suite 401	St. Paul, MN 55101-1638
Environmental Protection Agency - Region 5	Westlake	Ken	NEPA Implementation Office of Enforcement and Compliance Assurance	U.S. Environmental Protection Agency, 77 West Jackson Boulevard, Mail Code E-19J	Chicago, IL 60604-3590
U. S. Fish and Wildlife Service - Region 3	MacLean	Lyn		Bishop Henry Federal Building, One Federal Drive	Ft. Snelling, MN 55111
Federal Aviation Administration	Bemacchi	Carole	Air Traffic Division, AGL-520	Federal Aviation Administration, Great Lakes Regional Office, 2300 East Devon Avenue	Des Plaines, IL 60018
Natural Resources Conservation Service	Harrington	John (Matthew)	National Environmental Coordinator	Natural Resources Conservation Service, U. S. Department of Agriculture, Room 6151-S; PO Box 2890	Washington, DC 20013-2890
Department of Agriculture	Bergsten	David A.	Animal and Plant Health Inspection Service	U.S. Department of Agriculture, Room 3D-06D, 4700 River Road, Unit 149	Riverdale, MD 20737-1238
Local Stakeholders					
City of Rosemount	Johnson	Dwight	City Administrator	City Hall, 2875 W. 145th Street	Rosemount, MN 55068
Dakota County	Thompson	Lynn	Director	14955 Galaxie Avenue	Apple Valley, MN 55124
Dakota County Technical College	Thomas	Ron	President	1300 - 145th St. E.	Rosemount, MN 55068
Empire Township	Holmes	Terry	Town Board Chair	3390 197th Street West	Farmington, MN 55024
Metropolitan Council	Boylan	Patrick	Senior Planner, Sector Representative	390 Robert Street N	St. Paul, MN 55101

Agency/Organization	Last Name	First Name	Title	Address	City, State and Zip
Minnesota Department of Natural Resources	Kurcinka	Joe	Central Region Director	1200 Warner Road	St. Paul, MN 55106
Minnesota Pollution Control Agency	Kromar	Karen	Project Manager	520 Lafayette Road	St. Paul, MN 55155
Flint Hills	Kern	Don	Facilities/Engineering Manager	P.O. Box 64596	St. Paul, MN 55164-0596
Minnesota Public Utilities Commission	Cupit	Bob	Energy Facilities Permitting Manager	121 7th Place East, Suite 350	St. Paul, MN 55101-2147
Environmental Groups					
Audubon Minnesota & Upper Mississippi River Campaign	Peterson	Mark	Executive Director	2357 Ventura Drive, Suite 106	St. Paul, MN 55125
Institute for Local Self-Reliance	Morris	David	Vice President	1313 5th St. SE	Minneapolis, MN 55141
Izaak Walton League - Midwest Office	Grant	Bill	Executive Director	1619 Dayton Ave., Suite 202	St. Paul, MN 55104
MN Center for Environmental Advocacy	Brand	Martha	Executive Director	26 E. Exchange St., Suite 206	St. Paul, MN 55101
Pheasants Forever	Richmond	Dan		7064 Montrose Rd.	Woodbury, MN 55125
Sierra Club North Star Chapter	Houdek	Joshua	Land Use & Transportation Organizer	2327 Franklin Ave., Suite 1	Minneapolis, MN 55406-1024
The Green Institute	Heipel	Jamie	Executive Director	2801 21st Ave S. Suite 110	Minneapolis, MN 55407
Minnesota Environmental Partnership	Morse	Steve	Executive Director	546 Rice Street, Suite 100	St. Paul, MN 55114
Windustry	Daniels	Lisa	Executive Director and Founder	2105 1st Avenue South	Minneapolis, MN 55404
Fresh Energy	Noble	Michael	Executive Director	408 St. Peter St. Ste 220	St. Paul, MN 55102
Ducks Unlimited - Minnesota	Ness	Lee	State Chair	9551 Deer Garden Ln.	Chisago City, MN 55013

Agency/Organization	Last Name	First Name	Title	Address	City, State and Zip
Minnesota Public Interest Research Group (MPIRG)	Winters	Josh	Executive Director	U-Tech Building, 1313 5th St SE, Suite 111	Minneapolis, MN 55414
Tribes					
Flandreau Santee Sioux	Allen	Mark	Tribal Representative	P.O. Box 283	Flandreau, SD 57028
Iowa Tribe of Kansas & Nebraska	Campbell	Leon	Tribal Representative	3345 Thrasher Rd.	White Cloud, KS 66094
Iowa Tribe of Oklahoma	Bernadette Huber	Emily	Tribal Representative	Rt. 1, Box 721	Perkins, OK 74059
Lower Sioux Indian Community Council/MN	Wolfchild	Sheldon	Tribal Representative	39527 Res Highway 1 P.O.Box 308	Morton, MN 56270
Omaha Tribal Council	Baxter	Eleanor	Tribal Representative	P.O. Box 368	Macy, NE 68039
Otoe-Missouria Tribe of Indians, Oklahoma	Harwell	Michael	Tribal Representative	8151 Highway 177	Red Rock, OK 74651
Prairie Island Indian Community	Bennett	Audrey	Tribal Representative	5636 Sturgeon Lake Rd.	Welch, MN 55089
Sac and Fox Nation of Missouri	Keo	Sandra	Tribal Representative	305 N. Main St.	Reserve, KS 66434
Sac and Fox Nation of Oklahoma	Rhoads	Kay	Tribal Representative	Route 2, Box 246	Stroud, OK 74079
Sac and Fox Tribe of the Mississippi in Iowa	Bear, Jr.	Homer	Tribal Representative	349 Meskwaki Rd.	Tama, IA 52339-9629
Sisseton-Wahpeton Oyate of the Lake Traverse Reservation	Crawford	James	Tribal Representative	P.O. Box 509	Agency Village, SD 57262
Santee Sioux Nation	Trudell	Roger	Tribal Representative	108 Spirit Lake Avenue West	Niobrara, NE 68760
Spirit Lake Tribal Council	Pearson	Myra	Tribal Representative	P.O. Box 359	Fort Totten, ND 58335
Yankton Sioux Tribe	Pearson	Maria Darlene	Tribal Representative	1001 North Dakota	Ames, IA 50014

