



**NORTH DAKOTA PUBLIC
SERVICE COMMISSION**

TEN-YEAR PLAN

Chapter 49-22, NDCC

Energy Conversion and Transmission Facility Siting

**LOGAN COUNTY WIND FARM
A LARGE WIND ENERGY
CONVERSION SYSTEM**

**PREPARED BY
JUST WIND, LLC**

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July 2008

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A. INTRODUCTION

1. Overview

Just Wind, LLC is providing this information to meet the necessary requirements for our Interconnection Process, Environmental Impact Study, our financial obligations, our construction process, our engineering process and the North Dakota Century Plan. Just Wind plans to construct up to approximately 500 megawatts (MW) of nameplate wind power generating capacity (the "Development"). The total Development will consist of approximately 160 Siemens 93/2.3 wind turbine generators and associated collection system, including underground power collection lines, turbine access roads, underground telemeter communication lines, substation and any other equipment necessary for successful operation of the Development.

Available wind monitoring data analysis of 5 years done by 2 independent engineering firms indicates an excellent wind sources. The Development sites identified in this report are located in Glendale, Bryant and Starkey Townships in Logan County North Dakota. (Figure 1).

2. Development Summary

Development Description

Just Wind proposed to own, finance, construct, operate, maintain, and manage the Development near the town of Napoleon, North Dakota. The Development will utilize Siemens 93/2.3 MW wind turbines.

The total Development will be nominally rated at up to approximately 367 Mws and will consist of up to approximately 160 units of 2.3 MW wind turbines. The 2.3 MW wind turbines will be mounted atop free standing tubular towers. The towers will be 80 meters (262.46 feet) in height. The blades on the wind turbine are 46.2 meters (129.73 feet) long, resulting in a maximum overall height of the wind turbines of 126.2 meters (329.19 feet) when one blade is in the vertical position. The rotor diameter will be 93 meters (266.76 feet).

Proposed Site

The proposed Development site is located in Logan County, North Dakota, near the town of Napoleon. The Development site will be within three townships in Logan County: Glendale (T-136-N, R-72-W), Bryant (T-135-N, R-72-W), and Starkey (T-134-N, R-72-W) (Figure 1). Just Wind has obtained Lease Options and Wind Energy Lease Agreements. All turbines will be sited within the Development site boundary. The total Development site area including the wind plant and land leases is approximately 55,000 acres. The total Development consists of approximately 80 acres.

The Development site exhibit's a relative flat elevation to the surrounding land areas and an excellent wind exposure for optimum energy capture. An extensive wind resource assessment of 5 years has been performed in and around the Development site area by two independent wind engineering firms.

Figure 1 shows detailed maps of the Development site area including topography of the area, the project site boundaries, section numbers, county boundaries, existing roads, land use, soil types, other infrastructure, residence (county setbacks noted), it is important to emphasize that the depicted locations of these facilities, including but not limited to the wind turbines and access roads, are likely to change subsequent to further site study and planning activities by Just Wind.

Projected Output

Under estimated average wind conditions in the Development site, the 367 MW wind power plant will deliver approximately 1,507,457.1 megawatt hours (MWh) per year.

Siting Plan

The Development site is located in the relative southeastern part of North Dakota. Just Wind explored a number of prospective wind sites in the region and has run comparisons to select the site which offers the optimum advantages in terms of the available wind resource and ability to deliver power directly to the transmission system.

Spacing between the wind turbines is approximately 4.1 to 7.1 rotor diameters (RD). Extra land is available in the Development site to provide flexibility in final turbine placement. The turbines will be placed using the established County Zoning setback requirements from occupied residence and public roads. Turbines will not be located in wildlife management areas (WMAs), scientific and natural areas (SNAs), or Class 3, 4, or 5 wetlands.

Just Wind's engineers will attempt to maintain the required setbacks based on Logan County Zoning Ordinance or greater. Establishing a greater setback from homes allows for greater public acceptance within the Development site. Just Wind strives to create positive working relationships with homeowners within the Development site and feels the increased setback contributes to this.

Commercial Operation

The Development is anticipated to be fully commercially operational in part by December 2009 with the balance in mid 2010.

Operation and Maintenance

Just Wind plans to enter into a Maintenance Agreement with the Siemens Power Systems for the Operation and Maintenance of the Development for the 20-30 year minimum life of the project(s). Just Wind is also engaged in negotiations with Siemens to train local individuals in the Service and Maintenance of the 93/2.3 WTG.

Site Control

As of the date of this report, Just Wind has obtained Option Agreements and Wind Energy Lease Agreements with landowners for sufficient land within the Development site for the installation of the 367 MW Plant. Additional rights are being obtained for a Phase 2.

Permits and Licenses

Just Wind or its associates will undertake all required environmental review and obtain all permits and licenses that are necessary to complete the Development.

Development and Construction

Just Wind and/or its construction affiliate, will perform or manage all development and construction activities. Specifically, Just Wind and/or its affiliate will:

- Acquire land leases (Done)
- Install wind sensors (Done)
- Measure and analyze the wind resource and site the 2.3 MW wind turbines (Done)
- Undertake environmental review and obtain specific permits and licenses for the Development (In Process – Some Complete)
- Perform civil engineering for construction of the Development, construct foundations, towers, the power collection system and substation, assemble and install 2.3 wind turbines (In Process)
- Install the communication system, including supervisory control and data acquisition software and hardware
- Arrange project financing

3. Project Ownership

Just Wind proposes to own, finance, construct, operate, maintain, and manage the 367 MW wind power plant. The Development will be designed, constructed, operated and managed by Just Wind and/or its affiliates.

Just Wind will maintain ownership of the Development, but reserves the right to assign ownership to one or more institutions or other investors or project entities formed for that purpose.

a. **Just Wind**

Just Wind, LLC is a startup wind development company that is looking to undertake three core activities in the wind industry: development, operations and maintenance, and asset management services. At this time Just Wind is looking to develop two additional sites in North Dakota with plans to install wind monitoring equipment in the Spring of 2008.

B. DEVELOPMENT DESCRIPTION

Just Wind has developed this report to meet the necessary requirements of the North Dakota Century Plan, The North Dakota Administrative Code Article 69-06, North Dakota Conversion Facility Siting Overview NDCC Chapter 49-22, Jurisdictional Energy Conversion Facilities 49-22-03-(5), The North Dakota Transmission Facility Siting Overview, Jurisdictional Transmission Facilities 49-22-03. The Environmental Impact Study information request by the Western Area Power Administration (WAPA), our engineering groups, our financial group, and our construction group.

1. Development Layout

160 Turbine Project Layout from EAPC.

3. Associated Facilities

In addition to the 2.3 MW wind turbines, the Development also includes a system of gravel access roads that allow for easy accessibility to the wind turbines year round. These roads will be approximately 16 feet wide and low profile to allow cross-travel by farm equipment. Just Wind will work closely with the landowners to locate access roads in order to minimize land-use disruptions, and will install gates, when necessary, between access roads and public roads. The Development will also have a few permanent reference meteorological towers (met towers). The guyed towers will be up to 80 meters in height. They will be equipped with six anemometers and wind direction sensors at several levels. The total number of met towers required is expected to be 7, with the final number being determined during the final turbine siting process. As with the access roads, Just Wind will locate the met towers to have the least possible impact on farming operations.

4. Land Rights and Wind Energy Lease Agreements

Just Wind has obtained Option Agreements and Wind Energy Lease Agreements with landowners for land within the Development site boundary necessary for installation of the components of the wind power plant.

C. PROPOSED SITE

1. Site Boundaries

The proposed Development site is located in Logan County, North Dakota, near the town of Napoleon. At this time the Development site includes three townships, Glendale, Bryant and Starkey. The Development site boundaries are illustrated in Figure 1, which was generated from the U. S. 7.5 Minute Topographical Map Quadrangles: Alkaline Lake S W Quadrangle North Dakota Logan County, Burnstad Quadrangle North Dakota Logan County.

2. Wind Resource Consideration

Wind power plant production is determined by wind resource at the Development site. Just Wind has had the 5 years of collected wind data analyzed by two independent engineering firms, and based on that data a fifty year projection was completed to estimate the potential energy production for the Development. The projections are perceived to be accurate within 96%-98%. These projections include the project's annual, seasonal and monthly deliveries. By correlating site-specific characteristics with long term data from a location in the same wind regime, an estimate of the inter-annual variation of energy output has also been made.

3. Wind Characteristics of Logan County Wind Farm

Land use in the wind plant area is mainly agricultural and grazing activities and as a results, there are few trees or structures in the proposed Development site to retard the wind as it passes over the land.

All collected wind data has been subjected to standard quality assurance procedures.

a. Inter-annual Variation

The wind resource varies from year to year.

b. Seasonal Variation

On a seasonal basis, the wind speeds measured on the Development site are weakest in July and August and increase steadily during the fall. The strongest winds occur between November and May.

c. Hub Height Turbulence – Not Applicable

d. Climatic Data – Not Applicable

e. Wind Speed Frequency Distribution

Frequency distribution and has been integrated with the density corrected 2.3 power curve. Wind data at the Logan County Wind Farm Project area has been gathered since the year 2001. At the bottom of the table, the theoretical energy is normalized to 8760 hours (one full year). The term “normalized to 8760 hours” means that the production shown on the table represents the “average” year (or average 8760 hours) based on actual data from the site. The table also shows that the annual gross energy yield is 1,356,711.3 MWh per year. This is the estimated gross energy output for the 160 turbine location in the area of the Development site.

f. Wind Variation with Height – Not Applicable

g. Spatial Wind Variations

Analysis of meteorological site within the Development site area indicates that energy production is expected to vary within the site by a maximum of approximately 15 percent.

h. Wind Direction – Not Applicable

4. Other Meteorological Conditions

a. Temperature – Not Applicable

b. Extreme Weather

Thunderstorms occur on about 20 days each year. Tornadoes and severe thunderstorms strike occasionally. These storms are local in extent and of short duration. They result in sparse damage in small areas. Hail occasionally falls in scattered small areas during the warmer periods. Neither hail nor lighting from severe storms present a problem for operation of the proposed Development. Wind turbines; however, are not designed to survive tornado force winds in excess of 200 mph. In the winter, icing events are variable in frequency. It is expected that the average annual energy loss will be one percent due to icing.

5. Wind Plant Energy Productions

a. Proposed Array Spacing for Wind Turbines

Wind turbines are sited in clusters, or strings within the site boundaries. The wind turbines are site so as to have good exposure to winds from all directions, with emphasis on exposure to the prevailing northwesterly wind direction. Sufficient spacing between the turbines is utilized to minimize array wake loss.

Almost all turbine sites are above 1,750 feet above mean sea level in elevation and are considered prime wind locations by both engineering firms hired by Just Wind.

b. Base Energy Calculation

A representative wind speed frequency distribution adjusted for inter-annual wind variation and adjusted using the shear coefficient have been used to predict average annual output for 2.3 MW turbines at the Development site. This frequency distribution described above sets forth the percentage of time the wind will occur in each one-mile per hour wind speed bin on an annual basis. This frequency distribution is matched to the 2.3 MW power curve to estimate the gross energy production. Net output for each turbine, or the actual energy delivered to the substation, is calculated by applying various loss factors.

The net annual energy output is estimated to be approximately 9,421.6 MWh per turbine in the Project site.

c. Wind Power Plant Output Variability

The base energy calculation assumes a normal or average wind year. In order to show the magnitude of year-to-year variability in the proposed Development site output, a simulation of annual average output was developed using a long-term reference site and information provided by EAPC Architects and Engineers.

The maximum variation in energy has been within +/- 7 Percent. Based on this data, one would expect the annual variation in energy at the Development site to be within 10% of the mean during most years.

6. Efficiency of Proposed Plant Layout

Analysis from the Development site of wind direction data suggests that the optimal turbine string alignments are approximately from northwest to southeast. Individual, isolated turbine sites are avoided to minimize interconnect and access road costs. The wind turbines are sited so as to have good wind exposure to winds from all directions, with emphasis on exposure to the prevailing northwesterly wind direction. Sufficient spacing between turbines is utilized to minimize wake losses when the winds are blowing parallel to the turbine rows.

Greater or lesser spacing between the turbine strings was used in areas where terrain dictated the spacing. Setbacks for turbine siting will fall within the local zoning ordinances.

7. Sensitive Features

The sensitive features, human and natural, that may be impacted by the proposed wind power plant are further discussed in Section F of this report.

D. COST ANALYSIS

The following sections describe the cost-related implications of the Development as a means of assessing the suitability for development. The site specific wind resource, construction costs and operating costs have been considered.

1. Wind Plant Energy Output

The sole fuel for the proposed Development is wind, a clean and reliable energy source. Integrated into a utility fuel mix, wind is an excellent hedge against other fuel price risks, has no fuel transportation costs or environmental hazards and emits no pollutants (greenhouse gases) that would alter the climate. Along with wind, Just Wind is incorporating a Hydrogen Production Facility which would act as an energy storage system for back-up power in the event the wind isn't blowing.

The single most important factor affecting the price of wind generated electricity is the capital cost required to build the wind power plant. With zero "fuel" costs and essentially linear costs for ongoing operations and maintenance, the number of kilowatt-hours produced has a dramatic effect on the cost of wind generated electricity. Because a wind power plant's capital costs are fixed, the greater the number of kilowatt-hours produced the lower the cost per kilowatt-hour. For this reason, an accurate understanding of the wind resource is critical to the success of the Development.

The engineers and meteorologists hired by Just Wind have used an extensive meteorological database to develop accurate energy projections for the Development site wind resource and have produced reliable estimates of the proposed wind power plant's annual, seasonal and monthly deliveries based on several years of wind data collected within the Development site.

Net output for each turbine, or the actual energy delivered to the substation, is calculated by applying various loss factors. The net annual energy output is estimated to be approximately 9,421.6 MWh per turbine.

2. Capital and Operational Costs

The total installed capital costs for Just Wind's Development are estimated to be approximately \$850 million, including 2.3 wind turbines, associated electrical and communication systems, access roads, land leases, permitting, and other development costs. Ongoing operations and maintenance costs and administrative costs vary between years based on depreciation and other factors reflected in the financial projections and are estimated to be approximately between \$23 and \$70 million per year, including payment to landowners for wind leases and property taxes. The amount per year is anticipated to be roughly split between the operations and maintenance costs, landowner payments, and property taxes.

3. Site and Design Dependent Costs

The overall cost of developing the Development site depends primarily on site selection and construction timing. Site dependent costs will include: the relative ease of access to the individual wind turbine location; site specific subsurface conditions which determine foundation design; site access road design and layout, ease of plowing in electrical and communications cable; and the layout of the turbine arrays which governs underground cable placement. Underground cable will be employed in all areas of the Development to connect the individual wind turbine generators to transformers, communication enclosures, and feeder lines. The underground placement of cables along the wind turbine strings is preferable for land use and aesthetic purposes on all land.

E. Engineering and Operational Design and Analysis

MWT 93/2.3 (CONFIDENTIAL)

1. Wind Plant Electrical System

- a. Low Voltage System, Medium Voltage System (In Design)**
- b. Turbine to Substation Wiring Design & Routing (In Design)**

14.

2. Transmission Line and Interconnection

- a. **Description (In Process)**
 - b. **Design Standards (In Design)**
 - c. **Location of the Proposed Electrical Facilities**
- 3. Wind Plant Substation**
- a. **Grounding System (In Design)**
 - b. **Communication System (In Design)**
 - c. **kW Rating (In Design)**
(All In Design Items Will Be Furnished When Complete).
- 4. Wind Plant Operations**

The wind turbines, as well as certain circuit breakers, metering and meteorological equipment are monitored by a centralized SCADA system. The SCADA system is designed to: monitor the condition of the wind plant equipment, alert service technicians to any fault or alarm conditions and also record and sort data relating to availability, kWh production and turbine performance.

Generally, the project will be manned 5 days per week. At all other times, operations and maintenance personnel will be on-call, and equipped with remote monitoring and control capabilities as described below.

If a turbine faults off line or if a collection system circuit breaker trips, an error code is enunciated on the SCADA system, which then pages the on-call technicians who responds by physically going to the equipment to investigate or, if the fault occurs when no technician are on site, he can call up the SCADA from a portable laptop or other remote PC. Once connected to the SCADA System the technician can see more specifically what equipment has been faulted and the exact nature of the fault. The technician can also view current wind speed and production data to determine if an emergency visit to the wind plant is warranted.

5. Wind Plant Construction

a. Construction Management

Just Wind will perform the construction management services. Generally, Just Wind by itself or in coordination with local contractors, will undertake the following activities:

- Securing building, electrical, and grading permits
- Performing detailed civil, structural, and electrical engineering
- Scheduling execution of construction activities
- Completing surveying and geo-technical investigations
- Forecasting project labor requirements and budgeting

Just Wind also serves as the key contact and interface for subcontractor coordination. Just Wind oversees the installation of communication and power collection lines as well as the substation. Just Wind also oversees the installation of access roads, concrete foundations, towers, machines and blades, as well as the coordination of materials receiving, inventory distribution.

The proposed Development will be constructed under direct supervision of Just Wind's on-site construction manager with the assistance of local contractors. The construction consists of the following tasks:

- Site development, including access roads
- Foundation excavation
- Concrete foundations
- All electrical and communication installation
- Tower assembly and machine erection
- System testing

purchasing, construction, and quality control. Just Wind personnel will manage local subcontractors to complete all aspects of construction.

Throughout the construction phase, ongoing coordination occurs between the Project development and the construction teams. The on-site project manager helps to coordinate all aspects of the Project, including ongoing communication with local officials, citizens groups and landowners. Even before the Project becomes fully operational, the O & M staff is integrated into the construction phase of the Project. The Just Wind construction manager and O & M staff manager work together continuously to ensure a smooth transition from construction through wind power plant commissioning and, finally, operations.

b. Foundation Design

The free standing, tubular towers will sit atop a robust foundation designed for the specific soil conditions at the individual turbine site. Due to the wide array spacing of the turbines, a thorough investigation of the soil strengths and characteristics will be performed at each turbine site for optimization of the foundation designs for the Project. Preliminary soil samples indicates favorable soil conditions for turbine foundations.

c. Civil Works

Completion of the Development will require various types of civil works and physical improvements to the land. These civil works primarily include the following:

- Improvements of existing roads to the Development site
- The construction of access roads adjacent to the wind turbine strings to allow construction and servicing of the wind turbines
- Clearing and grading for wind turbine tower foundation installations
- Plowing underground cabling for connecting the individual wind turbines
- Installation of an on-site transmission line connecting the wind turbine strings for delivery to the electricity collection/metering location
- Installation of any site fencing and security

Any improvements to existing roads will primarily consist of re-grading and filling of the gravel. Access roads will be constructed along each turbine string, approximately parallel to the wind turbines. Siting roads in areas with unstable soil will be avoided wherever possible. All access roads will include appropriate drainage and culverts while still allowing for crossing of farm equipment. The access roads will be approximately 16 feet wide and will be covered with road base designed to allow passage under inclement weather conditions.

The Development will be commissioned after completion of the construction phase. Acceptance of the five major subsystems (turbines, communication system, meteorological system, high voltage collection and distribution system, and wind power plant SCADA System) that comprise a wind power plant and the wind power plant as a whole is achieved through detailed inspection and testing procedures. The manufacturer's inspection criteria applicable to wind power plant components augment this process as wind power plant acceptance is dependent upon the cooperation of each component within the major wind power plant subsystems.

6. Operations and Maintenance

Just Wind will enter into a long term agreement to operate and manage the Project. Just Wind will be responsible for daily operations. Just Wind is in negotiations with Siemens for a long term maintenance contract that includes labor, part, and availability. Also, Just Wind is having negotiations with Siemens to train approximately 12-20 full time site technicians and a Wind Power Plant Supervisor. The site technicians will be responsible for performing daily plant checks and resets as well as scheduled and non-scheduled maintenance.

Generally, the project will be manned five days per week. At all other times, operations and maintenance personnel will be on-call, equipped with remote monitoring and control capabilities as described below.

a. Site Control and Data Acquisition (SCADA) System

The wind turbines, as well as certain circuit breakers, metering and meteorological equipment are monitored by a centralized SCADA system. The SCADA system is designed to: monitor the condition of the wind plant equipment, alert service technicians to any fault or alarm conditions and also record and sort data relating to availability, kWh production and turbine performance.