Agency/Organization	Last Name	First Name	Title	Address	City, State and Zip
Otoe-Missouria Tribe of Indians	Harwell	Michael	Tribal Representative	8151 Highway 177	Red Rock, OK 74651
Upper Sioux Community of Minnesota	Jensvold	Kevin	Tribal Representative	P.O. Box 147	Granite Falls, MN 56241-0147
Tribal Historic Preservation Officer Contacts					
Santee Sioux Tribe	Thomas	Thelma	Tribal Historic Preservation Officer	108 Spirit Lake Avenue West	Niobrara, NE 68760
Lower Sioux Indian Community	N/A	N/A	Tribal Historic Preservation Officer	P.O.Box 3087 Res. Hwy 1	Martin, MN 56270
Sisseton-Wahpeton Oyate	Desrosiers	Dianne	Tribal Historic Preservation Officer	P.O. Box 907	Sisseton, SD 57262
SHPO Contacts					
State Historical Preservation Officer	Anfinson	Scott	State Archaeologist	Minnesota Office of the State Archaeologist Fort Sneling History Center	Saint Paul, Minnesota 55111
State Historical Preservation Officer	Gragg-Johnson	Kelly	Review and Compliance Associate	MN Historical Society 345 Kellogg Blvd W.	Saint Paul, Minnesota 55102

Appendix B
FAA No Hazard Determination Letters

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Federal Aviation Administration
Air Traffic Airspace Branch, ASW-520
2601 Meacham Blvd.
Fort Worth, TX 76137-0520

Aeronautical Study No.
2010-WTE-7802-OE

Issued Date: 06/15/2010

Greg Patten
Barr Engineering
4700 West 77th street
minneapolis, MN 55427-4803

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Met Tower Umore Park Met Tower 02
Location:	Rosemount, MN
Latitude:	44-43-33.70N NAD 83
Longitude:	93-02-52.90W
Heights:	427 feet above ground level (AGL) 1357 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part I)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part II)

This determination expires on 06/15/2012 unless:

(a) extended, revised or terminated by the issuing office.
(b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE POSTMARKED OR DELIVERED TO THIS OFFICE AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE.

Page 1 of 2

Additional wind turbines or met towers proposed in the future may cause a cumulative effect on the national airspace system. This determination is based, in part, on the foregoing description which includes specific coordinates and heights . Any changes in coordinates will void this determination. Any future construction or alteration requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (404) 305-7081. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2010-WTE-7802-OE.

Signature Control No: 708404-127052703 (DNE -WT)
Michael Blaich
Specialist

Page 2 of 2

Federal Aviation Administration
Air Traffic Airspace Branch, ASW-520
2601 Meacham Blvd.
Fort Worth, TX 76137-0520

Aeronautical Study No.
2010-WTE-9301-OE
Prior Study No.
2010-WTE-7803-OE

Issued Date: 09/10/2010

Greg Patten
Barr Engineering
4700 West 77th street
minneapolis, MN 55427-4803

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Wind Turbine Umore Park Wind Turbine 01 - Revised
Location:	Rosemount, MN
Latitude:	44-43-41.90N NAD 83
Longitude:	93-02-53.10W
Heights:	492 feet above ground level (AGL) 1422 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation provided the following condition(s), if any, is(are) met:

As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, white paint/synchronized red lights - Chapters 4,12&13(Turbines).

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

_____ At least 10 days prior to start of construction (7460-2, Part I)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part II)

This determination expires on 09/10/2012 unless:

(a) extended, revised or terminated by the issuing office.
(b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE E-FILED AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE. AFTER RE-EVALUATION OF CURRENT OPERATIONS IN THE AREA OF THE STRUCTURE TO DETERMINE THAT NO

Page 1 of 2

SIGNIFICANT AERONAUTICAL CHANGES HAVE OCCURRED, YOUR DETERMINATION MAY BE ELIGIBLE FOR ONE EXTENSION OF THE EFFECTIVE PERIOD.

Additional wind turbines or met towers proposed in the future may cause a cumulative effect on the national airspace system. This determination is based, in part, on the foregoing description which includes specific coordinates and heights . Any changes in coordinates will void this determination. Any future construction or alteration requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

If we can be of further assistance, please contact our office at (404) 305-7081. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2010-WTE-9301-OE.

Signature Control No: 127961431-130779340 (DNE -WT)
Michael Blaich
Specialist

Page 2 of 2

Appendix C
Agency Correspondence

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INVITATION FOR PUBLIC COMMENT

Federally-Funded Wind Turbine Research Project, University of Minnesota

The U.S. Department of Energy (DOE) is inviting public comments on the scope of an Environmental Assessment (EA) being prepared to evaluate the potential impacts of a 2.5-megawatt wind turbine to be located in Dakota County, Minnesota. The University of Minnesota's DOE-funded research project, located at its UMore Park property, will result in innovation that can reduce the cost of wind energy through increased reliability, more durable component parts and more efficient operations.

Information on the project is available at the DOE Golden Field Office web-site: http://www.eere.energy.gov/golden/Reading_Room.aspx

You may submit comments to the DOE Golden Field Office, Attn: Kurt Rautenstrauch, NEPA Division, 1617 Cole Blvd, Golden, CO 80401, or by email to Kurt.Rautenstrauch@go.doe.gov. Please send your comments by June 25, 2010.

Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401-3393

June 3, 2010

TO: Distribution List

SUBJECT: Notice of Scoping – University of Minnesota Wind Energy Research Consortium Project, Dakota County, Minnesota

The U.S. Department of Energy (DOE) is proposing to provide federal funding to the University of Minnesota (University) to construct and operate a wind power facility in Dakota County, Minnesota. Details of the proposed project and its location are contained in the attachment to this Scoping Notice. Additional project information can be found at the University's website: http://www.umorepark.umn.edu.

Pursuant to the requirements of the National Environmental Policy Act (NEPA), the Council on Environmental Quality regulations for implementing the procedural provision of NEPA (40 CFR Parts 1500-1508), and DOE's implementing procedures for compliance with NEPA (10 CFR 1021), DOE is preparing a draft Environmental Assessment (EA) to:

- Identify any adverse environmental effects that cannot be avoided should this proposed project be implemented.
- Evaluate viable alternatives to the proposed project.
- Describe the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity.
- Characterize any irreversible and irretrievable commitments of resources that would be involved should this proposed project be implemented.

Potential Environmental Effects or Issues Identified for the Environmental Assessment

The EA will describe and analyze any potential impacts on the environment that would be caused by the project and will identify possible mitigation measures to reduce or eliminate those impacts. At a minimum, DOE will evaluate the potential impacts that may result to:

- Land Use
- Biological Resources
- Cultural Resources
- Noise
- Safety and Occupational Health
- Socioeconomics and Environmental Justice
- Utilities
- Traffic and Transportation
- Aviation Hazards
- Electromagnetic Interferences
- Aesthetics and Shadow Flicker

- Water Resources

Development of a Reasonable Range of Alternatives

DOE is required to consider a reasonable range of alternatives to the proposed action during an environmental review. The definition of alternatives is governed by the "rule of reason." An EA must consider a reasonable range of options that could accomplish the agency's purpose and need and reduce environmental effects. Reasonable alternatives are those that may be feasibly carried out based on environmental, technical, and economic factors.