If a turbine faults off line or if a collection system circuit breaker trips, an error code is enunciated on the SCADA system, which then pages the on-call technicians who responds by physically going to the equipment to investigate or, if the fault occurs when no technician are on site, he can call up the SCADA from a laptop or other remote PC. Once connected to the SCADA System the technician can see more specifically what equipment has been faulted and the exact nature of the fault. The technician can also view current wind speed and production data to determine if an emergency visit to the wind power plant is warranted. As required or deemed appropriate, remote access to the SCADA system can be made available to the local utility and the turbine manufacturers.

b. Maintenance Schedule

The project will require scheduled maintenance of individual wind turbines, the transmission facilities, and the site improvements (roads, gates, fences, etc.). Estimates of the duration and scheduling of the maintenance activities are based on manufacturers experience and recommendation. Scheduled maintenance of the wind turbines and transmission facilities will be completed whenever possible, at times when the wind speed at the site is insufficient for the Project to produce power.

c. General Maintenance Duties

Each wind turbine requires periodic scheduled maintenance in accordance with schedules and procedures required by the turbine manufacturers. Generally, scheduled maintenance is conducted in two separate inspections at approximately six-month intervals. On average the turbines will require 40 to 50 person hours of scheduled mechanical and electrical maintenance per year. Usually, no more than two turbines are being serviced at any one time. In our case, due to the fact we have additional electrical production based on our Hydrogen System, if necessary we can service more turbines. Another advantage the Development has is the opportunity to extend the operating life of the turbines by rotating machines during any possible curtailment process.

In addition to the turbine manufacturer supplied O & M Manuals, Just Wind will develop extensive tracking and documentation procedures and systems which enhance its ability to optimize scheduling, track labor and parts usage and analyze parts failure and trending.

Just Wind plans to employ a staff of highly experienced personnel who will be well versed in maintenance and repair procedures of the type of electrical equipment anticipated for the Development, with a particular emphasis on preventative and predictive maintenance testing and procedures.

Just Wind will coordinate the timing cycle for service of high voltage and low voltage collection system equipment with any scheduled outages planned by the purchasing utility. If coordination of these service activities in conjunction with the purchasing utility is deemed impractical, Just Wind will attempt to schedule service outages during low wind periods. Just Wind will provide data that may be required by the purchasing utility to respond to information requests from the following: MAPP, MERC, ISO, and RTO guidelines.

subcontractors with a representative from the purchasing utility present, and a written report verifying calibration will be submitted to the purchasing utility.

The Preventative Maintenance Schedule includes, but not limited to, inspections of the following:

- Switch cupboards (door and floor plate and cable clamps) on an annual basis.
- Control box/top cabinets (sensors, emergency stop switch) on a semi-annual basis and the safety chain with centrifugal switch on an annual basis.
- Low Tension Main Distribution (power switch) on a semi-annual basis.
- Converter Cabinets (low tension part, power switch, network contact) on an annual basis.
- Tower components including climb protection and resting platforms on an annual basis.
- Wind direction tracking (gliding areas, yaw drive, yaw position sensor, cable torsion safety switch, slide bearing, wind flag, anemometer) on a semi-annual basis.
- Rotor blades, external on a semi-annual basis and blade fastenings on an annual basis.
- Machine strap on an annual basis.
- Pitch motors on an annual basis.

22.

- Pitch adjustment (pitch gearing, position switch) on an annual basis and switch

cupboards on a semi-annual basis.

- Nose cone (general, entry to hub) on an annual basis.
- Drive land (pillow block, Shaft, gear box, oil cooler, decoupling for structure-borne noise, coupling, decoupling for generator) on an annual or semi-annual basis depending on the component.
- Generator and a semi-annual basis.
- Braking hydraulics unit (brake disc, coatings, and calipers) on an annual or semi-annual basis depending on the component.
- Hydraulics (valves, hydraulics tubes, control block, pipe work, hydraulic oil) on a semi-annual basis.
- Cable in the machine head and in the tower on an annual basis.

d. Operation/Maintenance Facility

The operation and maintenance facility will be located near Napoleon, North Dakota with a preference of an on-site facility.

The Facility will be located in the new Renewable Energy Center. It will provide a shop for the Operation and Maintenance Staff, the SCADA System and performing operation and maintenance functions. In addition, there will be an outside fenced-in area for storage of equipment and other material to be used at the Project site.

a. Land Acquisition

Land Option Agreements and Wind Energy Lease Agreements with landowners is being completed by Just Wind.

b. Permits

Just Wind will be responsible for undertaking all required environmental review and will obtain all permits and licenses that are required.

c. Equipment Procurement, Manufacture Delivery

Equipment procurement and turbine manufacturing will be started prior to commencing construction of the wind power plant and will be completed concurrently with the phased completion of other project construction.

d. Detailed Design Cycle

Just Wind will be responsible for completing all site design work determining the optimum wind turbine configuration.

e. Construction

Just Wind along with its construction subcontractor will be responsible for completing all wind power plant construction, including roads, 2.3 MW wind turbines, electrical and communications work. The construction of road, turbine foundations, and electrical collection system is anticipated to begin as early as the fall of 2008 and take approximately four (4) months to complete. The erection of the turbine towers is anticipated to begin after installation of the roads, turbine foundations and electrical collection system. The nacelle installation is expected to immediately follow and take approximately three (3) months to complete.

f. Construction Financing

Just Wind will be responsible for financing all pre-development, development and construction activities. Just Wind Anticipates financing the cost of all pre-development activities through independent construction financing.

g. Permanent Financing

Just Wind anticipates obtaining permanent financing from an institutional lender and/or other institutional investors prior to commercial operation of the wind plant.

h. Expected Commercial Operations Date

The commercial operation date of the proposed wind power plant will be phased in over a (2) two month period, with segments of the wind plant coming on line in stages. Full wind power plant commercial operation is anticipated to be achieved by December 31, 2008.

8. Decommissioning and Restoration

a. Estimated Decommissioning Costs

All necessary decommissioning cost are included in the project budget.

b. List of Decommissioning Activities

Decommissioning activities include the removal of the following: (i) all turbines, blades, towers, transformers, and transformer foundations, (ii) all turbine hardware and protrusions such as anchor bolts and tower levelers, with turbine foundations to be removed to the depth of 48 inches below the natural surrounding grade, and (iii) all above-ground wiring and electrical transmission lines.

c. Method for Ensuring that Funds are Available for Decommissioning

Decommissioning funds will be set aside as a specific budget item. A set-aside guarantee will be executed on behalf of the Project with an independent administrator of such funds. A periodic review of that fund will be conducted. During year 20 of operation of the wind power plant, approximately \$5,000 per turbine will be set aside for decommissioning if necessary.

d. Method for Updating that Funds are Available and Updating Decommissioning Costs

The independent administrator will report annually to the Project on the status of decommissioning funds. The Project will report every 3 years to the independent administrator with an updated budget for the cost of decommissioning the plant in current-year and decommissioning-year dollars.

This section provides a description of the environmental conditions, which exist at the Development site. Consistent with the various agencies regulations, various exclusion and avoidance criteria have been taken into account in the section of the project area from a large study area. To support this siting process, surveys and studies of the Development site were undertaken to assess the presence or absence of the following:

- National and state parks, wildlife refuges, wilderness areas, monuments, historic sites, and districts and special designation river ways and trails.
- State wildlife management, scientific and natural areas.
- Nature conservancy preserves.
- County and municipal parks
- Registered historic sites and districts
- Prime farmlands
- Wetlands
- Avian nesting areas and migration routes
- Streams
- Residences

1. Demographics/Homes

a. Site Description of Resources

The proposed Development is located within a lightly populated rural area in southeastern North Dakota. The Development site is located in Logan County, North Dakota. Information on demographics and housing for this section was taken from the U. S. Census Bureau. The population in Logan County has decreased by an estimate 2.0 percent since 2000. There is indication of no new residential construction occurring in the site area. The estimated 2004 population is 2099.

b. Impacts

Demographics and residences are anticipated to be affected by the proposed construction and operation of the wind power plant.

c. Mitigative Measures

Just Wind purposes to use the required setbacks established by the Logan County Zoning Ordinance from occupied homesteads, public roads, and adjacent property of landowners not involved in the Project.

d. Occupancy Status of Structures

There are approximately forty-five (45) homesteads within the Development site.

2. Noise

Noise consultants have recommended a maximum noise threshold of 45dBA at occupied homes. To facilitate planning for this guideline, the manufacturer has created simulations verified by independent testing of noise emissions from the 2.3 MW turbine. Results indicate source noise from turbine at hub height to be 104dB. Uncertainty is +/-2dB for results. The distances of 1,000 feet noise will meet the industry standard of 45 dBA at all occupied homes in the project site.

a. Site Conditions

Background noise levels in the Development site area are typical of those in rural settings, where decibel levels are commonly in the low to mid-30 decibels (dBA). These ratings are relatively low background levels and generally representative of the Project site. Higher levels exist near main roads and other areas of human activity. In addition, the windy conditions in this region tend to increase ambient noise levels compared to other rural areas.

b. Impact

The wind turbines will be sited so as to comply with or to exceed the existing noise standards established by the North Dakota Pollution Control Agency. The maximum noise levels for the Development, as measured at all occupied residences, will be no greater than 45 dBA with no discernible pure tones.

c. Mitigative Measures

Setbacks will be established where the wind turbines will be sited according to the Logan County Zoning Ordinance so as to create a setback or buffer to minimize noise.

a. Site Description

The Development site for the proposed Project is visually dominated by agricultural fields, farmsteads, fallow fields and large open vistas. The landscape can be classified as rural open space with gently rolling topography. Local vegetation in the area is predominantly pasture with varying crops of corn, sunflower, small grain and forage crops, creating a low uniform cover. Farmsteads are typically surrounded by a mix of deciduous and coniferous trees planted for windbreaks. In the swales, there is occasional riparian growth of native willows, cattails, sedges, and rushes.

The settlements in Logan County are residences and farm buildings (occupied and unoccupied) scattered along rural township and county roads. These structures are focal points in the dominant open space character of the vicinity.

At close range the turbines will be visible from local county, township and state roads adjacent to the wind plant. All of these local two-lane roads carry limited amounts of traffic, of which most is local. In the general Development area there will be intermittent expansive views of the area.

b. Impact

The placement of up to 160 turbines with the potential for 210 will have some impact on the area's visual quality. However, visual effect is primarily based on a subjective human response. The wind power plant will most likely have a combination of effects on the visual quality/rural character of the area. From one perspective, the proposed Development site might be perceived as a visual intrusion on the natural aesthetic value of the landscape, characterized as tubular steel structures, standing on formerly undisturbed ridgelines.