The No Action Alternative will be addressed. The need for project redesign, or a project alternative, will be determined during the course of environmental review.

Public Scoping

The DOE is sending this letter to interested federal, state, and local agencies to provide information on issues to be addressed in the EA. Agencies are invited to identify the issues within their statutory responsibilities that should be considered in the EA. The general public is also invited to submit comments on the scope of the EA.

This letter and the draft EA, when it is available, will be posted in the DOE Golden Field Office online reading room:

http://www.eere.energy.gov/golden/Reading_Room.aspx.

The DOE Golden Field Office welcomes your input throughout our NEPA process. Please submit your comments by June 25th, 2010 to:

Department of Energy Golden Field Office
NEPA Division
Attn: Kurt Rautenstrauch
1617 Cole Boulevard
Golden, Colorado 80401

or via email to:

Kurt.Rautenstrauch@go.doe.gov

Thank you for your participation in the NEPA process.

Sincerely,

Steve Blazek
NEPA Compliance Officer

Enclosure

Minnesota Department of Natural Resources

Division of Ecological Resources
1200 Warner Road
St. Paul, MN 55106
651-259-5738

June 25, 2010

RE: Notice of Scoping – University of Minnesota Wind Energy Research Consortium Project, Dakota County, Minnesota

Mr. Rautenstrauch,

The Minnesota Department of Natural Resources (DNR) has received the Notice of Scoping letter dated June 3, 2010 regarding the proposed wind power facility to be located on the University of Minnesota property in Dakota County. The DNR appreciates the opportunity to provide input during the Environmental Assessment (EA) scoping process and offers the following comments for consideration.

The DNR received a request from Barr Engineering, local consultant, in April 2010 requesting information and comments regarding the proposed turbine site, as depicted in the attached map in the June 3rd letter. In an e-mail transmission dated May 10, 2010, we responded with comments and recommendations that highlighted natural resources, rare features, and DNR management areas that may be impacted by the proposed project*. In addition, the DNR provided thoughts for considerations that involve education opportunities and further research needs surrounding wind turbine(s) and wind farms. This research could be implemented in addition to the proposed objectives. The DNR could provide assistance in identifying these research needs.

The DNR considers the proposed wind power facility as a small-scale facility. However, given the proposed hub height and rotor diameter, the potential for negative effects to rare and natural resources exists. The following generally addresses recommendations and points of consideration when planning the turbine and infrastructure placement.

- Although the project would be constructed solely on the University of Minnesota property, local land use compatibility and zoning, through the comprehensive land use plan, should be considered during siting.
- Natural Heritage Information – known threatened and endangered species and other rare resources within project area need to be identified and avoided.
- Habitat Complexes – combination of various resources, which may not be significant on their own that can form a habitat complex that concentrates birds or bats.
- Native prairie - given the rarity of this native plant community and the potential for state-listed species to occur within it, the DNR recommends avoidance of all native prairie remnants. If avoidance is not feasible, rare species surveys will be required and DNR recommends preparation of prairie protection and management plans.
- Grasslands – large blocks of grasslands (>40 acres) have an increased diversity of species and provide habitat for area sensitive species. These areas should be avoided.

*Please note, in regards to state-owned lands wind rights setbacks, the statement should read that the setback is a recommendation and not a requirement.

DOE EA Scoping Notice
UMore Wind Facility
June 25, 2010

- Forest interior - forest interior habitat that provides habitat that supports nesting and migratory stopover areas for area sensitive species. Consideration should be given to the fragmentation affects that occur with projects in forested areas.
- Lakes, wetlands, streams, and rivers - 5RD by 3RD setback for navigable waters. Other setbacks should be considered for other public waters and wetland types 3, 4, and 5, some counties have used 600 feet.
- Flyway corridors - common flyway corridors to consider are avian flyways between wetlands, raptor migration routes along streams or areas with thermal updrafts, and high use bat corridors.
- Wildlife designated lakes/Waterfowl Feeding and Resting Areas - The DNR recommends a minimum setback of ¼ mile from the MWFRAs and their associated habitat in order to reduce potential mortality and avoidance of the lakes by avian species. The associated habitat includes any natural habitat such as forest, grassland, wetlands, floodplain, or stream corridors.
- Species of Greatest Conservation Need and key habitats – key habitats in the relevant Ecological subsection need to be avoided.
- Biological field surveys - Coordinate potential pre- or post-construction surveys in the preliminary planning phase with the DNR.

Please note the attached letter highlights recommendations and concerns for the turbine site layout. The above points are recommended points of discussion to consider during the EA scoping process. The DNR looks forward to reviewing the EA.

Please feel free to contact me at 651-259-5738 or by e-mail at melissa.doperalski@state.mn.us with any questions or information related to the project area.

Thank you,

Melissa Doperalski
Region Environmental Assessment Ecologist

Cc: DNR - Jamie Schrenzel, Liz Harper, Janell Miersch, Bob Fashingbauer, Lisa Joyal, Jan Wolff

From: Kowal.Kathleen@epamail.epa.gov
[mailto:Kowal.Kathleen@epamail.epa.gov]
Sent: Wednesday, June 30, 2010 1:05 PM
To: Rautenstrauch, Kurt
Subject: Response to Notice of Scoping - UoMn Wind Energy Research Consortium Project, Dakota County, MN

Kurt,

Based on our review of the Notice of Scoping for the University of Minnesota Wind Energy Research Consortium Project, Dakota County, Minnesota, we recommend the following items be discussed in the forthcoming environmental assessment (EA).

Equipment

§ The types of materials proposed for the project, including infrastructure required to connect to the general electric grid (e.g., monopole v. lattice construction towers, use of guy wires, etc.) and the potential impacts to wildlife. Discussing data from studies which analyzed the effects of using the same technology in similar habitat(s) would be useful to understand the range and severity of potential impacts.

§ Decommissioning and disposal of turbines. Danish studies published in the International Journal of Technology, Policy and Management show that windmills become a waste concern, particularly those with blades made of composite materials, which are difficult to separate into clean sections for recycling. The EIS should discuss disposal options when windmills will be replaced, upgraded or decommissioned.

Project Impacts

§ Characterize the project area, as well as in the larger, general area (e.g., water features, vegetation, etc.), and discuss potential impacts to habitat, particularly sensitive terrestrial features, if any (e.g., wetlands, unfragmented habitat). We recommend including a discussion focused on how the range for this analysis was determined.

§ Provide specific data on the use of the project area, as well as in the larger, general area, for nocturnal and diurnal movements of migratory birds and bats (e.g., location, timing, magnitude of movements, etc.), as well as breeding/nesting activity (e.g., habitat use patterns). We recognize that the biological assessment required under the Endangered Species Act will address these issues for federally-listed threatened or endangered species; however, we recommend data be provided for all species which use the area (e.g., birds of conservation concern, state-listed species, etc.).

§ Describe potential impacts to species whose behavioral patterns contribute to exposure to the hazards posed by rotating turbines blades or aircraft avoidance lighting (e.g., time spent within height range of blades, type of behaviors that might occupy wildlife attention, such as hunting or predator avoidance, etc.).

§ Describe potential behavioral impacts to wildlife species (e.g., displacement from feeding or nesting grounds, avoidance of the

turbines and surrounding habitat during daily movements or during migration, reproductive interference, etc.).
$ Discuss the abundance and location of habitat features where birds, particularly water birds, concentrate in large numbers (e.g., water features) in the project area, as well as in the larger, general area.
$ Discuss the abundance and location of habitat features that migrating birds or bats are likely to use following nocturnal migrations (e.g., water features, woodlots, etc.) in the project area, as well as in the larger, general area.
$ Discuss whether wind resource areas in the general project area overlap with ecologically-important intact landscapes (e.g., landscape features known to attract large numbers of raptors) and whether migratory pathways are likely to be disrupted.

Minimization/Monitoring/Mitigation
$ Discuss whether the USFWS' Interim Voluntary Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines will be followed.
$ Discuss whether Avian Power Line Interaction Committee standards will be followed if above-ground power transmission lines are proposed.
$ Collect data to characterize bird and bat baseline conditions. This will be useful to establish a comprehensive baseline as well as mitigation and monitoring protocols. The draft EA should discuss post-development monitoring protocols to collect mortality data (e.g., numbers of individuals, species, time of year when fatal collisions occur, etc.) and the length of time post-development monitoring will occur.
$ Coordinate efforts by the applicant with the USFWS regarding possible construction timing restrictions to reduce impacts to birds and bats during the migratory and breeding periods.
$ Control non-native invasive species in the project area during the life of the wind farm.
$ Restore habitat once the wind farm is decommissioned.

Cumulative Impacts
$ Evaluate cumulative impacts from conversion of habitat. The impacts analysis should focus on effects to wildlife species and terrestrial habitat (e.g., forest fragmentation, road densities, etc.).

We appreciate the opportunity to submit scoping comments, and we look forward to receiving the EA. If you have any questions concerning these comments, please contact me at (312) 353-6206 or via email. We apologize for sending this email after the requested response date.

Kathleen R. Kowal

Life Scientist
NEPA Implementation Section
Office of Science, Ecosystems & Communities U.S. Environmental
Protection Agency
77 West Jackson Blvd.
Mailcode: E-19J
Chicago, IL 60604-3590
312/353-5206
312/385-5523 (FAX)

Minnesota Historical Society

STATE HISTORIC PRESERVATION OFFICE

July 19, 2010

Ms. Laura Margason
DOE NEPA Specialist/EA Document Manager
Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, CO 80401-3393

RE: University of Minnesota UMore Wind Energy Project
T115 R19 S25 & S36, Dakota County
SHPO Number: 2010-3249

Dear Ms. Margason:

Thank you for the opportunity to review and comment on the above project. It has been reviewed pursuant to the responsibilities given the State Historic Preservation Officer by the National Historic Preservation Act of 1966 and the Procedures of the Advisory Council on Historic Preservation (36CFR800).

We received your letter initiating the Section 106 process for the UMore Park Wind Energy Project on 28 June 2010. We have now also received a Phase IA survey report entitled "Phase IA Archaeological and Architectural History Survey for the UMore Park Research and Wind Turbine Project, Dakota County, Minnesota" prepared by The 106 Group Ltd (July 2010). This report was received by our office on 16 July 2010. We look forward to reviewing the results of this survey and will respond with our comments within the 30 day time frame (15 August 2010).

Please contact our Compliance Section at (651) 259-3455 if you have any questions regarding our review of this project.

Sincerely,

Mary Ann Heidemann, Manager
Government Programs & Compliance

cc: Jim Litsheim, University of Minnesota, Capital Planning & Project Management

Minnesota Historical Society, 345 Kellogg Boulevard West, Saint Paul, Minnesota 55102
651-259-3000 • 888-727-8386 • www.mnhs.org

STATE HISTORIC PRESERVATION OFFICE

August 16, 2010

Ms. Laura Margason
DOE NEPA Specialist/EA Document Manager
Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, CO 80401-3393

RE: University of Minnesota UMore Wind Energy Project
T115 R19 S25 & S36, Dakota County
SHPO Number: 2010-3249

Dear Ms. Margason:

Thank you for the opportunity to review and comment on the additional materials received concerning the above project. They have been reviewed pursuant to the responsibilities given the State Historic Preservation Officer by the National Historic Preservation Act of 1966 and the Procedures of the Advisory Council on Historic Preservation (36CFR800).

We reviewed the Phase 1A Archaeological and Architectural History survey for the UMore Park Wind Energy Project, in addition to earlier materials received. Based on the information provided, we **concur with the Area of Potential Effect (APE) for archaeological resources**, and we also concur that **no archaeological properties on or eligible for the National Register will be affected by this project.**

We do not concur with using visual APE that you have identified for the above-ground resources affected by this project, for several reasons. We believe that the visual APE must correspond to the area within which the wind turbines will be visible. This will require you to analyze the height of the turbines, the topography of the project area, and existing conditions that affect the view shed, such as vegetation or the presence of other structures that may block views. And we do not agree with the statement in your consultation letter that structures built after 1945 are not subject to visual intrusions.

We also feel that the selection of 1945 as a survey cut-off date is not consistent with federal law and guidelines. Alternatively, we suggest you evaluate all structures within the APE (including the visual APE) that are 45 years old or older. Appendix A in the Phase 1A survey provides photographs of these structures within the previously defined APE. However, many of these structures will not need full evaluation, and can be eliminated from further consideration based on age or integrity that clearly does not meet Register standards. Others may need to be added for consideration from the expanded APE.

We do concur with the findings presented in Table 1 of the survey that identifies all previously inventoried structures as **not eligible** for the National Register, with the exception of the farmstead at 15102 Clayton Avenue. We concur that further study is needed on the farmstead.

Additionally, we request that you consider and evaluate the University's use of this site subsequent to the Gopher Ordinance Works (GOW). We understand the University's agricultural experiment station was located on the old GOW grounds for many years. Please identify any buildings or landscape elements remaining from this use, and evaluate such resources against National Register criteria.

In summary, we look forward to seeing the revised visual APE for this site; an informed evaluation of all potentially-eligible structures older than 45 years that are located within the expanded APE; and an evaluation any resources within the APE that are connected with the University's agricultural experiment station.