On the other hand, wind plants have their own aesthetic quality, distinguishing them

from other non-agricultural land uses. First, the wind plant does not generate much traffic or significantly increase day-to-day human activity in the area. Therefore, the Development site will retain the rural nature of the area. Second, although “industrial” in form and purposes, wind turbines are essentially “farming” the wind for energy. The proposed land use would not involve any ongoing use of non-renewable resources or emissions into the environment. Fossil fuels will not be refined, transported, or burned for the production of electricity. Emissions of toxic substances will not be produced by the wind plant. Although the turbines are “hi-tech” in appearance, they are compatible with the natural environment and rural area.

c. Mitigative Measures

The following are proposed mitigative measure:

- Wind turbines and turbine access roads will not be located in Nature Conservancy Land, State Wildlife Management Areas, or Scientific and Natural Areas. However, some turbine locations might be in native prairies. In accordance with state and federal guidelines.
- Turbines will not be located in biologically sensitive areas such as wetlands or relic prairies.
- Turbines will be illuminated according to FAA regulations.
- Existing roads will be used for construction and maintenance where possible. Road construction will be minimized.
- Access roads created for the wind power plant will be located on gentle grades to minimize visual cuts and fills.
- Temporarily disturbed areas will be reseeded to blend in with existing vegetation.
- Any local road damage will be repaired.

a. Description of Resources

The proposed Development is located in a lightly populated, rural area in southeast North Dakota. There is an established transportation and utility network, which provides access and necessary services to the light industry, small cities, homesteads, and farmsteads in the area.

Electrical Service. Electrical service in the area is shared by Montana Dakota Utilities and the local Rural Energy Co-ops.

Traffic Routing. The major traffic routes to and from the Development site include North Dakota State Highways 3 and 34. In addition, there are several county, township, and section line roads that provide access to the Development site, including two-lane paved and gravel roads and minimum maintenance roads. In the agricultural areas, many landowners use single-lane farm roads and driveways on their property.

Water Supply. The proposed wind power plant is not connected to a municipal water supply system. Wells provide the water needed for human consumption, farming, commercial and industrial use, except in the local towns. The proposed Hydrogen Production Facility and Renewable Energy Center will have their own well systems.

Sanitary Sewer. Sanitary sewer systems are only available to the residences commercial, and industrial operations located within the cities near the proposed Development site. The occupants residing within the Development site have individual septic systems to handle their sanitary wastes. This will be the same for the Hydrogen Production Facility and the Renewable Energy Center.

Railroad. A railroad runs northwest to southeast, just south of the Development site. It

is the intentions of Just Wind to use a staging area adjacent to the railroad for the off loading of the nacelles. That negotiation is taking place with the turbine manufacturer.

Telephone. Service is provided by BEK Communications to the cities, rural developments, and homes in the proposed vicinity of the Development site. BEK will be the main communications network for the Development.

Radio Towers. There is the potential of one (1) radio tower to be located in the Development site.

Radar. There are no radar sites within or anywhere near the Development site. An FFA study will be required due to height regulations.

b. Impacts

The proposed wind power plant is expected to have a minimal effect on the existing public services and infrastructure. The following is a brief description of the impacts, which may occur during the construction, operation, and maintenance of the wind power plant.

Electrical Service. Construction of the project will add the following facilities to the existing electrical service in the proposed Development site: up to 160 2.3 MW turbines and associated power collection system, including power collection cable. Approximately/estimated that 150 miles of underground cable will be installed.

The power generated by the wind turbines and collected at the substation will be routed to the purchaser's utility system via the existing transmission lines.

Roads. Construction of the proposed wind power plant will require some local

unimproved roads to be upgraded and the addition of new access roads will be routed along the wind turbine strings, fence lines, and field edges to minimize disturbance to agricultural activities. The roads will be installed on gentle slopes or flat areas to reduce their visibility. The typical access road will be approximately 16 feet in width and surfaced with a granular wearing course.

During operation and maintenance of the wind power plant, the access roads will be used by operation and maintenance crews while inspecting and servicing the wind turbines. The roads will be maintained by periodic grading.

Water Supply. Construction, operation and maintenance of the proposed wind power plant will not significantly impact the water supply of the area. The project will not require the appropriation of ground or surface water nor will any dewatering take place into ground water or surface waters. The installation or abandonment of any wells is not required for the project. However, in the event wells are abandoned, they will be sealed and capped as required by North Dakota Law and the North Dakota Department of Health.

Railroad. The Development will have no significant impact on the local rail system.

Telephone. Construction, operation, and maintenance of the proposed wind power plant will not impact the telephone service to the area. The collector and feeder lines will not share the same right of way as the existing telephone lines. Just Wind will be working with the local telephone company to install communication lines and telemeter lines for the Development.

Radio Towers. One radio tower might be in the Development area during Phase 2.

Impacts are not expected on the telecommunication or commercial radio activities by the operation of the wind power plant. (See EMF study results).

Television Reception. Operation of the wind power plant may or may not impact the quality of television reception in the area. Previous work on this subject indicates that in some cases new antenna or tuning of antennas has resolved the problem. Just Wind will attempt to work with the residents in the area of the Development site before and after the project is constructed to document and mitigate impacts that might occur.

Meteorological Towers. Some met towers will be installed throughout the Development site. That number is yet to be determined.

c. Mitigative Measures

Construction, operation, and maintenance of the proposed wind power plant will be in accordance with associated federal and state permits, as well as, Just Wind's construction and operations standards. Siting roads in area with unsuitable soil will be avoided whenever possible. Because the anticipated impacts on the existing infrastructure during construction, operation, and maintenance of the proposed wind power plant are minor, extensive mitigation measures will not be required for this plant.

5. Cultural/Archaeological

The cultural/archaeological review will be conducted jointly by the environmental study groups involved and the North Dakota State Historical Society.

6. Recreation Resources

Recreation resources were obtained from the North Dakota Parks and Recreation Services, the North Dakota Game and Fish Department, and the U. S. Fish and Wildlife Service.

a. Description of Resources

Recreational opportunities in Logan County include hunting, fishing, snowmobile, and campgrounds.

b. Impacts

Visual impacts will be the most evident in the Development site area as well as no hunting near the turbine locations.

7. Public Health and Safety

a. Air Traffic, Electromagnetic Fields, Security, and Traffic

Air Traffic. There is one local airport located just south of the Development site. The typical use of this airport is for crop dusting, approximately twice a year. However, the vast majority of the current land use is agricultural, which may require periodic overhead spraying of crop dusting. Crop dusting is typically carried out during the day by highly maneuverable airplanes or helicopters. The installation of the wind turbines in active cropland will create a potential for collisions with crop-dusting aircraft. Due to health, safety and insurance issues, no crop dusting will be allowed in the Development Site area. One farmer in the Development site did use a crop dusting service. He will try a ground spraying application this next growing season. Just Wind will install safety shields or another type of indicator to the wires of met towers to make the wires more visible.

The tallest structures of the proposed wind plant are the wind turbines. A three (3) bladed rotor with a diameter of 95 meters (266.76 feet) will be atop an 80 meter (262.46 feet) tower, resulting in a maximum overall height of 126.2 meters (329.19 feet). Since the highest point of the blade sweep exceeds 200 feet, notification must be made to the FAA and compliance with requirements imposed by the FAA must be followed on the wind power plant.

Electromagnetic Fields. Electromagnetic fields (EMF) are invisible lines of force that surround an electrical device and occur where an electrical conductor exists with an electrical current flowing through it. Examples of such conditions include high-voltage transmission lines, distribution (feeder) lines, substation transformers, house wiring, and electrical appliances. EMFs also occur in nature, in the form of the earth's direct current magnetic field and in electrical and magnetic fields generated during lightning storms.

Exposure to electric fields has not been proven to pose a long-term health threat. Concern has grown over the past 15 years about possible health effects resulting from exposure to magnetic fields. It is not known whether exposure to magnetic fields causes human injury or disease. The study of magnetic fields on the human body has not been demonstrated. To date, tests have shown inconsistent responses to different field of strengths. Many of the reports appearing in popular press linking magnetic field exposure to childhood cancer are based on the results of epidemiological studies. These studies have not been able to demonstrate a direct correlation between magnetic fields and human disease.

Consistently, expert review of panels commissioned by state, national, and foreign regulatory agencies have concluded that the existing body of research does not establish whether EMF poses significant health risks. They recommend more research to analyze issues raised by work done to date. Scientists continue to study magnetic fields and several nationwide research efforts are underway to investigate human exposure risks.

Regardless of the scientific community's determinations regarding EMF and possible health effects, or lack thereof, the typically low EMF field strengths of the 34.5kV distribution lines in the proposed project area indicates that these sources should not substantially increase public exposure to EMF, and no adverse impacts to health or safety are expected.

Security. The proposed Development site is located in an area which has a low population density. Construction, operation, and maintenance of the project(s) will have minimal impacts on the security and safety of the local population.

The following measures will be taken to reduce the risk of personal injury and property damage:

- Just Wind will attempt to locate the wind turbines 1,000 feet from occupied homesteads and from 250 feet from public or developed roads.
- Security measures will be taken during construction, operation, and maintenance of the project(s), including temporary and permanent fencing, warning signs, and locks on equipment and wind power plant facilities.
- Each turbine door will be clearly labeled alphanumerically to identify each unit and a map of the site with the labeling system will be provided to local authorities as part of the fire protection plan.

- In winter months ice may accumulate on the wind turbine blades when the turbines are stopped or operating very slowly. Furthermore, the anemometer may ice up at the same time, causing the turbine to shut down during any icing event. As weather conditions change, any ice will nominally drop off the blades in relatively small pieces before the turbines resume operation. This is due to flexing of the blades and the blades smooth surface. Although turbine icing is a very infrequent event, it remains important that the turbines are not sited in areas where regular human activity is expected below the turbines or in the immediate proximity during the winter months.

Traffic. The existing traffic levels for the State Highways and County Roads in the project area are relatively low. County and township roads are the least traveled. No significant permanent changes in traffic patterns or volume are expected.

During the construction phase, several types of light, medium, and heavy-duty vehicles will travel to and from the Development site, as well as private vehicles used by the construction personnel. Based on developed experience, the worst-case scenario would be an average of 25-30 trips per day. That volume would occur during the peak time when the majority of the foundation work and wind turbine assembly is taking place. At such time, the majority of the heavy equipment and construction personnel will be entering or leaving the site. Other phases of construction would require less equipment and fewer personnel.

The operations and maintenance phase of the project will require approximately 12-20 people to monitor and maintain the wind turbines. There would be a slight increase in traffic for occasional turbine repair.

The Development site is in an area of low population density; primarily a rural area with very little residential, commercial, or industrial development outside of the surrounding town boundaries. Wind tower technology has no air or water emissions. Impacts of the Development on public health and safety will be minimal.

c. Mitigative Measures

Airports are not located within the Development site; however, there is a local single directional runway system used primarily for crop dusting. Spraying and crop dusting of the agricultural fields is conducted in the area. Notification of construction and operation of the wind power plant to the FFA will be completed and compliance with FAA requirements will be followed by the wind power plant. The wind power plant should not substantially increase public exposure to EMF; there, no adverse impacts to health and safety are expected. Significant permanent changes in traffic patterns or volume are not expected.

8. Land-Based Economics

a. Agriculture/Farming

Approximately 92 percent of the land in Logan County is utilized for agricultural purposes. Crop rotation is used extensively throughout the area. Corn, sunflowers, alfalfa, small grains, and pasture are reflective of crops in the area. Feeding cattle, raising livestock, and dairy farming are also major sources of income in the proposed project area.

The land in Logan County is used mainly for growing crops with some areas used for grazing. Farming is the most important enterprise in the county. Corn, sunflowers, soybeans, alfalfa, clover, small grains and hay are the main crops. The main livestock is beef and some buffalo.

The Conservation Reserve Program (CRP) is another source of farm income. Cropland is

planted to conservation grasses and legumes to protect and improve the soil and can be harvested or pastured periodically. Within the Development site, the trend is toward fewer and larger farms.

b. Impacts

The proposed Development is compatible with existing land use plans. Approximately 64 acres of land in the Development site will be removed from its current use for the development, construction, operation and maintenance of the wind power plant. Agricultural activity and wildlife grazing is anticipated to occur between the wind turbines.

c. Mitigative Measures

The wind turbines and access roads will be located so that the most productive farmland (prime farmland) will be avoided as much as possible and they will not be located within sand/gravel pit operations.

9. Tourism and Community Benefits

a. Description of Resources

Logan County focuses on promoting the areas abundant game and wildlife, lakes and recreational areas.

b. Impacts

Wind development may become a significant tourism attraction, bringing more visitors to the community. Potentially, the community could benefit from revenues generated by tourism dollars for hotel rooms, restaurant, and other goods and services. Wind generation could become a new addition to the community's calendar of events. The Renewable Energy Center should be a great addition to this process.

10. Topography

See U. S. 7.5 Minute Topographic Map Quadrangles.

11. Soils (See Figure 1)

More Detail in Houston Engineering's Environmental Review.

12. Geologic and Groundwater Resources (See Figure 1)

More Detail in Houston Engineering's Environmental Review.

13. Surface Water and Floodplain Resources

See Houston Engineering's Environmental Review.

14. Wetlands

Delineated wetlands for the proposed Project site were identified from reviewing National Wetland Inventory (NWI) Maps developed by the United States Department of the Interior and Fish and Wildlife Service and depicted on U. S. 7.5 Minute Topographic Maps (Figure 1).

The major wetlands within the proposed project site mainly include: Paulstrine wetlands and small areas defined as a riverine wetland.

The Paulstrine System was developed to group the vegetated wetlands traditionally called such names as marsh, swamp, bog, fen, and prairie. It also includes the small, shallow, permanent or intermittent water bodies often called ponds. Paulstrine wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes. They may also occur as islands in lakes or rivers. The erosive forces of wind and water are of minor importance except during severe floods.

The Riverine System includes all wetlands and deepwater habitats contained within a channel, with two exceptions: wetlands dominated by trees, shrubs, persistent emergent, emergent mosses, or lichens and habitats with water containing ocean derived salts in excess of 0.5 percent. The Riverine System is bounded on the landward side by upland, by the channel bank, or by wetland dominated by trees, shrubs, persistent emergent, emergent mosses, or lichens. Water is usually, but not always flowing. Upland islands or Paulstrine wetlands may occur in the channel, but they are not included in the Riverine System. Paulstrine Moss-Lichen Wetlands, Emergent Wetlands, Scrub-Shrub Wetlands, and Forested Wetlands may occur adjacent to the Riverine System, often on a floodplain

Figure 1 lists the wetland types found within the Development site. The information was obtained from the North Dakota State Water Commission.

Another wetland type identified within the Development site is:

- U-Primary represents upland areas, but may include unclassified wetlands such as man-modified areas, non-photo-identifiable areas, and/or unintentional omissions.

b. Impacts

The wind turbines will be built to capture the wind resource and to avoid wetlands on the lower positions in the landscape. Access roads and ancillary wind power plant features will be designed to minimize impacts on the wetlands.

c. Mitigative Measures

Wetlands will be avoided during the construction phase of the wind power plant. A General Storm Water Construction Plan will be prepared by Houston Engineering and submitted for the Development. The General Construction Storm Water Plan requires that temporary and permanent erosion and sediment control plans be developed. The goal of the plan is to prevent erosion from occurring and to keep sediment on the site during construction. Erosion control measures will be installed prior to construction and maintained throughout the construction until areas disturbed have successfully re-vegetated.

If it appears that wetlands could become affected, Just Wind will follow the requirements of the applicable program and work with governing entities to reduce or eliminate wetland impact or if necessary, replace or substitute wetland values or resources where avoidance is not feasible.

Information on the existing vegetation in the proposed Development site will be obtained from Houston Engineering's Environmental Review.

The following sections do not include any discussion on vegetation species considered by the state to be threatened, endangered, or of special concern. Refer to Section 17 Rare and Unique Natural Resources for information on these resources.

a. Description of Resources

The pre-settlement vegetation within the Development site consists of medium and tall grass prairie with wet prairie covering a small proportion of the Development area. Agriculture is the primary land use in the Development site area and few remnants of pre-settlement vegetation remains.

Fire and drought were and still are the dominant causes of natural disturbance. Fires were common before settlement, re-energizing the prairie plant communities.

Farmland currently occupies a majority of the Development site. The land consists of pasture, and agricultural crop land.

b. Impacts

Construction of the proposed wind power plant will result in the permanent disturbance of approximately 64 acres. Some vegetation will be permanently removed and converted to the wind power plant. Some additional acreage will be temporarily disturbed during the construction and operation and maintenance of the wind power plant (contractor staging area, underground, power lines). The wind turbines require uninterrupted airflow, therefore, they will be constructed at a certain distance from buildings and tree groves to maximize wind turbine output and reduce any need for tree removal. Operation and maintenance of the wind power plant and its subsequent development, operation and maintenance:

- Conduct a pre-construction inventory of existing wildlife management areas, scientific and natural areas, recreation areas, wetlands, native prairie, and tree groves.
- Exclude established wildlife management, recreation and scientific natural areas from consideration for wind turbine locations, access roads, or electrical/transmission line placement.
- Avoid disturbance of individual wetlands during construction of the project.
- Protect existing trees and shrubs.
- Maintain sound water and soil conservation practices during construction and operation of the project to protect topsoil and adjacent resources and to minimize soil erosion. Practice may include containing excavated material, protecting exposed soil and stabilizing restored material.
- Re-vegetate non-cropland and range areas with wildlife conservation species and wherever possible, plant native tall grass prairie species in cooperation with landowners.

Information on the existing wildlife in the proposed Project site will be obtained from a variety of sources, including the North Dakota Game and Fish Department, the U. S. Fish and Wildlife Service and the Environmental Review developed by Houston Engineering.

The following sections do not include any discussion on wildlife species considered by the state to be threatened or endangered or of special concern. Refer to Section 17 Rare and Unique Natural Resources for information on these resources.

a. Description of Resources

Wildlife within the Project site consists of birds, mammals, herpetiles, and insects-both resident and migratory-which utilize the area habitat for forage, breeding, and/or shelter. The resident species are representative of North Dakota game and non game fauna which are associated with upland grass and farm lands with few wetland areas. The majority of the migratory wildlife species are birds including waterfowl and song birds. The principle migration routes for the large number of waterfowl which pass through North Dakota each year in the spring and fall, to and from northern breeding grounds, lie outside of the project area. However, some migrants do pass over the study area at elevations of 1,000 to 10,000 feet.

Resident Birds. Resident bird species are those that occupy the proposed Project site throughout the year. The resident bird species include the game birds, which form the most important economic component of this group.

Migratory Birds. Migratory bird species are those which may use the Development site for resting, foraging, or breeding activities for only a portion of the year.

Mammals. Mammal species that are expected to occur within the Development site.

These species use the food and cover available from agricultural fields, grasslands, farm woodlots, wetlands and wooded ravines. Agricultural crops provide seasonal food sources for the herbivores and omnivorous species.

Grassland areas and woody vegetation are also habitat for a variety of small mammals including mice, which serve as food base for larger carnivorous and omnivorous mammals and birds. Natural predator-prey relationships exist between some of the species.

White-tailed deer, an economically important species, have a strong affinity for agricultural crops and use farm woodlots, wooded ravines and intermittent stream bottoms for shelter. Winter yarding is reported in the prairie hills where wooded ravines are present.

Herpeiles. Reptile and amphibian species, which may use the grassland areas within the Project site.

It is unlikely that the water dependent species occur in the Project site because of the lack of significant amounts of water.

Insects. While many species are important to the indigenous vegetation and wildlife, honey bees are the only species economically important within the Development site.

Development of the wind power plant, including the construction and operation of the project, is expected to produce a minimal impact to wildlife. Based on studies of existing wind power projects in the United States and Europe, the greatest impact to wildlife would occur to migrant and resident avian populations. (Add more after Avian studies).

The impact of the proposed wind power plant on resident wildlife is expected to be minimal. The only measurable impact is a small percentage reduction in the available habitat, which the resident wildlife uses for forage or cover. Operation and maintenance of the wind power plant will not change the existing land use.

c. Mitigative Measures

The following measures will be used to help avoid or alleviate potential conflicts and impacts on the wildlife of the area during the final siting of the wind power plant and its subsequent development, operation, and maintenance:

- Conduct a pre-construction inventory of existing wildlife management areas, scientific and natural areas, recreation areas, wetlands, and native prairies.
- Exclude established wildlife management, recreation and scientific natural areas from consideration for wind turbine locations, access roads or electrical/transmission line placement.
- Avoid disturbance of individual wetlands or drainage systems during construction of the project.
- Protect existing trees and shrubs, which are important to the wildlife present in the area.
- Avoid construction activities within deer-wintering yards during winter.
- Maintain sound water and soil conservation practices during construction, operation, and maintenance of the wind power plant to protect topsoil and adjacent resources and to minimize soil erosion. Practices may include containing excavated material. Protecting exposed soil, and stabilizing restored material.
- Re-vegetate non-cropland and range areas with wildlife conservation species.