Please contact our Compliance Section at (651) 259-3456 if you have any questions regarding our review of this project.

Sincerely,

Mary Ann Heidemann, Manager
Government Programs & Compliance

cc: Jim Litsheim, University of Minnesota, Capital Planning & Project Management

UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
Washington, D.C. 20230

SEP 7 2010

Mr. Greg Patten
Sr. Consultant/Advisor
BARR Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

Re: University of Minnesota UMore Wind Research Project, in Dakota County, MN, **Revision 1**

Dear Mr. Patten:

In response to your request on July 9, 2010, the National Telecommunications and Information Administration provided to the federal agencies represented in the Interdepartment Radio Advisory Committee (IRAC) the plans for **Revision 1** of the University of Minnesota UMore Wind Research Project, in Dakota County, Minnesota.

After a 45 day period of review, no federal agencies identified any concerns regarding blockage of their radio frequency transmissions.

While the IRAC agencies did not identify any concerns regarding radio frequency blockage, this does not eliminate the need for the wind energy facilities to meet any other requirements specified by law related to these agencies. For example, this review by the IRAC does not eliminate any need that may exist to coordinate with the Federal Aviation Administration concerning flight obstruction.

Thank you for the opportunity to review these proposals.

Sincerely,

Edward M. Davison
Deputy Associate Administrator
Office of Spectrum Management

Minnesota Historical Society

STATE HISTORIC PRESERVATION OFFICE

September 14, 2010

Ms. Laura Margason
DOE NEPA Specialist/EA Document Manager
Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, CO 80401-3393

RE: University of Minnesota UMore Park Wind Energy Project
T115 R19 S25 & S36, Dakota County
SHPO Number: 2010-3249

Dear Ms. Margason:

Thank you for sending some of the requested follow-up materials concerning the above project. They have been reviewed pursuant to the responsibilities given the State Historic Preservation Officer by the National Historic Preservation Act of 1966 and the Procedures of the Advisory Council on Historic Preservation (36CFR800).

We concur with the revised visual area of potential effect submitted for the project, and that is a one mile radius from the proposed wind turbine location, rather than the half mile originally proposed.

Before any more visual simulations are performed, however, we feel it is important to confirm the actual height of the proposed tower. The consultation letter dated June 28, 2010 stated that the turbine would have an 80-meter hub height and up to a 100-meter rotor diameter. That makes for a total height of 130 meters (hub height plus ½ rotor diameter), or 426.5 feet. But the consultation letter dated September 3, 2010 states that the turbine will be 490 feet tall. Please confirm the actual proposed height of the tower, including hub height plus rotor radius.

We also concur in the revised study approach for structures within the revised APE, to include evaluation of all structures constructed prior to 1960. Further, we appreciate your willingness to evaluate any remaining structures and landscape features associated with the University's re-use of the property (post-Gopher Works) as an agricultural experiment station. We look forward to receiving and reviewing those materials as soon as they are available.

Please contact our Compliance Section at (651) 259-3456 if you have any questions regarding our review of this project.

Sincerely,

Mary Ann Heidemann, Manager
Government Programs & Compliance

cc: Jim Litsheim, University of Minnesota, Capital Planning & Project Management

Minnesota Historical Society, 345 Kellogg Boulevard West, Saint Paul, Minnesota 55102
651-259-3000 • 888-727-8386 • www.mnhs.org

Minnesota Department of Natural Resources

Division of Ecological and Water Resources
1200 Warner Road
St. Paul, MN 55106
651-259-5738

October 7, 2010

Jessica Butler, Ecologist
Barr Engineering Company
4700 West 77th Street
Minneapolis, MN 55435-4803

RE: UMore Park Wind Turbine – Loggerhead Shrike Survey Comments and Discussion

Ms. Butler,

This letter serves as a follow-up to the September 2010 discussion between Barr Engineering representatives and the Minnesota Department of Natural Resources (DNR) regarding the Loggerhead Shrike Survey Report dated June 15, 2010 for the UMore Park Wind Turbine project. The discussion entailed survey results and methodology, related data, project timelines and future assessment possibilities.

As detailed in the Loggerhead Shrike Survey Report dated June 15, 2010 (Barr Engineering), Loggerhead Shrikes (*Lanius ludovicianus*) are a state-listed threatened species in Minnesota. Dakota County is considered to hold the densest concentration of shrikes in Minnesota. Historic and recent surveys, dating through 2009, indicate that it is likely that Loggerhead Shrikes utilize the project area. The listed status of the species as well as the known occurrence of the species in the project area resulted in the recommendation of a habitat assessment and survey to be completed prior to construction (e-mail transmittal, May 10, 2010).

Based on the methodology and results of the report, the DNR had the following comments to the report.

- Surveys were completed earlier in the season (early to mid-June on 3 days) than what is typically recommended.
- Weather conditions were overcast or raining during all site visits. These conditions are not considered to be optimal for surveying.
- Each survey site was visited only one time and each at varying hours.

Based on discussed comments for survey methodology, the DNR stated concern that the survey results do not accurately depict the Loggerhead Shrike usage in the project vicinity. As the project has the potential to negatively impact Loggerhead Shrikes, the following options were discussed.

Based on the current project timeline that identifies a construction start date in winter 2010-2011, the feasibility of conducting a supplemental pre-construction survey is not likely. However, given the known Loggerhead Shrike usage in the project area, the DNR has recommended post-construction surveys in the event that pre-construction supplement sampling is not feasible. Coordination with the proposer on the details for post-construction surveys will continue as the proposed project progresses.

UMore Park Wind Turbine
Loggerhead Shrike Comments
October 7, 2010 - Page 2

Comments included in this letter reflect concerns noted specifically for the Loggerhead Shrike. No other resources were included in this discussion. Further comments will be provided during the environmental assessment comment period if such comments are necessary.

Please feel free to contact me at 651-259-5738 or by e-mail at melissa.doperalski@state.mn.us with any questions.

Thank you,

Melissa Doperalski
Region Environmental Assessment Ecologist

Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401-3393

October 29, 2010

Mary Ann Heidemann
Manager of Government Programs and Compliance
Minnesota State Historic Preservation Office
Minnesota Historic Society
345 Kellogg Blvd. W.
St. Paul, MN 55102-1903

Subject: University of Minnesota Outreach and Education (UMore) Park Wind Energy Project (T 115 R19 S25 S36, Dakota County, SHPO Number 2010-3249)

The University of Minnesota and their contractors have completed two additional studies needed to evaluate the potential impacts on historic properties of installing a 2.5-megawatt turbine at UMore Park. The final reports from those studies are attached for your review.