17. Rare and Unique Natural Resources

The Endangered Species Act of 1973, as amended, requires that a consultation pursuant to Section 7 be conducted to insure that a proposed project will not affect the continued existence of any endangered or threatened species or adversely affect their habitats, and that corrective action be taken if adverse impacts may occur. The North Dakota Game and Fish Department maintains a Comprehensive Wildlife Conservation Strategy a.k.a. Wildlife Action Plan, which is the most complete source of data on North Dakota's rare, endangered or otherwise significant plant and animal species, plant communities and other natural features.

a. Description of Resources

Houston Engineering's Environmental Review along with the results of the EIS will assess if any rare plant or animal species or other significant natural features are known to occur within an approximate one-mile radius of the Development site. Figure 1 shows some information.

A survey of rare features has not yet been completed for Logan County; therefore, there may be rare or otherwise significant natural features for which no records exist on the Development site.

b. Impacts

Construction of the proposed wind power plant(s), will result in the disturbance of approximately 64 acres for the Phase one (1) part of the Development. The vegetation (habitat) will be permanently removed and converted to access roads or wind turbines to support the proposed design for the wind power plant(s). Additional acres will be temporarily disturbed during construction of the wind power plant(s) (contractor staging areas and underground power lines).

The permanent removal of vegetation will result in less habitat available for breeding, forage, or nesting of state-listed butterfly species. These species are associated with the prairie. Habitat loss and degradation is a contributing factor to the decline of these butterflies as they are dependent on specific plant community types for survival.

Operation and Maintenance of the proposed wind power plant(s) will not affect the state-listed butterfly species. Wind Turbine blades operate at heights which are generally well above the normal flight patterns of the butterfly species listed by the state.

c. Mitigative Measures

The following measures will be used to avoid or alleviate potential conflicts on the state-listed butterfly, and plant species of the area during final siting of the wind power plant(s) and its subsequent development, operation, and maintenance:

- Conduct a pre-construction inventory of the Development site to assess the presence of state-listed species and sensitive habitats (wetlands and native prairie).
- Avoid placing wind turbines and wind power plant facilities in or disturbing those areas identified in the pre-construction survey, which contain state-listed species, wetlands, or native prairie.

18. Adverse Human and Environmental Effects Which Cannot be Avoided

Aesthetics. The wind turbine arrays will be prominent features in the landscape. By design, these structures are placed in open areas some in higher elevations. Some mitigative measures as described in Section 3, can be implemented to somewhat limit visual impacts. However, it is inevitable that the wind turbines will be noticed. The degree to which the visual impacts are considered adverse is subjective, and can be expected to vary depending on the viewer's perspective.

Commitment of Land. The proposed Development will be sited on land for which Just Wind currently has legal, valid, and binding contracts for wind energy rights. Approximately 824 acres will actually be impacted with turbines and related equipment, access roads, and maintenance facilities; which will include re-vegetation and site restoration. The existing use of this land can continue as agricultural or open fields. Some areas will be affected as the character of the land surface changes from vegetation of agricultural field to gravel roads, tower foundations, or maintained grassy areas.

Wind Turbine and Substation Noise. When in motion, the wind turbines emit a perceptible sound. The level of this noise varies with the speed of the wind turbine and the distance of the listener to the turbine. On relatively windy days, the turbines create more noise; however, the ambient, or natural, noise level simply from the wind tends to override the wind turbine noise as distance from the turbines increases. The noise generated by the wind turbines is less than 45 dBA at an average distance of 500 feet.

Avian Impacts. Occasional collisions of avian species with turbine blades occur at wind

power plants. The frequency of these collisions depends upon the spacing and number of turbines, as well as the size of the local and migrating avian species that frequent the project area. The wind turbines must be spaced far apart to avoid interference or wake effects. This design tends to lower the number of avian collisions. While a number of different species of birds use the project area for habitat, as described in Section 16, the Development site does not represent a significant habitat for raptors nor is it a significant migratory route.

G. IDENTIFICATION OF REQUIRED PERMITS/APPROVALS

Just Wind has identified the applicable regulatory approvals required for the construction and operation of the proposed wind power plant. Contacts have been established with appropriate federal, state and local agencies to discuss the applicable permitting requirements, and to learn of and mitigate any concerns by these agencies early in the development process. The following items summarize applicable permits & licenses for the wind power plant:

Public Service Commission

Site Permit

There are a number of primary regulatory approvals required for the construction and operation of the Project, by the Public Service Commission ("PSC").

Pursuant to the North Dakota Energy Conversion Facility Siting Overview, (N. D. C. C. Chapter 49-22 and North Dakota Administrative Code Article 69-06).

Jurisdictional Energy Conversion Facilities: (49-22-03(5)) Any plant, addition, or combination of plant and addition designed for or capable of:

- Generation of 100 MW or more of electricity

(N. D. C. C. Chapter 49-22 and North Dakota Administrative Code Article 69-06).

Jurisdictional Transmission Facilities: (49-22-03) Electric transmission lines and associated facilities with a design in excess of 115 kV, except for some temporary facilities as described in the statute.

Waiver of Procedures and Time Schedules: (49-22-07.2, 69-06-06).

Utility may make application for wavier of any procedures and time schedules, including the requirement for separate corridor and route applications. The Commission may grant the wavier after hearing and upon a finding that:

- A demonstrable emergency exists which requires immediate construction and that adherence to the procedures and time schedules would jeopardize the utility's system
- The proposed facility is of such length, design, location, or purpose that it will produce minimal adverse effects.

Ten Year Plan: (49-22-04, 69-06-02) Every utility that owns, operates, or plans within the next ten years to own, operate or start construction shall file a ten-year plan by July 1 of each year.

Logan County Building (Zoning) Permit




(As additional permits are required, they will be added to this section).

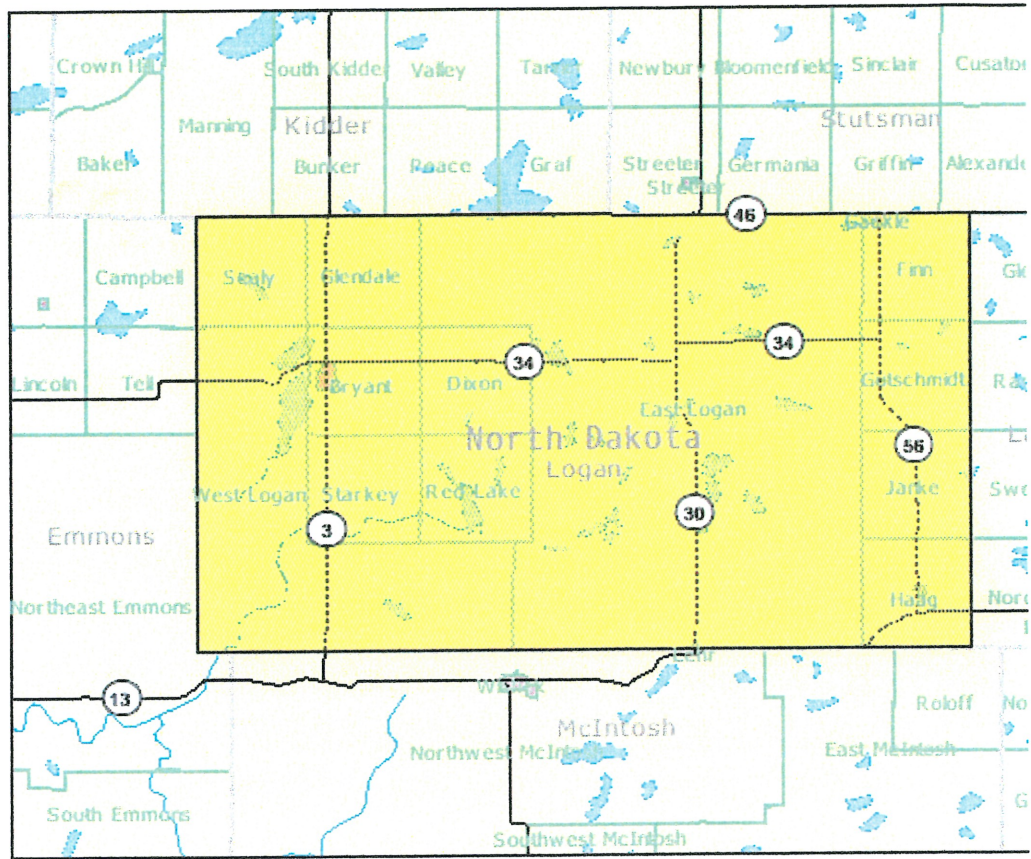
Logan County, North Dakota

Boundaries

-  State
-  '00 County
-  '00 Co Sub
-  '00 Subbarrio
-  '00 Place
-  '00 Place
-  '00 Con City
-  '00 Urban Area
-  '00 Urban Area

Features

-  Major Road
-  Stream/Waterbody
-  Stream/Waterbody



65 miles across

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112 N. Roberts St., Suite 300,
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 TEL 701.461.7222 : FAX 701.461.7223

1819 Bemidji Ave
 Bemidji, Minnesota 56601
 TEL 218.751.0151 : FAX 271.751.0170

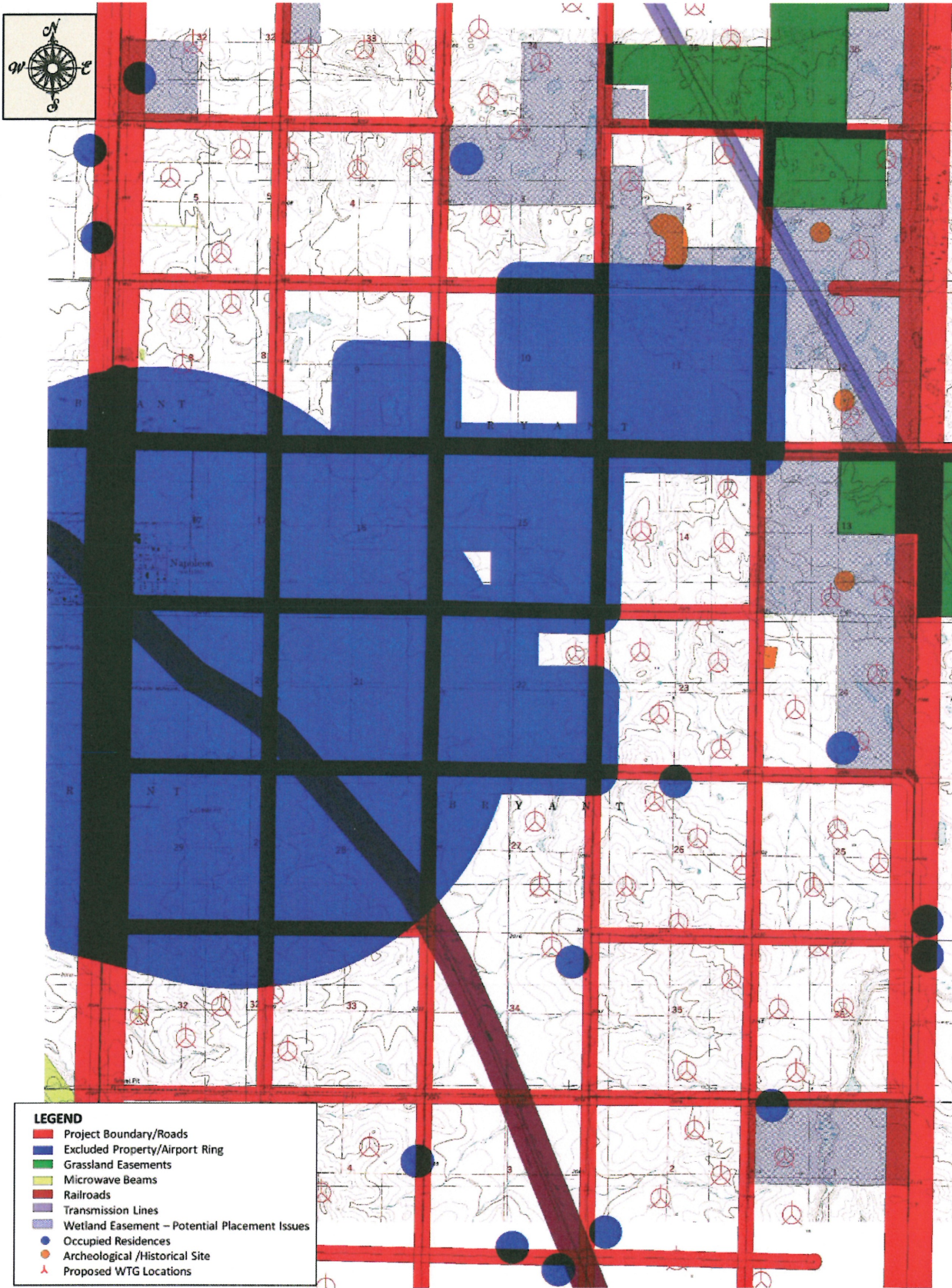
121 E. Broadway Ave.,
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E-MAIL: enr@eapc.net : WEB www.eapc.net

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MWT2.4-95-80-364.8MW
 Setbacks Included
 24K Topo

Client	Just Wind	
Project Description	Bryant Township	
CITY	Napoleon	
STATE	North Dakota	
Issue Dates	5/5/08	
MARK	DESCRIPTION	DATE
PROJECT NO: 20064000		
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LEGEND

	Project Boundary/Roads
	Excluded Property/Airport Ring
	Grassland Easements
	Microwave Beams
	Railroads
	Transmission Lines
	Wetland Easement – Potential Placement Issues
	Occupied Residences
	Archeological /Historical Site
	Proposed WTG Locations

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MW12.4-95-80-364.8MW
Setbacks Included
24K Topo

Client: Just Wind		
Project Description: Glendale Township		
CITY: Napoleon		
STATE: North Dakota		
Issue Dates		
MARK	DESCRIPTION	DATE
		5/5/08

PROJECT NO: 20064000

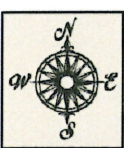
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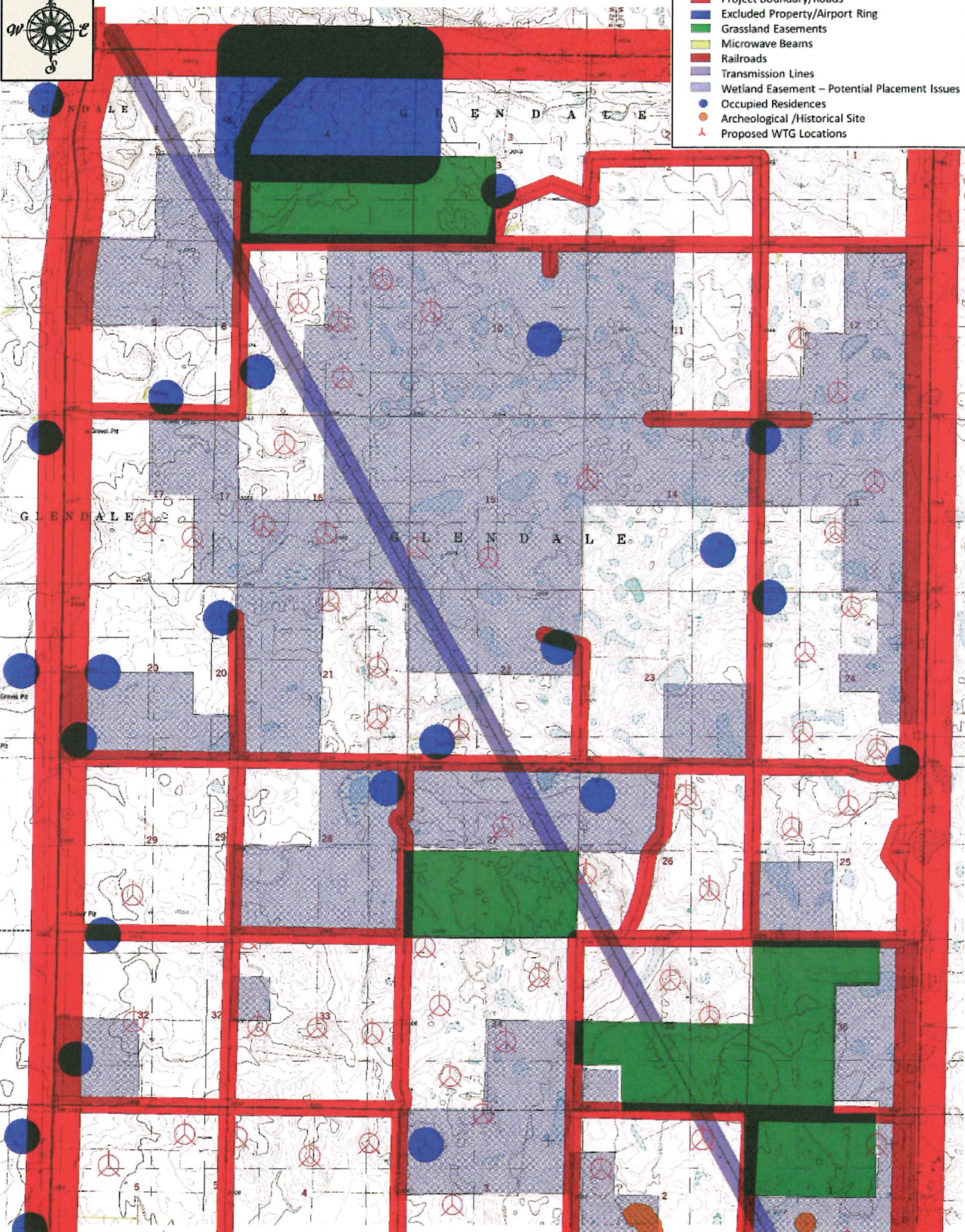
Drawing Title

MW12.4-95-80-364.8MW
24K Topo



LEGEND

- Project Boundary/Roads
- Excluded Property/Airport Ring
- Grassland Easements
- Microwave Beams
- Railroads
- Transmission Lines
- Wetland Easement - Potential Placement Issues
- Occupied Residences
- Archeological /Historical Site
- ⊗ Proposed WTG Locations



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MW12.4-95-80-364.8MW
Setbacks Included
24K Topo