One of those two studies was a Phase I review of structures and landscapes within the one-mile-radius area of potential effects (APE) that are associated with the Minnesota Agricultural Experiment Station (MAES). That study concluded that no structures or landscape features within the APE have been used in association with the MAES.

As part of that study, two structures (DK-RSC-031 and DK-RSC-032) were identified within the APE that were used as part of the Rosemount Aeronautical Research Laboratory and that have not been formally evaluated for listing in the National Register of Historic Places (NRHP) for their association with the laboratory. However, a preliminary evaluation of the significance of those and other structures on the UMore Park was conducted using National Register criteria as part of the 2006 *Historical Interpretation and Preservation Plan for UMore Park*. That study concluded that the Rosemount Aeronautical Research Laboratory complex lacks historic integrity due to the loss of Gopher Ordinance Works Building 302-A and that the structures therefore were not recommended as eligible for listing in the NRHP (page 9 of Lauber 2006. *A Historical Interpretation and Preservation Plan for UMore Park*. University of Minnesota). Based on that evaluation, DOE has determined that no further evaluation of those structures is required for this project, and requests concurrence from your office on that decision. Please let me know if you require a copy of the 2006 UMore Park report.

The second study included a Phase I evaluation of 36 properties 50 years of age or older that are within the one-mile-radius APE and that had not been previously inventoried and evaluated for listing in the NRHP. That study also included a Phase II evaluation of one property, the Edmund H. Knodt Farm, which had been previously recommended as potentially eligible for listing in the NRHP (DK-RSC-024), but for which additional research was recommended. As described in the attached report, the authors of that study concluded that the 36 properties are recommended as not eligible for listing in the NRHP due to a loss of historic integrity and/or a lack of historical significance, and that no additional work is recommended prior to construction. That study also concluded that Edmund H. Knodt Farm (DKRSC-024), is recommended as eligible for listing in the NRHP

DOE has conducted an evaluation of the potential indirect impacts of installing and operating the wind turbine and associated meteorological tower on the Knodt Farm, and has concluded that the project would not adversely affect that historic property. DOE has reached that conclusion based on the following.

- The presence of the turbine and tower would not directly affect the integrity of the buildings and structures on the farmstead, which are the primary features that characterize the historic property.
- The turbine and meteorological tower would be 0.65 miles from the farmstead. At that distance, the top of the turbine tower and the nacelle, which are the most visible aspects of the project, would be about 5 degrees above the horizon. The meteorological tower and the top of a vertical blade would be about 8 degrees above the horizon. Although these structures would be clearly visible from the farm, they would not visually dominate the landscape. Therefore, the project would not introduce a visual element that that would further diminish the integrity of the property's significant historic features.
- There are at least two non-historic vertical features near the farmstead, a freestanding truss antenna tower and a concrete water tower, that have about the same relative height as the proposed turbine tower and nacelle. The 145-foot tall water tower is located just to the north of the farmstead property, and the 220-foot tall antenna is 0.6 miles to the northwest of the property. These structures are shown in figures 70 and 71 of the Phase I and II Architectural History Survey Report. Other non-historic features, such as the Pipe Bend Refinery and transmission lines are also visible from the farmstead. In addition, there is a well-traveled four-lane highway on the western edge of the property. Thus, the historic characteristics of the area surrounding the property have been visibly altered.

In your letter of September 14, 2010, you pointed out inconsistent information presented to your office about the height of the turbine. The University is considering mounting the turbine on either a 262-foot or 328-foot-tall tower. Combined with the 164-foot-long turbine blades, the total height of the turbine would be either 426 or 490 feet. All information presented in this letter is based on the height of the taller tower.

DOE is requesting concurrence from your office on the conclusions and decisions described in this letter. Please contact me if you have any questions or require additional information. I can be reached at 720-356-1322 or by email at Laura.Margason@go.doe.gov.

Sincerely,

Laura Margason

Laura Margason
DOE NEPA Specialist/Document Manager

Attachments:
Phase I and II Architectural History Survey Report
Phase I Architectural History Review for the Minnesota Agricultural Experiment Station

Minnesota Historical Society

STATE HISTORIC PRESERVATION OFFICE

November 30, 2010

Ms. Laura Margason
DOE NEPA Specialist/EA Document Manager
Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, CO 80401-3393

RE: University of Minnesota UMore Park Wind Energy Project
T115 R19 S25 & S36, Dakota County
SHPO Number: 2010-3249

Dear Ms. Margason:

Thank you for sending the additional follow-up materials concerning the above project. It has been reviewed pursuant to the responsibilities given the State Historic Preservation Officer by the National Historic Preservation Act of 1966 and the Procedures of the Advisory Council on Historic Preservation (36CFR800).

We appreciate receiving the survey information on the Minnesota Agricultural Experiment Station, as well as all the inventory forms for properties within the revised Area of Potential Effect, greater than 50 years of age. We concur with your determination that neither the MAES site, nor any of the additional surveyed properties are eligible for listing in the National Register, with the exception of the Edmund. H. Knodt Farm.

If you have not already done so, please print out a set of inventory forms with each site on a separate sheet. The review copy that came to me had the inventory sheets printed back-to-back, making it impossible to file the site information separately.

We concur with your determination that **the Edmund H. Knodt Farm is eligible for listing in the National Register of Historic Places.** However, we disagree regarding effect. We find that the construction of the wind turbine project within the clear viewshed of the Knodt Farm, does in fact constitute an adverse effect, because it alters the visual setting of the farm, and introduces visual elements that are not associated with the period of significance for this site.

Please notify the Advisory Council of the adverse effect. We will be happy to work with you to minimize or mitigate the adverse effect of this project. At minimum, documenting the Edmund H. Knodt Farm per the Minnesota Historic Property Record guidelines (Level II) would be requested. Much of the needed narrative information for documentation has already been assembled during the site survey process.

Please contact me at (651) 259-3456 if you have any questions regarding our review of this project.

Sincerely,

Mary Ann Heidemann, Manager
Government Programs & Compliance

cc: Jim Litsheim, University of Minnesota, Capital Planning & Project Management

Minnesota Historical Society, 345 Kellogg Boulevard West, Saint Paul, Minnesota 55102
651-259-3000 • 888-727-8386 • www.mnhs.org

Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401-3393

VIA UNITED PARCEL SERVICE

December 10, 2010

Ms. Charlene Dwin Vaughn, AICP
Assistant Director
Federal Permitting, Licensing and Assistance
Office of Federal Agency Program
Advisory Council on Historic Preservation
1100 Pennsylvania Avenue NW, Suite 803
Washington, DC 20004

Subject: University of Minnesota Outreach and Education (UMore) Park Wind Energy Project (T 115 R19 S25 S36, Dakota County, SHPO Number 2010-3249)

Dear Ms. Vaughn,

This letter constitutes a notification to the Advisory Council on Historic Preservation (ACHP) that the U.S. Department of Energy (DOE) may result in an adverse affect on an eligible historic property for the University of Minnesota UMore Park Wind Energy Project. Please consider this a formal invitation to participate in consultation if ACHP requests. DOE is currently in consultation with the Minnesota State Historic Preservation Office to resolve this issue and determine if mitigation measures can be agreed upon. DOE will keep ACHP informed of the outcome of this issue and involve ACHP as necessary. Please see the attached requisite documentation as specified in 36 CFR 800.11(e).