Client: Just Wind

Project Description
Starkey Township

CITY Napoleon
STATE North Dakota

Issue Dates
5/5/08

MARK	DESCRIPTION	DATE

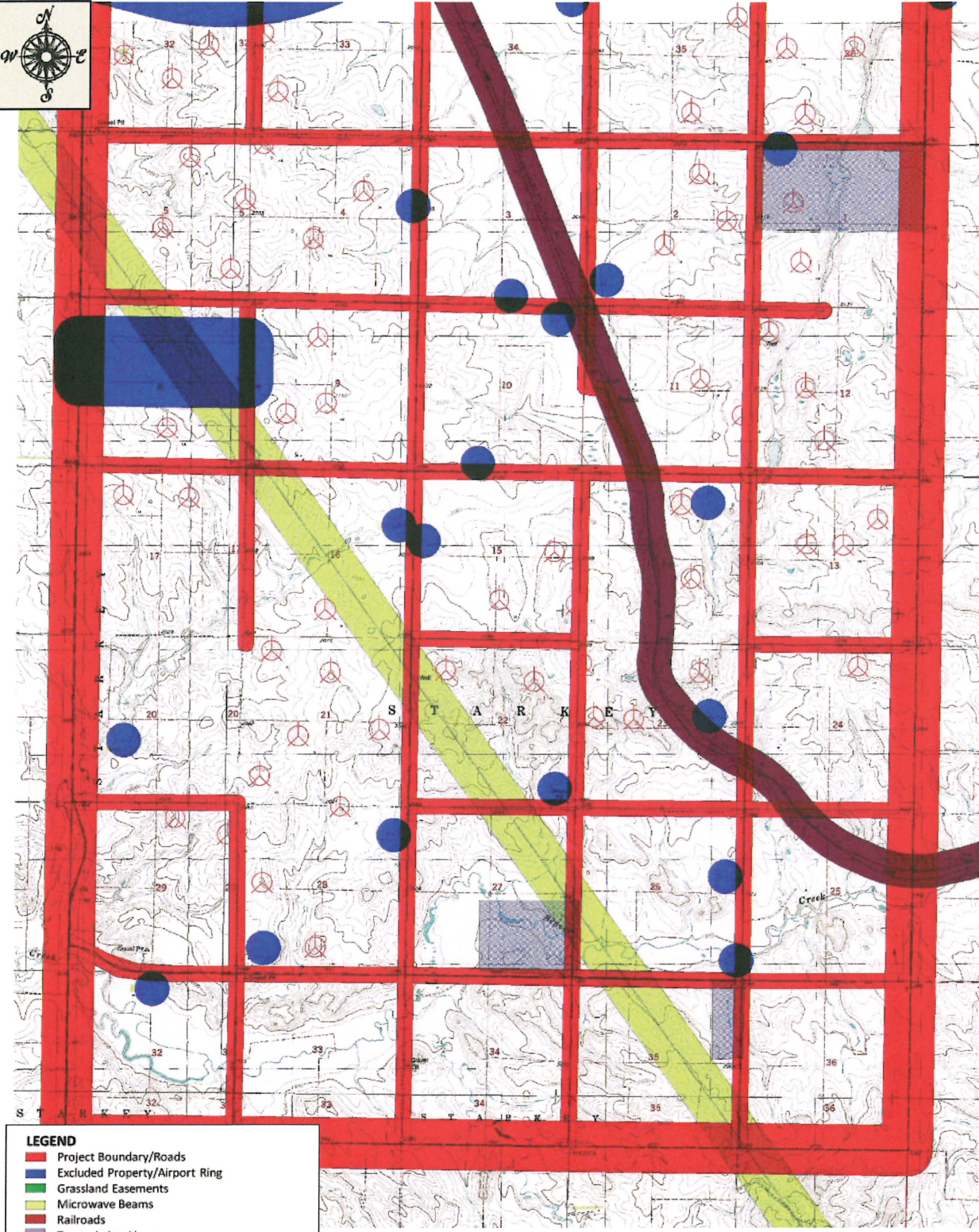
PROJECT NO: 20064000

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Drawing Title
MW12.4-95-80-364.8MW
24K Topo



- LEGEND**
- █ Project Boundary/Roads
 - █ Excluded Property/Airport Ring
 - █ Grassland Easements
 - █ Microwave Beams
 - █ Railroads
 - █ Transmission Lines
 - █ Wetland Easement – Potential Placement Issues
 - Occupied Residences
 - Archeological /Historical Site
 - ▲ Proposed WTG Locations

MapStats

Logan County, North Dakota

People MapStats	Logan County	North Dakota
? Population, 2006 estimate	1,999	635,867
? Population, percent change, April 1, 2000 to July 1, 2006	-13.4%	-1.0%
? Population, net change, April 1, 2000 to July 1, 2006	-309	-6,333
? Population, 2000	2,308	642,200
? Persons under 5 years old, 2006	81	39,556
? Persons under 5 years old, percent, 2006	4.1%	6.2%
? Persons under 18 years old, 2006	425	144,934
? Persons under 18 years old, percent, 2006	21.3%	22.8%
? Persons 65 years old and over, percent, 2006	28.7%	14.6%
? Persons 65 years old and over, 2006	574	92,874
? Female persons, percent, 2006	49.4%	49.8%
? White persons, 2006 (a)	1,981	584,116
? Black persons, 2006 (a)	2	5,262
? American Indian and Alaska Native persons, 2006 (a)	3	34,190
? Asian persons, 2006 (a)	6	4,743
? Native Hawaiian and Other Pacific Islander, 2006 (a)	0	297
? Persons reporting two or more races, 2006	7	7,259
? Persons of Hispanic or Latino origin, 2006 (b)	18	10,637
? White persons not Hispanic, 2006	1,963	574,818
? White persons, percent, 2006 (a)	99.1%	91.9%
? Black persons, percent, 2006 (a)	0.1%	0.8%
? American Indian and Alaska Native persons, percent, 2006 (a)	0.2%	5.4%
? Asian persons, percent, 2006 (a)	0.3%	0.7%
? Native Hawaiian and Other Pacific Islander, percent, 2006 (a)	0.0%	Z
? Persons reporting two or more races, percent, 2006	0.4%	1.1%
? Persons of Hispanic or Latino origin, percent, 2006 (b)	0.9%	1.7%
? White persons not Hispanic, percent, 2006	98.2%	90.4%
? Births, 2004	14	8,189
? Deaths, 2004	27	5,601
? Infant deaths, 2004	0	46
? Living in same house in 1995 and 2000, pct 5 yrs old & over	76.4%	56.8%

? Foreign born persons, percent, 2000	0.6%	1.9%
? Language other than English spoken at home, pct age 5+, 2000	25.5%	6.3%
? High school graduates, percent of persons age 25+, 2000	66.0%	83.9%
? Bachelor's degree or higher, pct of persons age 25+, 2000	12.9%	22.0%
? Persons with a disability, age 5+, 2000	492	97,817
? Mean travel time to work (minutes), workers age 16+, 2000	20.4	15.8
? Housing units, 2006	1,207	307,802
? Housing units, net change, April 1, 2000 to July 1, 2006	14	18,123
? Housing units percent change, April 1, 2000 to July 1, 2006	1.2%	6.3%
? Homeownership rate, 2000	85.8%	66.6%
? Median value of owner-occupied housing units, 2000	\$30,200	\$74,400
? Households, 2000	963	257,152
? Persons per household, 2000	2.32	2.41
? Median household income, 2004	\$31,379	\$39,233
? Persons below poverty, percent, 2004	10.4%	10.8%

Business MapStats

	Logan County	North Dakota
? Personal income, 2005 (\$million)	71	19,899
? Personal income per capita, 2005	\$34,404	\$31,357
? Civilian labor force, 2006	953	357,960
? Unemployment rate, 2006	3.1%	3.2%
? Full-time and part-time employment by place of work, 2005	1,529	472,729
? Full-time and part-time employment, net change 2000 to 2005	-73	25,349
? Employment in government, 2005	161	80,693
? Earnings, 2005 (\$1000)	45,132	16,282,202
? Average earnings per job, 2005	\$29,517	\$34,443
? Private nonfarm establishments, 2005	74	21,061 ¹
? Private nonfarm employment, 2005	387	270,479 ¹
? Private nonfarm employment, percent change 2000-2005	-9.8%	6.0% ¹
? Total number of firms, 2002	204	56,781
? Black-owned firms, percent, 2002	F	0.1%
? American Indian and Alaska Native owned firms, percent, 2002	F	1.5%
? Asian-owned firms, percent, 2002	F	0.5%
? Native Hawaiian and Other Pacific Islander owned firms, percent, 2002	F	0.0%
? Women-owned firms, percent, 2002	F	23.3%
? Hispanic-owned firms, percent, 2002	F	0.4%

Manufacturers shipments, 2002 (\$1000)	NA	6,856,653
Accommodation and foodservices sales, 2002 (\$1000)	1,010	854,656
Wholesale trade sales, 2002 (\$1000)	97,003	8,806,340
Retail sales, 2002 (\$1000)	14,403	7,723,945
Retail sales per capita, 2002	\$6,568	\$12,187
Building permits, 2006	0	3,529
Valuation of building permits, 2006 (\$1000)	0	462,339
Farm land, 2002 (acres)	577,823	39,294,879
Federal spending, 2004 (\$1000)	27,581	6,034,799 ¹
Federal spending per capita, 2004	\$13,140	\$9,513 ¹

Geography MapStats	Logan County	North Dakota
Land area, 2000 (square miles)	992.64	68,975.93
Persons per square mile, 2000	2.3	9.3
FIPS Code	047	38
Metropolitan or Micropolitan Statistical Area	None	

1: Includes data not distributed by county.

[Download the full data set](#)

(a) Includes persons reporting only one race.

(b) Hispanics may be of any race, so also are included in applicable race categories.

Figures are in absolute numbers unless otherwise indicated.

- FN: Footnote on this item for this area in place of data
- NA: Not available
- D: Suppressed to avoid disclosure of confidential information
- X: Not applicable
- S: Suppressed; does not meet publication standards
- Z: Value greater than zero but less than half unit of measure shown
- F: Fewer than 100 firms

Source: Bureau of Economic Analysis, Bureau of Labor Statistics, National Agricultural Statistics Service, National Center for Health Statistics, U.S. Census Bureau.

Last Revised: Monday, 14-Apr-2008 07:58:42 EDT

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Department of Energy
Western Area Power Administration
P.O. Box 281213
Lakewood, CO 80228-8213

NEWS FROM WESTERN AREA POWER ADMINISTRATION

CUSTOMERS OFFER ADDED POWER TO OFFSET DROUGHT IMPACT

LAKEWOOD, Colo.—While the drought continues to draw down hydropower resources in the West, Omaha Public Power District is stepping up by supplying Western an additional 50 megawatts to the grid for the next five years beginning October 1, 2008. Western also negotiated a short term contract for 25 MW from April 1, 2008 to September 30, 2008.

Western Area Power Administration, a Federal agency under the Department of Energy, received 15 proposals—including OPPD's—in response to a request for 200 megawatts of additional power to help offset the shortage of hydropower from dams on the Missouri River.

"Due to the extended drought, Western has been purchasing a considerable amount of power in order to meet its commitments to firm power customers," explained Jody Sundsted, Western's Upper Great Plains Power Marketing manager.

Additionally, Western selected two wind developer proposals for further negotiation, including:

- **Just Wind**—which plans to have its Napoleon, N.D., wind farm in service in 2009
- **Iberdrola Renewables (formerly PPM Energy)**—which plans to have a South Dakota wind farm in service by 2010 and a second one in service by 2010.

"The mid-term purchase of power from OPPD, and potential purchases from Just Wind and PPM Energy, will help mitigate the impact of purchase power costs on our firm power rate," said Sundsted. "The power purchased through this process makes economic sense for our ratepayers."

Both Just Wind's and PPM Energy's proposals include Renewable Energy Certificates—or "green tags"—the intangible environmental benefits associated with generating one megawatthour of electric energy by a renewable resource. Renewable energy producers can sell the credits, as well as the power itself, to offset the difference between the cost of the renewable power and power from fossil energy sources.

"We were pleased to receive competitive proposals from renewable energy developers as part of the process," said Sundsted.

Western Area Power Administration annually markets and transmits more than 10,000 megawatts of power from hydroelectric powerplants owned and operated by the Bureau of Reclamation and the U.S. Army Corps of Engineers in 15 western and central states. It is part of the Department of Energy.

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Serving the West with Federal hydropower