Sincerely,

Derek G. Passarelli
Acting Deputy Manager and Chief Counsel
U.S. Department of Energy
303-275-4798
derek.passarelli@go.doe.gov

Enc.

Federal Recycling Program Printed on Recycled Paper

Preserving America's Heritage

December 21, 2010

Mr. Derek G. Passarelli
Acting Deputy Manager and Chief Counsel
U.S. Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, CO 80401-3393

Ref: *University of Minnesota Outreach & Education Park Wind Energy Project (T 115 R19 S25 S36) Dakota County, Minnesota*

Dear Mr. Passarelli:

On December 10, 2010, the Advisory Council on Historic Preservation (ACHP) received your notification and supporting documentation regarding the adverse effects of the referenced undertaking on a property or properties listed or eligible for listing in the National Register of Historic Places. Based upon the information you provided, we have concluded that Appendix A, *Criteria for Council Involvement in Reviewing Individual Section 106 Cases*, of our regulations, "Protection of Historic Properties" (36 CFR Part 800), does not apply to this undertaking. Accordingly, we do not believe that our participation in the consultation to resolve adverse effects is needed. However, if we receive a request for participation from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer, affected Indian tribe, a consulting party, or other party, we may reconsider this decision. Additionally, should circumstances change, and you determine that our participation is needed to conclude the consultation process, please notify us.

Pursuant to 36 CFR §800.6(b)(1)(iv), you will need to file the final Memorandum of Agreement (MOA), developed in consultation with the Minnesota State Historic Preservation Office (SHPO), and any other consulting parties, and related documentation with the ACHP at the conclusion of the consultation process. The filing of the MOA, and supporting documentation with the ACHP is required in order to complete the requirements of Section 106 of the National Historic Preservation Act.

Thank you for providing us with your notification of adverse effect. If you have any questions or require further assistance, please contact Mr. Lee Webb at 202-606-8583 or at lwebb@achp.gov.

Sincerely,

LaShavio Johnson

LaShavio Johnson
Historic Preservation Technician
Office of Federal Agency Programs

ADVISORY COUNCIL ON HISTORIC PRESERVATION

1100 Pennsylvania Avenue NW, Suite 803 • Washington, DC 20004
Phone:202-606-8503 • Fax: 202-606-8647 • achp@achp.gov • www.achp.gov

MEMORANDUM OF AGREEMENT

A MEMORANDUM OF AGREEMENT AMONG THE UNITED STATES DEPARTMENT OF ENERGY, THE MINNESOTA STATE HISTORIC PRESERVATION OFFICE, AND THE UNIVERSITY OF MINNESOTA,

REGARDING The UMore Park Wind Energy Project at T115 R19 S25 & S36, Dakota County

WHEREAS, the United States Department of Energy (DOE) plans to authorize expenditure of funding to the UMore Park Wind Energy Project pursuant to the Wind and Hydropower Technologies Program authorized by the Energy Policy Act of 2005, Sec. 931(a)(2)(B) (Public Law 109-58) and appropriated by the American Recovery and Reinvestment Act of 2009 (Public Law 111-5); and

WHEREAS, DOE has determined that projects funded by the above program are undertakings subject to review under Section 106 of the National Historic Preservation Act, 16 U.S.C 470f (NHPA) and its implementing regulations at 36 CFR part 800; and

WHEREAS, the University of Minnesota is receiving financial assistance from DOE to carry out part of the Wind and Hydropower Technologies Program. DOE initiated Section 106 compliance in accordance with 36 CFR 800.2(a); and

WHEREAS, the University of Minnesota proposes to construct a wind turbine, a meteorological tower and an interconnect line at T115 R19 S25 & S36, Dakota County; and

WHEREAS, DOE, in consultation with the Minnesota State Historic Preservation Office (SHPO), has determined that the Area of Potential Effects (APE) for this undertaking is a one mile radius area surrounding the project; and

WHEREAS, the Edmund H. Knodt Farm (DK-RSC-024) is eligible for listing in the National Register of Historic Places; and

WHEREAS, the DOE in consultation with the SHPO pursuant to 36 CFR 800.2(a)(4) has determined that the undertaking may have an adverse effect on the Edmund H. Knodt Farm; and

WHEREAS, in accordance with 36 CFR 800.6(a)(1), DOE has notified the Advisory Council on Historic Preservation (ACHP) of its potential adverse effect determination with specified documentation and the ACHP has chosen not to participate in the consultation pursuant to 36 CFR 800.6(a)(1)(iii); and

WHEREAS, DOE has invited the University of Minnesota to participate in this consultation and to sign this Agreement as an invited signatory and the University of Minnesota has elected to participate; and

NOW THEREFORE, in order to satisfy DOE's Section 106 responsibilities to take into account the effects of the undertaking on historic properties, DOE and the SHPO agree that the undertaking shall be implemented in accordance with the following stipulations:

STIPULATIONS

DOE, in cooperation with the University of Minnesota, shall ensure that the following stipulations are met:

I. DETERMINATION OF ADVERSE AFFECT

DOE finds that the construction of the UMore Park wind turbine may have an adverse affect on the Edmund H. Knodt Farm. The Edmund H. Knodt Farm is recommended as eligible for listing in the NRHP under Criterion A at the local level in the area of agriculture for its association with the Country Life Movement in Minnesota, which sought to improve conditions and the viability of Minnesota farms. Edmund H. Knodt was a pioneer in implementing the principals and practices promoted by this movement to improve the productivity of his farm, especially his dairy operation. The Farm also has significance at the local level under Criterion B in the area of agriculture for its association with the significant contributions of Edmund H. Knodt to the advancement of the dairy industry in Minnesota in the early and mid-twentieth century.

The Edmund H. Knodt Farm is approximately 181.68 acres and is comprised of two houses, two dairy barns, and numerous outbuildings. The farmstead principally acquired its present form and buildings during the period in which it was associated with Edmund H. Knodt. For this period, the Farm retains good integrity in terms of location, setting, feeling, and association. All of the buildings and structures on the farmstead, except for the original 1967 house, have generally good integrity in terms of design, materials, workmanship, feeling, and association.

The proposed 2.5 MW wind turbine will be located approximately 0.65 miles from the Farm. The proposed turbine will be directly visible from the Farm, which is separated from the Farm by a cornfield and Highway 52, neither of which would provide any screening for the turbine. The total height of the wind turbine would be a maximum of 426 feet tall. The meteorological tower's height would be 426 feet tall. The meteorological tower and top of a vertical blade would be about 8 degrees above the horizon.

Given the height of the proposed turbine, construction of the turbine will introduce a visible and prominent feature into the landscape as viewed from the front (west) of the Farm. Since the proposed turbine will be significantly taller and its blades wider than other features found on the landscape, it will be out of scale with the surrounding

landscape, which may potentially alter the setting and feeling of the landscape and the farm. Therefore, the construction of the proposed turbine has the potential to result in an indirect adverse visual affect to the Edmund H. Knodt Farm.

II. RECORDATION OF PROPERTY

University of Minnesota will:

A. Within 120 days of execution of this Agreement, the University of Minnesota shall collect all information to provide adequate documentation of the Edmund H. Knodt Farm following the Minnesota Historic Property Record Guidelines (Level II). The guidelines require a brief narrative describing the historic property, its history, and pertinent historical, architectural or engineering data. Photocopies of historic photographs shall be used to help illustrate the historic property. The documentation should also include a bibliography as described in the Guidelines. The University of Minnesota must follow the Guidelines for the appropriate format, information requested, and submittal procedure.

B. The University of Minnesota shall submit the appropriate documentation to the SHPO for review and approval. The SHPO shall advise the University of Minnesota within 30 days of receipt if the submitted documentation is satisfactory or request specific revisions. The SHPO shall also advise the University of Minnesota if any revised documentation is to be submitted to SHPO for a 30-day review. Upon SHPO final acceptance of the complete documentation package, the construction of the wind turbine project may proceed.

III. DURATION OF AGREEMENT

This Agreement will continue in full force and effect until one (1) year after the date of the last signature. At any time in the three-month period prior to such date, any party to this Agreement may request the other signatory parties to consider an extension or modification of time for this Agreement. No extension or modification of time will be effective unless all parties to the Agreement have agreed with it in writing.

IV. DISPUTE RESOLUTION

A. Should any party to this Agreement object in writing to DOE regarding any action carried out or proposed with respect to this Agreement or to implementation of this Agreement, DOE will consult with the objecting party to resolve the objection.

B. If after initiating such consultation, DOE determines that the objection cannot be resolved through consultation, DOE shall

1. Forward all documentation relevant to the dispute, including DOE's proposed resolution, to the ACHP. The ACHP shall provide DOE with its advice on the resolution of the objection within thirty (30) days of receiving adequate documentation. Prior to reaching a final decision on the dispute, DOE shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP and Signatories, and provide them a copy of this written response. DOE will then proceed according to its final decision.

C. Should the ACHP not provide its advice regarding the dispute within the thirty (30) day time period, DOE may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, DOE shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories to the Agreement, and provide them and the ACHP with a copy of such written response.

D. At any time during implementation of the measures stipulated in this Agreement, should an objection pertaining to this Agreement be raised by a member of the public, DOE shall notify the parties to this Agreement and take the objection into account, consulting with the objector and, should the objector so request, consult with the parties to this Agreement to resolve the objection. If DOE determines that the public objection cannot be resolved through consultation, DOE shall follow the procedure outlined in Section IV. B.1 and C.

E. DOE's responsibility to carry out all other terms of this Agreement that are not the subject of the dispute remain unchanged.

V. AMENDMENTS

A. This Agreement may be amended when such an amendment is agreed to in writing by all signatories. The amendment will be effective on the date a copy signed by all of the signatories is filed with the ACHP.

VI. TERMINATION

A. If any signatory to this Agreement determines that its terms will not or cannot be carried out, that party shall immediately consult with the other parties to attempt to develop an amendment per Stipulation VI, above. If within thirty (30) days an amendment cannot be reached, any signatory may terminate the Agreement upon written notification to the other signatories.

B. Termination shall include the submission of a technical report or other documentation by the University of Minnesota on any work done up to and including the date of termination.

C. Once the Agreement is terminated, and prior to work continuing on the undertaking, DOE must either (a) execute an Agreement pursuant to 36 CFR 800.6 or (b) request, take into account, and respond to the comments of the ACHP under 36 CFR 800.7. DOE shall notify the signatories as to the course of action it will pursue.

VII. EXECUTION OF AGREEMENT

This Agreement may be executed in counterparts, with a separate page for each signatory. DOE will ensure that each party is provided with a copy of the fully executed Agreement.

Execution of this Memorandum of Agreement by DOE and the SHPO and its submission to the ACHP in accordance with 36 CFR 800.6(b)(1)(iv), shall, pursuant to 36 CFR 800.6(c), be considered to be an agreement pursuant to the regulations issued by the ACHP for the purposes of Section 110(l) of the NHPA. Execution, submission, and implementation of the terms of this Agreement, demonstrates that the DOE has afforded the ACHP an opportunity to comment on the proposed undertaking and its effect on historic properties, and that the DOE has taken into account the effect of the undertaking on historic properties.

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SIGNATORIES:

UNITED STATES DEPARTMENT OF ENERGY
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY
GOLDEN FIELD OFFICE

By: _____ Date: 1/28/11
Derek G. Passarelli, Chief Counsel and Acting Deputy Manager

MINNESOTA STATE HISTORIC PRESERVATION OFFICE

By: _____ Date: 1/31/11
Britta Bloomberg, Deputy State Historic Preservation Officer

INVITED SIGNATORIES:

UNIVERSITY OF MINNESOTA

By: _____ Date: 1/21/11
Kathleen O'Brien, Vice President

Minnesota Historical Society

State Historic Preservation Office

March 1, 2011

Ms. Laura Margason
DOE NEPA Specialist/EA Document Manager
Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, CO 80401-3393

Re: Level II MHPR – Edmund H. Knodt Form
Rosemount, Dakota County
SHPO Number: 2010-3249MOA

Dear Ms. Margason:

We have received and reviewed the final Minnesota Historic Property Record for the Edmund H. Knodt Farm in Rosemount, Minnesota and find the materials acceptable. This documentation was prepared in accordance with Stipulation II of the Memorandum of Agreement for the Umore Park Wind Energy Project. The terms of the agreement have now been fulfilled. We appreciate the work and effort that went into the preparation of this documentation.

Sincerely,

Kelly Gragg-Johnson

Kelly Gragg-Johnson
Review & Compliance Associate
MN SHPO

cc: Jim Litsheim, University of Minnesota
Amanda Gronhovd, 10,000 Lakes Archaeology, Inc.

Minnesota Historical Society, 345 Kellogg Boulevard West, Saint Paul, Minnesota 55102
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